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North Central Europe

North Central Europe is important to world energy markets because it is a significant producer and exporter of coal and an important transit point for Russian oil and natural gas pipelines

Note: Information contained in this report is the best available as of March 2002 and is subject to change.

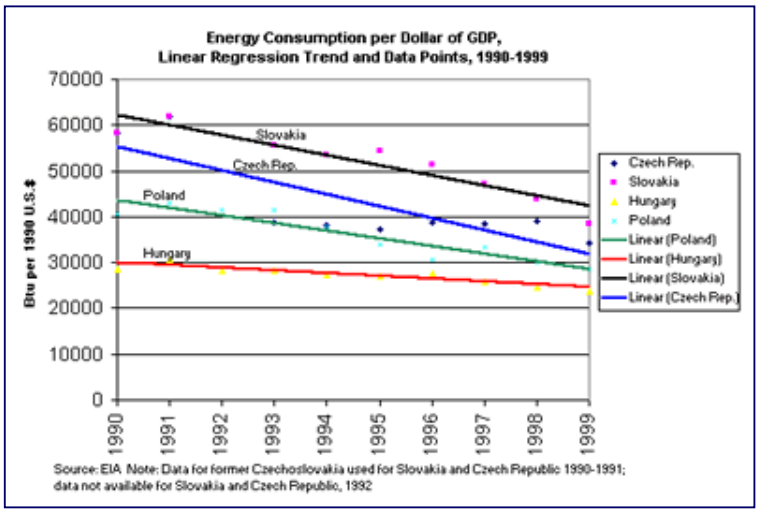
GENERAL BACKGROUND

Poland, the Czech Republic, the Slovak Republic (commonly referred to as Slovakia), and Hungary are all the members of the Visegrad Group and share certain common characteristics in addition to being geographical neighbors. The Czech Republic and Slovakia were the single country of Czechoslovakia formed from the former Austro-Hungarian Empire in 1918 (with an interruption during the Second World War) until Czechoslovakia's peaceful dissolution into the independent states of the Czech Republic and the Slovak Republic in 1993. Hence, the Visegrad group was known as the Visegrad Troika when it was formed February 15, 1991 in Visegrad, Hungary. Hungary, Poland, and Czechoslovakia had all been Communist states and members of the Warsaw Pact during the years following World War II until 1989-1990. All three states had developed heavy industry that was characterized by being very energy intensive and polluting. Poland is much larger than the other states of the Visegrad Group in area and population, having a greater population than the other three combined. Hungary's main ethnic group is not Slavic in origin, unlike the other two (now three) states. Hungary and Slovakia have large minority populations, with both having large populations of Roma, and Slovakia having a significant Hungarian minority. The issue of ethnic Hungarians living outside Hungary has become an important issue for the current Hungarian government, which passed a law granting economic, cultural, and educational benefits to ethnic Hungarians in neighboring countries. This has caused some friction with Slovakia, which sees the law as having an extraterritorial nature.

All four countries have successfully transitioned to democracy and have made great strides in moving to market-based economies. Slovakia was slower to change than the other three, especially in the area of democracy, and is unlikely to be among the first group of former Communist countries to enter the European Union (EU), although the country has made great strides of late. Poland remains a more rural society than the Czech Republic or Hungary. All four countries have applied for membership in the EU, with Poland, the Czech Republic, and Hungary probably acceding in 2004 or 2005. In 1999, Hungary, Poland, and the Czech Republic became the first former-Warsaw Pact countries to join the North Atlantic Treaty Organization (NATO). Slovakia is a member of

NATO's Euro-Atlantic Partnership Council. The Czech Republic became a member of the Organization for Economic Co-operation and Development in 1995, Hungary and Poland joined in 1996, and Slovakia in 2001. As members of the Visegrad Group, the four countries are also members of the Central European Free Trade Agreement (CEFTA). There is a customs union between the Czech and Slovak Republics, and most products have no tariffs or quotas for trade amongst the other countries, with the exception of agriculture. CEFTA was founded by the Visegrad Troika, but Slovenia, Romania, and Bulgaria have since joined.

The Visegrad countries are dependent on trade with the EU and in particular with Germany. Continuing economic challenges that these countries share include: technologically backward agricultural sectors that will find it difficult to compete internationally; industries that are still more energy intensive than their counterparts in western Europe (though energy intensity is on a declining trend as these economies become more similar to their western counterparts; see chart); costs from heavily-polluting industries and clean-up costs; the challenge of increasing standards of industries and services to the levels of the EU.



REGIONAL ENERGY ISSUES

Coal is the only fossil fuel of abundance in the region, and only Poland and the Czech Republic have substantial quantities of hard coal. Poland is the largest hard coal producer and exporter in absolute terms by far, though the Czech Republic exports over one-third of its production, whereas Poland only exports about one-fifth of its coal output. Of strategic importance is the fact that most of the crude oil and natural gas from Russia that is piped to western Europe passes through the Visegrad region, with the four countries only taking a small part of this for domestic consumption. Crude oil consumption in the region is small -- only about 56% of that of Spain alone. Not only is the region's total natural gas consumption (1.4 trillion cubic feet - Tcf) smaller than its neighbor Germany (over 3 Tcf), but Poland and Hungary each satisfied more than one third of their natural gas consumption from domestic sources in 2000. Preliminary estimates of imports of Russian natural gas into the region during January-November 2001 show Hungary importing 257.8 billion cubic feet (Bcf), the Czech Republic 243.7 Bcf, Poland 240.1 Bcf, and Slovakia about 236 Bcf.

The Czech Republic and Poland export coal to each other, and both countries have import quotas for the other. Unions in Poland have campaigned to have the quota for Czech imports lowered, whereas industries in the Czech Republic have campaigned to have the quota for Polish imports raised. Polish coal has become cheaper than Czech coal in the Czech Republic, but Polish unions claim that Czech coal is "dumped" in Poland. Neither government has changed its quotas so far.

Oil Transit

The northern branch of the 1-million-barrel-per-day capacity Druzhba ("Friendship") pipeline from Russia through Belarus brings oil to Poland which then can be transited onward to Germany. The 1.2-million-barrel-per-day capacity southern branch of the Druzhba pipeline runs from Russia through Ukraine into Slovakia. In August 2001, the Yuzhnyy-Brody pipeline was officially opened in Ukraine. This allows Caspian region oil that is piped to Black Sea ports to be shipped across the Black Sea to Yuzhnyy's Pivdenny terminal (near Odessa) and then transported in a new pipeline to Brody, where it connects with the southern Druzhba pipeline for shipment to Slovakia, Hungary, and onward. There is discussion of extending the Yuzhnyy-Brody pipeline north to Plotz in Poland where the pipeline could tie into the Druzhba northern route and/or an existing line to the Polish Baltic Sea

port of Gdansk and allow imports of Caspian crude oil to Poland, Germany, and other Baltic states. The southern Druzhba pipeline splits in Ukraine just before it reaches the borders of Slovakia and Hungary. Some of the oil imported into Hungary transits onward to the former Yugoslavia and the Croatian port of Omisalj on the Adriatic.

Natural Gas Transit

The region is extremely important as a transit center for Russian natural gas exports to western Europe. The Yamal pipeline from Russia will deliver about 1.1 Tcf per year into Poland by 2005 under current contracts. Most of this natural gas transits onward to Germany. Yamal is the only route that bypasses Ukraine. The Russians have considered adding additional routes that bypass Ukraine for their natural gas exports to Europe, partially because Russia has accused Ukraine of stealing natural gas transiting through the country and because of Ukraine's nearly $2 billion in debt to Russia for natural gas. The planned Yamal II pipeline would link Yamal with the Southern pipeline to make for an additional source for the pipelines in Slovakia that currently take natural gas transiting through Ukraine. Yamal II has not been formally approved yet and there are still disagreements about its route in Poland. Germany and Russia appear to favor a route that is more southerly, as that is where Germany has more natural gas demand, but Poland favors a more northerly route that could provide some natural gas to its industries as the pipeline passes through to Germany. A possible entirely new natural gas pipeline from Russia to Slovakia by way of Belarus and Poland appears to have been cancelled by Gazprom in February 2002. This pipeline differed from the planned Yamal II in that it would have had a new source pipeline in Russia, instead of just feeding off of existing Russian pipelines and would only have transited through the region to western Europe; it would not have provided natural gas to the intermediary countries. In March 2002, Poland's state auditor NIK urged the Polish government to renegotiate its long-term supply deal with Russia.

The Brotherhood (Druzhba), Progress, and Soyuz natural gas pipelines that go through Ukraine to Slovakia have annual capacities of about 1 Tcf each. There is still some excess capacity in the pipelines. From Slovakia, the natural gas transits to Austria and the Czech Republic. The natural gas that passes through Slovakia represents about 25% of the natural gas consumed in western Europe and about 70% of the Russian natural gas exported to western Europe. The Druzhba pipeline splits in the Ukraine, with one part going to Hungary. Hungary takes some of the natural gas, and the rest continues on to the Balkans. At a meeting of the Visegrad Group's Economic Forum in September 2001, the possibility of providing Polish natural gas imports from Norway and/or Denmark to Slovakia and/or Hungary was discussed, with favorable statements by leaders. The region's leaders worry about being too dependent on Russia.

Regional Integration

There have been attempts by various energy companies in the region to merge in order to compete with larger rivals from the west and from Russia. The two largest oil companies in the region, Nafta Polska's PKN Orlen of Poland and MOL of Hungary have been in so-far unsuccessful talks to sell a 17.58% share of PKN Orlen for some time. OMV of Austria has now been permitted to be involved in these talks by the new Polish government, which have been extended now to April 15, 2002. The result of such a sell-off likely would create a loosely-tied regional oil company. MOL did purchase a 36.2% share of Slovakian oil company Slovnaft in 2001, which is the only integration of the region's oil companies so far, though MOL in particular continues to look for ways to expand in the region.

The region shares the CENTREL electricity system, which links the Czech Republic, Slovakia and Hungary. In 1995, the CENTREL system was connected with Western Europe's system. Poland also has electricity connections with Ukraine and Belarus. Currently, both north-south and east-west connections are being expanded, as part of the EU's Trans-European Energy Network project, including a new link to Lithuania. The four countries of the region are also members of European electricity transmission system Union for the Coordination of Transmission of Electricity (UCTE). UCTE coordinates the interests of transmission system operators in 20 European countries.

There has been some interest in a regional energy exchange market, but rivalries over where it would be based as well as the regions's eventual integration into the EU that might make such a market superfluous have delayed this idea. Poland and the Czech Republic are developing electricity exchanges, while such exchanges are still in the planning stages in Hungary and Slovakia. Hungary imports a large amount of electricity from Slovakia, and is the region's only net power importer. Much of Poland and the Czech Republic's electricity exports go to western markets, Germany in particular.

POLAND

Poland was one of the first of the former Soviet satellite countries to hold free elections and to successfully introduce market reforms (1989). A new constitution was approved by a national referendum in May 1997. On September 23, 2001, Poland held legislative elections in which no party won an outright majority. In October 2001, a coalition government was formed by the Democratic Left Alliance (the former Communist Party) that won 41% of the popular vote, but was still 15 seats short of an absolute majority. After joining with the Polish Peasants Party in a coalition, Leszek Miller of the Democratic Left Alliance became prime minister on October 19, 2001. The new coalition has called for a relaxing of monetary policy by Poland's Central Bank in order to promote economic growth and to reduce the country's high (over 16%) unemployment rate. Poland's real GDP growth rate slowed from 4% in 2000 to 1.3% in 2001. It is estimated that Poland's high rate of foreign direct investment ($10.6 billion in 2000) fell considerably in 2001. The economic downturn has also reduced government revenue, to as little as 49% of the target for January-July 2001. The budget deficit was estimated by the previous government to be about $7 billion, or 4% of GDP, in July 2001. The current government has taken measures, including a new tax, to ensure that the budget deficit does not exceed $9.4 billion, especially in light of continuing low economic growth rates. Poland's inflation rate is at a recent historical low.

Poland is planning to enter the EU in the group's next expansion, and the country is in the midst of reforms necessary to meet membership criteria. Coal and steel industry restructuring is expected to be completed by the end of 2001, and the energy sector will be open to competition by about 2004. Many Polish farmers are opposed to joining the EU, as they believe it will entail agricultural reforms that will render them unable to compete with imports. Poland has a current account deficit and is working to make its exports more competitive. On balance, EU membership is expected to benefit Poland, decreasing trade barriers with key trade partners such as Germany and enhancing political stability. In turn, Poland is a key to EU expansion plans, as Poland is by far the largest country, in terms of both population and gross domestic product, among the twelve states that have begun discussion of accession to the EU.

Energy

In April 1997, the Polish government passed a new Energy Act, which required the Government Economic Committee to pass "Guidelines on Poland's Energy Policy Through 2020." The document spells out long-term energy forecasts and action plans for the Polish government. The key objectives include: increased security of energy supplies, (including diversification of sources); increased competitiveness for Polish energy sources in domestic and international markets; environmental protection; improving energy efficiency; and reducing energy-related carbon emissions. Coal is Poland's most important domestic energy source. While coal production is

declining and will continue to decline over the coming years, it will remain a key energy source. In 2001, the Supreme Board of Inspection (NIK) released a report stating that energy sector reform is moving too slowly. The report cited insufficient privatization in the oil sector, a halt in natural gas sector restructuring due to a dispute with the regulator, and problems with coal sector reforms. Poland will have to have a 90-day oil reserve by 2008 as part of its EU agreements.

Oil

With proven oil reserves of only 115 million barrels, Poland relied on imports for 97% of its 2001 oil consumption. Poland's oil demand is expected to increase by as much as 50% by 2020. Polish oil production increased from 10,000 barrels per day (bbl/d) in 2000 to 14,000 bbl/d in 2001, but this is still a small fraction of oil demand (434,000 bbl/d). Polish oil production comes primarily from fields in southern and western Poland, with the southern reserves nearly exhausted. However, the Barnówko - Mostno - Buszewo "BMB" field discovered in 1996 in the Polish part of the Permian Basin (near the German border directly east of Berlin) has potential reserves of about 73 million barrels and the Miedzychod field is estimated to have even more, so Poland should be able to increase its production as these fields come on line.

Poland's oil and gas industries were consolidated in 1981 into a single entity, the state-owned Polish Oil and Gas Company (PGNiG), which dominates the natural gas and upstream oil industries. In 1996, PGNiG became a joint-stock company. The company is slated for privatization after restructuring is completed, bringing the country into line with EU regulations. While a specific privatization plan remains forthcoming, major components of the company are expected to become independent from each other, rather than having a single holding company. There could be one upstream company; one company responsible for gas trade, transmission and storage; and four regional gas distribution companies. The upstream company and the four distribution companies would be privatized first, while the transmission and storage company could remain state-owned for longer.

Oil imports from Russia through the Druzhba ("Przyjazn" in Polish) pipeline traditionally have been the main Polish oil source. Following the breakup of the Soviet Bloc, Poland attempted to diversify its oil sources and to reduce its dependence on Russian oil. For this reason, the "Naftoport" oil terminal at Gdansk was constructed in the 1990s, with a capacity to receive about 600,000 bbl/d. However, Russian oil has remained relatively inexpensive, and economic factors have resulted in Poland actually increasing its imports of Russian oil. In addition, Poland imports oil from Russia's Kaliningrad enclave through the Naftoport.

Russian oil is not imported through direct agreements with Russian suppliers. Rather, there is a complex network of middlemen, the most important of which is the J&S Company of Cyprus. In 2000, 60% of the crude oil purchased by PKN Orlen and 70% of the oil purchased by Rafineria Gdansk (RG) was from J&S. It is estimated that J&S supplies between 60% and 70% of of all crude oil processed by Polish refineries. To the Russians, these middlemen are referred to as "operators" and because of a host of regulations, important documents, and licenses, the operators do all the paperwork and financial transfers. Some Polish politicians have questioned this system.

Poland and Ukraine reached an agreement in February 1999 to complete jointly an extension of the 500,000-bbl/d Odesa-Brody pipeline for Caspian Sea oil to go through Ukraine to Poland.

In July 2000, Germany-based EuroGas, Inc. won ten concessions to explore and develop oil and natural gas deposits in southeast Poland. The company believes that the area, the Karpaten Flysch oil province near the city of Sanok, potentially has a 350-million-barrel oil field, or an equivalent quantity of natural gas, which would represent one of the larger oil and gas discoveries in the region. In November 2000, EuroGas signed an agreement with PGNiG to jointly develop the area through EuroGas' subsidiary. As part of the agreement, PGNiG acquired 30% of EuroGas' Polish subsidiary, EuroGas Polska.

Downstream

Most of Poland's refineries, which were built in the 1960s and 1970s, need modernization in order to meet the current shift in demand towards lighter products such as gasoline and diesel fuel. Refinery capacity also will need to expand to meet growing oil demand. PKN Orlen's 260,000-bbl/d Plock refinery has had some improvements done and others are planned in its efforts to eventually conform to EU standards.

The state's oil companies are held through Nafta Polska, a state holding company and privatization vehicle. Nafta Polska's PKN Orlen controls about 60% of the wholesale and about 40% of the retail fuel markets. In September 2001, the sale of 75% of the 90,000-bbl/d Gdansk refinery to Rotch Energy of the United Kingdom was approved. Rotch paid about $250 million for its stake and agreed to invest $600-$700 million in expansion over the next few years to boost the refinery's capacity to about 150,000 bbl/d.

Gasoline and diesel demand has fallen slightly in recent months, due to higher prices and an economic slowdown. However, the demand for heating oil (which is sometimes used as a vehicle fuel) and liquefied petroleum gas (LPG) has risen sharply, and about 530,000 vehicles in Poland are capable of using LPG, with many vehicles being converted every year.

Natural Gas

Poland has an estimated 5.1 trillion cubic feet (Tcf) of natural gas reserves. The country imported over 65% of its 442-billion cubic feet (Bcf) consumption in 1999. Natural gas production remained fairly stable throughout the 1990s, hovering between 150 Bcf and 180 Bcf, and was about 183 Bcf in 2001. This rate of production is expected to continue into the 21st century, as new exploration takes the place of depleting reserves. FX Energy, a U.S.-based company active in Poland with a 49% stake in the Fences gasfield (51% is owned by PGNiG), began production at its Kleska well in March 2001 at an initial rate of 2 million cubic feet per day. PGNiG is planning to launch 200 new drilling sites in 2002 at a cost of Zl 700-800 million and invest Zl 600 million in domestic oil and natural gas exploration. The company also plans to liquidate 1,500 old and exploited drilling sites within the next five years.

The outlook for natural gas imports into Poland is problematic over the next few years. Despite the fact that Poland's real GDP has grown by about 21% since 1997, natural gas demand has remained flat and is predicted to remain so over the next decade. Even optimistic unofficial Polish government forecasts estimate demand in 2005 to be between 484 and 572 Bcf. Much of the reason for this is that natural gas is simply uneconomical for power generation in Poland compared with coal. Yet, at the same time, diversification of natural gas sources is a high priority for Poland, and those traders with diversified sources will have priority. Russia supplied over 60% of all Polish natural gas in 2000, with smaller amounts coming from or through Germany as well as over 30% from domestic sources. Poland and Russia disagree about the route of the proposed extension of the Yamal pipeline (Yamal II). Poland's contracts with Gazprom are for imports to increase to 441 Bcf per year by 2010. However, in January 2002, Polish Economy Minister Jacek Piechota stated that the contract with Russia as well as the specifics of the extension of the Yamal pipeline will have to be renegotiated.

PGNiG recently has reached agreements to import Danish and Norwegian natural gas. In July 2001, an agreement was signed with Dansk Olie og Naturgas (DONG) of Denmark to import 16 billion cubic meters (565 Bcf) over eight years, starting in 2003. This would be done through the planned $330-million, 186-mile BalticPipe pipeline, scheduled to be constructed beginning in the summer of 2002. The pipeline's capacity, 283 Bcf per year, is four times the volume that PGNiG will import from DONG annually, prompting some to question whether the pipeline will be financially viable. In September 2001, PGNiG and Norway's (now defunct) Gas Negotiating Committee (GFU) agreed to the delivery of 74 billion cubic meters (2.6 Tcf) over 16 years. This replaces the previous contract with Norway for 500 million cubic meters (18 Bcf) per year until 2006. These deliveries would not start until 2008, and would gradually increase over the first three years. Norwegian exports to Poland would require the

construction of the $1.1-billion, 683-mile Austerled pipeline. Given probable increasing domestic natural gas production and flat demand, it will be very difficult for Poland to maintain its Russian, Danish, and Norwegian contracts in their present state. The new government already has signaled that it will probably amend or even cancel some or all of these contracts.

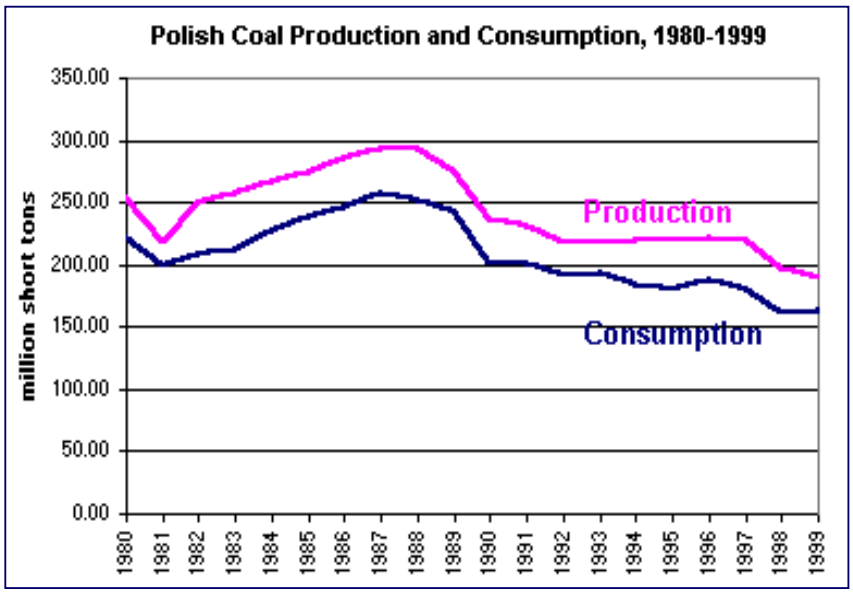
Poland needs to increase its environmental standards as part of its application to achieve member status in the EU. Increased consumption of natural gas, as an alternative to coal, is considered to be a key component of Poland's plan to meet the stricter regulations. The Polish government forecasts that about 14% of electricity will be generated from natural gas by 2020, up from just 2% in 2000, but still a relatively small share. Poland also will need to liberalize at least 28% of its natural gas market by August 2003, according to EU directives.

The Yamal pipeline connecting Poland to Siberian natural gas sources, began operations in September 1999. The $35-billion pipeline was designed to carry natural gas supplies from the Yamal (West Siberia) field in Russia to Germany and other Western European countries through Belarus and Poland. Under a 25-year contract signed in October 1996, annual throughput capacity of the pipeline is slated to increase to 32 billion cubic meters (about 1.1 Tcf) by 2005. The Polish section is operated by EuroPol Gaz and is 48% owned by PGNiG and Gazprom each, with the remaining 4% owned by a consortium of Polish firms called Gas Trading. Russia is seeking to link this new pipeline with the Southern pipeline, which would allow additional Russian gas to reach Western European markets while bypassing Ukraine (Yamal II). The exact route was discussed at senior-level Russo-Polish talks in January 2002, though no decision has been taken. Also in January 2002, Gazprom and PGNiG announced that feasibility tests will begin soon for the second stretch of the pipeline. Gazprom estimates that when all sections of the Yamal pipeline as well as two new compressor stations are complete, the total capacity will be 2.26 Tcf. Plans for an entirely new natural gas pipeline from Russia through Belarus and Poland to Slovakia appear to have been put aside indefinitely by Gazprom following friction between the Polish, Ukrainian, and Russian governments over the issue. There was some worry by Polish officials of damaging relations with Ukraine, because the diversion will cost Ukraine transit fees.

PGNiG is undertaking a program to add more than 6,200 miles to its gas distribution network by 2010. The company is also planning to invest $670 million over the next three years to upgrade its transmission system. PGNiG is appealing a ruling by the government gas regulatory agency that the company cannot raise its rates. PGNiG believes that raising rates for some customers is vital to its restructuring.

Coal

Although coal represents only 2% of Poland's total GDP, it is by far the dominant fuel in the country's economy, accounting for 95% of primary energy production in 2000. Polish coal, though of high quality, has various geological features that make it difficult to mine. Hard coal (mostly bituminous) provides about 65% of electricity generation, with brown coal (lignite) providing nearly all of the rest of the fuel consumed in Poland's power plants (many of which provide heat and hot water as well as electricity). Poland is the world's ninth-largest coal exporter, with coal going primarily to customers in Europe and the former Soviet Union. These exports historically have represented a major source of foreign exchange.



There are currently seven state-owned coal holding companies. They are: Bytomska Spolka Weglowa (six mines); Rudska Spolka Weglowa (4); Gliwicka Spolka Weglowa SA (5); Katowicki Holding Weglowy (9); Nadwislanska Spolka Weglowa (5); Rybnicka Spolka Weglowa (5); and Jastrzebska Spolka Weglowa (5), for a total of 39 operating mines. Weglokoks is the country's largest coal exporter. The company was created in 1993 as the successor to the state-owned coal monopoly; it is owned by the State Treasury. The other coal exporting company is Kopex, which may merge with Weglokoks in the future.

Coal Yards at Port of Gdansk

In May 1998, Poland announced a comprehensive restructuring program for its coal industry aimed at maximizing efficiency and paying off some of the industry's $4.5-billion debt. Before Poland's democratization, the industry had been heavily subsidized. In 2000, Poland closed 22 coal mines and partially closed seven others, with about 16,000 miners leaving the industry. This reduced production by about 10.3 million metric tons (11.4 million short tons), but the coal mining industry became profitable for the first time, and has continued to be profitable in 2001, though this has been attributed to a write-off of part of the industry's debt. Production rose very slightly, 0.5%, to 103.9 million metric tons (114.5 million short tons).

Privatization of Polish coal mines is just beginning, with the Bogdanka mine, one of Poland's most profitable, approved for a 45% sale to Management Bogdanka, a private company that is a consortium of investors. The fully private Jadwiga mine in Zabrze is expected to begin functioning February or March 2002. PricewaterhouseCoopers is advising the Ministry of the Economy on further privatization and restructuring, and three tentative plans have been drawn up that vary in the degree that the size of the sector that is maintained and the degree of subsidies and privatizations that would be put in place. A new plan proposed by the current government would create a new holding company called Polish Coal (PW) that would take over the shares of the seven state-owned companies and act as the manager until the coal sector is fully privatized. Another aim of this plan is to control the price of coal in Poland so as to avoid regional disparities that make imports cheaper in some parts of the country. It is estimated that various mining reform programs will cost $2.26 billion through 2006.

The changes brought about by the coal restructuring program have had some positive economic and environmental implications, which are important for Poland's accession to the EU. Despite this, Polish coal miners have been extremely resistant to the changes, and have held protests and strikes in opposition. The Polish coal industry is one of the country's most important employers and has a powerful union, so there are important political considerations to all reforms of the sector, as well as commensurate efforts to find employment for displaced miners.

Electricity

With installed electric capacity of over 30 million kilowatts in 1999, and electric generation of 134 billion kilowatt hours (bkwh), the Polish power generation sector is the largest in Central and Eastern Europe. As noted above, most of Poland's electricity comes from coal-fired plants, which are highly polluting and operate with outdated technology. The Polish government expects electricity demand to grow by over 50% by 2020. Poland produces more electricity than it consumes and exports the excess to neighboring countries. Polenergia, a new company, was established by Polish grid operator PSE, a German distributor, and a private Polish company, to sell privatized electricity, including electricity from Russia, to Western European markets.

Poland's electricity is produced by a combination of independent power producers that sell to the state-owned grid

operator PSE SA, as well as by PSE itself. There are 17 power plants and 19 power and heating (CHP) plants. PSE transfers power to 33 local distributors, of which the G8 Group is the largest. PSE is in the process of initiating an hourly balancing market for Poland. There has been some consolidation of producers, the most important of which is Poludniowy Koncern Energetyczny (PKE) with total capacity of 4,640 MW. It is expected that only consolidated producers will be able to compete with Western companies as the Polish market continues to open.

Poland's status as an EU applicant makes it more important that efficiency and environmental goals are met in a timely fashion. In November 1998, Poland ambitiously committed to adapting its electricity market regulations to EU standards within four years. Renovation of the sector is expected to cost about $15 billion by 2010. For these reasons, Poland's power generation is in need of investment. Multilateral lending institutions, most notably the World Bank and the European Bank for Reconstruction and Development, are involved heavily in financing and participating in projects ranging from building new, non-coal facilities to providing cleaner technologies for existing coal-fired plants.

Privatization is seen as the key to modernization and efficiency of the electricity sector. In September 1996, a law was passed that laid the foundation for de-monopolization and privatization of the industry. Plans called for reducing the number of generating companies from 35 to 7 and for privatizing power generation by the end of 2001. A law that took effect in December 1997 sets the groundwork for third-party access to the power grid and vests authority in an independent Energy Regulatory Office. However, the privatization has been delayed. According to the head of the Energy Regulatory Office, it will be two to four years until Poland's energy market is truly competitive. Outstanding long-term supply contracts between power generators and the national grid company, PSE, need to be resolved before market pricing can take effect. Currently, companies consuming more than 40 gigawatthours (GWh) of electricity annually can legally choose between suppliers, but this has yet to be fully implemented. Regulations are still seen as insufficiently defining PSE's position in the new system, such that as PSE continues to regulate itself, the opening up of the grid is restricted.

Electricite de France (EdF) is one of the larger investors in the Polish electricity sector thus far. It has a 57.9% share of the El. Krakow CHP plant and a 11.5% share of the ZEW Kogeneracja CHP plant. Working with Gaz de France, EdF in June 2000 won a tender to buy a 45% stake of the cogeneration company Zespol Electrocieplownia Wybrzeze (ZEcW), which serves Gdansk. EdF already owns a controlling stake in Elektrocieplownia Krakow, serving Krakow, and a smaller stake in a cogeneration group in Wroclaw. In November 2001, EdF's Zecw Group in Poland and Dalkia, a subsidiary of French multinational Vivendi, reached an agreement to purchase 45% of two thermal electric power plants at Torun. EdF is looking to invest in the distribution side as well. Sweden's Vattenfall has already invested in the distribution side, owning 32% of the large southern GZE distribution group as well as 55% of Warsaw's district heating plant in Siekierki. Vattenfall plans to gain majority shares as soon as possible. Belgium's Tractabel recently acquired a 25% stake in the Polaniec power plant, which is Poland's fourth-largest power generator. In August 2001, the Polish government granted Spanish utility Iberdrola the exclusive right to negotiate the acquisition of 25% of the G8 Group electricity distributor. In southern Poland, a new coal-fired plant is under construction by a subsidiary of U.S.-based PSEG. This will replace the Chorzow plant, now over 100 years old. American utility PSEG signed a deal to puchase 35% of the Skawina power plant for $24.8 million in January 2002. PSEG plans to invest $56 million in the plant, part of which will be used to make the plant compliant with stricter environmental regulations.

ENVIRONMENT

As the transition to democracy proceeds in Poland, environmental issues have become increasingly important. During the 1980s, Poland was one of the most polluted countries in Europe, and while democratic reforms have brought about reductions in the level of air pollution, there remains much room for improvement. In fact, as Poland negotiates with the European Union (EU) for membership, the EU has spotlighted Poland's environmental record, making the country's accession to the exclusive group contingent on improvements in Poland's

environmental record.

Similar to the pattern seen in other transition countries, Poland's energy consumption has decreased in the past 10 years as inefficient factories and industries were closed down. However, unlike the majority of the former Eastern Bloc, production has rebounded in Poland. Although the country's carbon emissions have dropped since 1989, Poland's dependence on coal, along with the explosion in private automobile use among Poles, correlates to high levels of energy and carbon intensity in Poland.

Poland's renewable energy sector is small, with only a few hydroelectric power plants. However, as Poland enters the 21st century, the country is beginning to shift away from non-ecological coal mining and related industries towards a more service-oriented, less pollution-intensive economy. In November 2001, Poland's Southern Energy Concern (PKE SA) announced plans to start up two 12-MW wind farms on the coast and in the southern mountains.

CZECH REPUBLIC

The Czech Republic saw its second straight year of positive economic growth in 2001 following three years of recession. The country's real gross domestic product (GDP), which had been in decline since 1997 following an economic boom during the mid-1990's, rose 2.9% in 2000 and 3.5% in 2001. Growth forecasts for 2002 have been cut back to 3.3% because of continued low demand for Czech exports in the European Union (EU) as growth there has remained slow. Trade with the EU represents about 69% of the Czech Republic's overall foreign trade. The Czech Republic is highly dependent on trade, with exports of goods and services being about 70% of GDP. Increasing exports are making a substantial contribution to growth, but imports have increased even faster, so that the current account deficit is estimated to have increased by $1.1 billion from 2000 to 2001. Foreign direct investment in the Czech Republic peaked in 1999 at $4.9 billion, and remained high in 2000 at $4.6 billion, but declined in 2001, with just $2.3 billion invested in the first three quarters of the year. The slowdown in exports has widened the current account deficit to about $2.9 billion, though there is a surplus in the capital account that makes this sustainable.

Since the end of the Communist era in 1989, when 100% of industries were state-owned, the Czech Republic has made great progress in privatization. It is estimated that only 10% of Czech industry was state-owned at the start of 2001. The government has plans for further privatizations in the chemical, energy and mining, telecommunications, and steel sectors. The structural reforms and economic rebound have strengthened the Czech Republic's fast-track status for membership in the EU, which is currently slated for 2003-2005.

The Czech Republic's unemployment figure, at about 8.5%, is about the European average, is expected to remain steady over the next two years. In late 2001, growth in industrial production began to slow in response to falling demand in key foreign markets, especially Germany, though domestic demand remains fairly strong. Czech inflation is low, falling to an annual rate of 4.1% in December 2001.

Following an October 1999 European Commission report which warned that the Czech Republic was lagging behind other so-called "firstwave" countries in the introduction of European Union (EU) laws and structural

reforms, the opposition Civic Democrats and the ruling Social Democrats (the country's two major parties) agreed to make approval of EU legislation a priority and to speed up the pace of reforms and the stalled privatization process. One issue to be dealt with for the Czech Republic's accession to the EU is the need for further restructuring of the country's energy sector and the end of energy subsidies. The energy chapter was included in the accession talks between the Czech Republic and the EU in November 1999, and while the Czech Republic applied for a phase-in period that would postpone full liberalization of its electricity market until 2005 and of its natural gas market until 2008, the EU called on the Czech Republic to look for ways of re-evaluating its application. In addition, it is estimated that achieving environmental compliance with EU standards by 2004 will cost about $15 billion. The Czech Republic became a member of the International Energy Agency (IEA) in 2001.

The decision in October 2000 by Czech authorities to activate the controversial, Soviet-era Temelin nuclear power plant in southern Bohemia led to a diplomatic confrontation with neighboring Austria, which argues that the plant is unsafe. A compromise was reached between Austria and the Czech Republic that allowed EU inspectors to assess the plant in December 2000, before it began operating commercially. In November 2001, the premiers of Austria and the Czech Republic came to an agreement to make certain bilateral duties in regards to the Temelin plant part of the Czech Republic's accession process to the EU in return for Austria not blocking the Czech Republic's accession. The other members of the EU must agree to this unusual step of having a protocol attached to the accession treaty. (See Electricity section for more on the Temelin plant.)

Oil

The Czech Republic has very limited oil reserves, and therefore relies almost exclusively on imported oil for its consumption need. Domestic oil production, which is extracted by the firm Moravske naftove doly (MND), reached 6,400 barrels per day (bbl/d) in 2001. In January 2002, Czech oil company Ceska Naftarska Spolecnost made a discovery at its Breclav block in southern Moravia, near the Vienna Basin. Oil is flowing from a test well, but estimates of production from the field are not set yet. Also in January, Australian-based Carpathian Resources discovered a natural flow of crude oil at its Postorna 1 Well in the Vienna Basin.

Czech oil consumption, which totaled 172,000 bbl/d in 2001, is projected to remain about the same in 2002. Oil imports are piped primarily from Russia, via the Druzhba pipeline, and Germany, via the Mero pipeline, which allows the land-locked Czech Republic to import crude oil from the Italian port of Trieste via the Trans-alpine pipeline network.

The Druzhba pipeline, with a capacity of 73 million barrels per year (200,000 bbl/d) to the Czech Republic, historically has been the source of the majority of the country's foreign oil. The completion of the Mero pipeline, which has the same capacity as the Druzhba, allows the Czech Republic to reduce its reliance on Russian oil. As the country continues to re-orient its economy to the West, imports of oil from Russia are declining while oil imports from the EU are rising. Overall, however, the Czech Republic's desire is to reducing its dependence on oil imports by reducing its consumption. High world oil prices in 2000 meant that the Czech Republic's increase in oil imports was slight in 2000, but imports may increase more in 2001 due to relatively lower world oil prices. In April 2001, the EU agreed to the Czech Republic's request to extend the transition period for building a 90-day state oil reserve until December 2005. Mero CR, which operates the Czech oil pipelines, is constructing three storage tanks, each with a capacity of 786,000 barrels, as part of the plan to raise reserves to comply with the EU directive. Completion is expected in 2004.

Refining

The Czech Republic has two major refineries, at Litvinov and Kralupy. The refineries, which have been privatized and are now owned and operated by Ceska Rafinerska, have a combined capacity of 178,000 bbl/d. These refineries supply slightly less than 50% of the gasoline and diesel market in the Czech Republic. Ceska Rafinerska is owned by holding company Unipetrol, which is 63% owned by the government. There are four companies that

are still competing for the 63% government share when full privatization occurs, which is expected sometime in 2002. Ceska Rafinerska began producing gasoline and diesel fuel from a new, czech koruna-8-billion cracking unit at Litvinov in April 2001. The added capacity will raise the production of light products, mainly petrols and diesel oil, while the production of heavier fuel oils, the demand for which is decreasing, will be reduced. Ceska Rafinerska sold about 1.1 million barrels of processed fuels to Poland in 2000, and plans to export about 1.9 million barrels in 2001. There also is a smaller refinery in Pardubice owned by Paramo, A.S. It has a capacity to refine about 20,000 bbl/d.

Natural Gas

As the Czech Republic strives to meet EU membership criteria, natural gas is becoming increasingly important to the country's energy mix. With the need to improve its environmental conditions, the Czech Republic is turning to cleaner-burning natural gas for its energy needs rather than coal. As a result, natural gas consumption has increased by 30% since 1993, from 259 billion cubic feet (Bcf) in 1993 to 337.3 Bcf in 1999. The Energy Regulation Office (ERU) has annouced that household natural gas prices will rise 5%-10% in January 2002.

The Czech Republic relies almost exclusively on imports for its natural gas consumption (approximately 98% of consumption). Most of the limited domestic gas production that does occur is carried out by a British company, Ramco Energy's Medusa Oil & Gas, near the Austrian border. MND also also extracts a small amount of natural gas. The the vast majority of gas consumed is imported from Russia. According to the Czech Statistical Office, in 1999 the Czech Republic imported approximately 78% of its natural gas from Gazexport, Russia's Gazprom subsidiary, with about 15% of its gas coming from Norway, 6% from Germany, and only about 1% from Slovakia. The percentage coming from Norway is expected to increase in the coming years, at the expense of Russian exports.

Transgas, the major gas utility in the Czech Republic, is responsible for purchasing natural gas for Czech consumption. Although the Czech natural gas industry was restructured in 1994, Transgas remained state-owned and operated until January 2002. On January 29, 2002, the National Property Fund of the Czech Republic and RWE Gas of Germany signed a contract for the sale of 97% of the shares of Transgas for koruna 117.3 billion. Transgas currently sells natural gas to eight regional gas distribution companies, the largest of which is Jihomoravska Plynarenska in southern Moravia. For an additional koruna 16 billion, RWE has acquired shares between 46% and 58% in these regional suppliers. The deal is contingent on final approval by the Czech and German anti-monopoly offices and the European Commission. RWE will become Europe's fifth-largest integrated natural gas company and the Czech Republic's largest foreign investor. Reforms have increased Transgas' profitability, from koruna 1.8 billion in 2000 to about koruna 3.8 billion in 2001. Transgas sold 346 Bcf of natural gas in 2001.

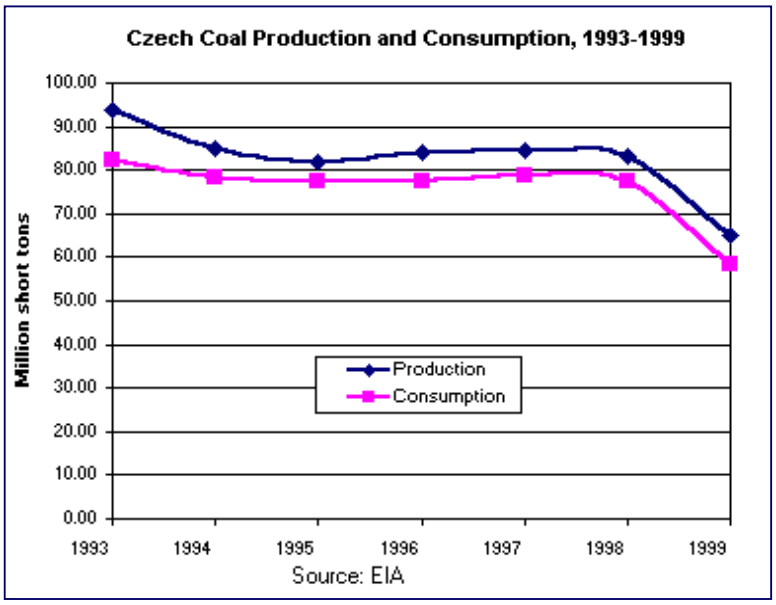
Pipelines

With nearly 32,000 miles of natural gas pipelines, the Czech Republic is a major transit center for Russian gas. Transgas is responsible for transporting Russian natural gas for export to Western Europe. Natural gas is piped to two points on the Czech-German border: Waidhaus, the main point, which delivers gas to Bavaria and points west and south; and Hora Svata Kateriny, on the border with eastern Germany, from which gas travels to Berlin and northern European destinations. The pipelines have been utilized at capacity levels since 1997.

At the beginning of November 1999, Transgas concluded with Gazexport a long-term contract for the transit of Russian natural gas across the territory of the Czech Republic until the year 2020. Until the year 2008, the contract guarantees the current volume of conveyed natural gas at the level of 28 billion cubic meters per year (91.9 Bcf). After 2009, however, the contract guarantees the conveyance of only 13 billion cubic meters (42.7 Bcf) annually. The reduction is connected with the start of the Yamal gas pipeline across Poland, which bypasses both the Czech Republic and Slovakia.

Coal

The Czech Republic's coal mining industry, which used to be one of the traditional pillars of the domestic economy, has experienced a thorough restructuring and paring down of activities over the past few years. The reasons behind this include a reduced demand for coal for electric power generation as the industry moves away from coal-fired power plants, the use of more environment-friendly fuels (such as natural gas) by domestic industry, and competition from cheaper imported coal. Coal mining production has fallen almost by half since 1989, and by 28.8 million short tons during the period 1993-1999. Coal's share of energy consumption has fallen to under 50% over the 1990s, to 43.9% in 1999.



A program for restructuring the Czech coal industry was approved by the government in December 1992. On the basis of this program, former state-owned coal mining companies were transformed into five large and two small commercial mining companies. In addition, the Czech government has reduced the number of inefficient mines in operation, cut the labor force associated with coal mining, and increased awareness of environmental issues related to the industry to bring the country in line with EU standards. The Czech Republic also has stated that it will accept the European Commission's decisions on coal prices in the common market.

As a result, the production of lower-quality brown coal, used mainly by power-producing and heavy industries, has been reduced significantly in the past ten years, especially the production of lignite. According to producer estimates, production of brown coal fell 12% in 2001 to 49.6 million short tons. The launching of operations at the Temelin nuclear power plant in southern Bohemia (see nuclear section, below), probably will cause brown coal mining to fall even more in 2002. Severocekse doly is the largest producer of brown coal, followed by Mostecka uhelna spolecnost and Sokolovska uhelna.

Black or hard coal, mined in particular by the Ostravsko-karvinske doly (OKD) company in northern Moravia, has also experienced a noteworthy decline, but the fall has been not as drastic, and furthermore, black coal continues to have better export markets. In 2000, OKD's production of black coal was 12.3 million short tons. In 1999, Severoceske doly Chomutov accounted for 46% of overall Czech mining production, followed by Mostecka uhelna spolecnost, with a 33% share, and Sokolovska uhelna with 21%. Of late, the domestic market for black coal has improved, and Czech industry, particularly steel, has demanded more than the import quota amount of coal from abroad.

The sharp reduction in coal mining over the last ten years has resulted in total employment in the four largest mining companies falling to less than 40,000. In comparison, OKD alone employed about 100,000 at the beginning of the 1990s. Further cuts in the mining workforce are expected.

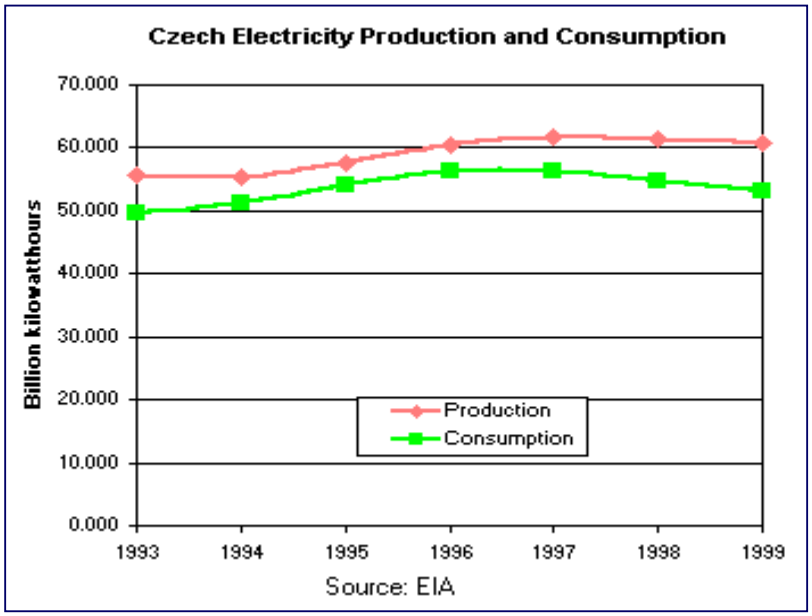
Czech coal consumption has fallen by 28% during the period 1993-1999, as the country switches to other fuels for electricity generation. Net exports of coal were 6.4 million short tons in 1999. Net exports have declined in the past few years, in part because of cheaper Polish coal exports in the region.

Electricity

Both electricity generation and consumption generally have been rising in the Czech Republic. From 1993 to

1999, electricity production in the country rose 9.2%, from 55.6 billion kilowatt-hours (Bkwh) to 60.7 Bkwh. During the same time period, electricity consumption increased 7%, from 49.6 Bkwh to 53.1 Bkwh. By November 2001, it was estimated that the country's consumption was 68.2 Bkwh on an annual basis, though the net figure (excluding consumption of power stations) was 63 Bkwh. The country is a net exporter of electricity, with the annual amount estimated at about 0.73 Bkwh.

Ceske Energeticke Zavody (CEZ) is the Czech Republic's dominant electric power utilities company. The company produces about 70% of the country's electricity, operating 28 power plants, of which 10 run on fossil fuels, 13 are hydroelectric plants, two are wind power stations, two are nuclear power plants, and one is a solar power station. CEZ owns 10,700 MW of generation capacity in the Czech Republic, as well as the national transmission grid, which CEZ operates under control of the company's recently established, wholly-owned subsidiary Ceska Prenosova (CEPS).



In an effort to liberalize its electricity sector to conform with EU standards, the Czech Republic has attempted to privatize CEZ. The privatization of the company, which is 67.6% owned by the state, is to be bundled with majority shares in six distribution companies and total control of the transmission grid company CEPS. In January 2002, the Czech government canceled a tender for the privatization of CEZ. The government stated that the bids submitted by Electricite de France (EdF) and a consortium of Enel and Iberdrola (of Italy and Spain, respectively) failed to meet the conditions of the tender. The companies wanted certain concessions regarding purchasing of brown coal and a state guarantee for the Temelin nuclear power plant, and there were also issues with the prices offered. Another concern for the government was its ability to handle such a large influx of foreign exchange at this time when the sale of Transgas would already bring in about $3.6 billion.

The largest heat and electric independent power producer (IPP) is Elektrany Opatovice a.s., and there are a number of smaller foreign and domestic IPPs operating in the Czech Republic. In order to enter the EU, the Czech Republic must open up 26.48% of its electricity market to competition. The Energy Act adopted in November 2000 opens up the market gradually from 2002 onward, such that 30% of the electricity market will be subject to competition by 2002, 50% by 2005, and 100% by 2006. Producers with over 10MW of installed capacity and consumers with annual consumption above 40 gigawatthours (about 60 large industrial firms) will be in a competitive market at some point this year. Additionally, subsidies for household electricity prices are to be eliminated by the year 2002, meaning that prices will rise over 10% in January, as announced by regulatory agency ERU recently. However, prices for transmission and distribution services will continue to be regulated by the state due to their monopoly character. Another objective is to increase the share of renewable resources in overall electricity consumption from the current 1.7% to 3%-6% by the year 2010.

Electricity export have become increasingly important for the Czech Republic over the past few years, peaking in the first six months of 2001, when the country exported 6.69 terawatt-hours of electricity. The majority of the electricity was imported by Germany. However, since then exports to Germany have fallen by over 30% as German utility E. On canceled its contract with CEZ on July 1, 2001, due to concerns about the Temelin nuclear power plant and pressure by environmentalists over cheap electricity from polluting power plants being "dumped" on the EU. However, E. On has signalled that it may again become a buyer of Czech electricity by purchasing

only non-nuclear-produced electricity. In November 2001, CEZ, along with coal producers Severoceske Doly, Mostecka Uhelna Spolecnost, and Sokolovska Uhelna, and trading company Carbounion Bohemia, formed a new company called Coal Energy that will be essentially a marketing company for CEZ's coal-produced electric power. Coal Energy is looking to expand electricity exports to Serbia, Romania, Slovenia, and other Balkan countries.

Nuclear

The Czech Republic has two operable nuclear power plants, at Dukovany and Temelin. Both are of Soviet design. The plant at Dukovany is equipped with four, 408-MW generators of the relatively new (1980s vintage) VVER-440-213 pressurized water reactor design. Dukovany provides approximately 20% of total Czech electricity output.

After years of delay, the controversial Temelin nuclear power plant, located just 30 miles from the Austrian border in southern Bohemia, was cleared for operations by the Nuclear Safety Authority on October 9, 2000. Although the plant is of Soviet design, Westinghouse was contracted to bring the plant up to Western safety standards during its construction. It consists of two VVER-981V320 generators, each with a capacity of 890-MW. The first reactor was connected to the national grid in December 2000, but was shut down in May 2001, because of circuit and turbine problems and remained closed to allow an EU inspection team time to assess the plant's safety. In August 2001, the EU inspection team found some minor flaws that could be remedied, but declared the plant safe. The first reactor was restarted, but shut down again within a week due to technical problems. Workers claim that the technical problems are not associated with the reactors, hence the plant is safe. The first reactor is currently undergoing tests and its trial operation is expected to be launched in spring 2002. The second reactor is expected to be launched in the beginning of 2003. When the plant is fully operative, it will provide over 20% of the Czech Republic's power needs.

Temelin has been controversial since construction first began in 1986. Opponents have argued that the plant is unnecessary, noting that the Czech Republic already produces more electricity than it consumes, and that additional electricity can be generated by improving the existing distribution network rather than installing new generating capacity. Critics have also accused CEZ of offering to supply energy to other countries at prices that are below production costs (dumping), a practice CEZ has publicly denied.

Although CEZ has stated that Temelin meets and even exceeds EU safety standards for nuclear power plants, Czech and Austrian environmentalists who oppose the project have accused CEZ of failing to conduct adequate safety checks. Ironically, one argument in favour of Temelin is an environmental one; specifically, that it will relieve the northern Czech Republic, whose aging coal-burning stations and extensive strip mines have turned the area into one of Europe's most polluted regions, of continued environmental degradation. The Czech government is eager to privatize Temelin when it sells its shares in CEZ.

SLOVAK REPUBLIC

Slovakia, unlike the country it was formerly joined with, the Czech Republic, has experienced significant political difficulties in its transition from a Communist state to a market economy seeking to join the European Union. The leader of Slovakia after its dissolution from the Czech Republic in 1993, Prime Minister Vladimir Meciar, was accused during his term of office of thwarting democratic principles and imposing a biased election law. However, the election of Mikulas Dzurinda as Prime Minister in 1998, and Rudolf Shuster as President in 1999 began an era of increasing democracy and integration with the rest of Europe and the possibility of EU and NATO membership. New parliamentary elections are set for the autumn of 2002.

The government began a structural reform program in 1999 that aims to privatize several state-owned companies, control the budget deficit, and reform the healthcare and social security pensions systems. The government has had some success, with budget deficits of 5% of GDP during the Meciar era reduced to 3.7% in 2001 and targeted for 3.5% or less in 2002. Proceeds from privatizations in the steel, energy, telecoms, and financial sectors have also helped reduce the deficit. After growth rates of 1.9% in 1999 and 2.2% in 2000, growth finally went above 3% in 2001 to 3.1%. Slovakia needs solid economic growth to reduce its high unemployment rate, one of the highest in Europe at about 17.5%, but as high as 40% in some areas of eastern Slovakia.

A possible drag on Slovakia's growth in 2002 is continued low growth in the EU, and particularly in Germany, Slovakia's most important trading partner. Trade accounts for about 76% of Slovakia's GDP, and Slovakia's trade deficit grew substantially in 2001, with exports declining 3.7% and imports rising 6.5%. Slovakia's trade deficit has been sustainable because of substantial inward investment flows, but it is unclear whether they will continue. Another drag on the economy has been the recent collapse of BMG Invest, an investment scheme that had 200,000 investors who will most likely not be compensated for their losses.

Slovakia closed the energy chapter of its EU accession talks in November 2001. The country agreed to close the two oldest of four blocks at the Jaslovske Bohunice nuclear power plant. The Economy Ministry sets energy policy.

Oil

Slovakia's oil production is the smallest of the four countries in the Visegrad Group, with production of only about 1,000 bbl/d in 2001. This is an increase over the previous year, with most of the gain coming from Nafta Gbely's Gajary Baden reserves in western Slovakia. Nafta Gbely is one of 18 members of the Nafta Group, Slovakia's oil and natural gas extraction company. Slovakia is a small oil consumer at about 72,000 bbl/d in 2001, and is nearly completely dependent on imports.

Slovakia imports its crude oil from Russia through the Druzhba (Friendship) and Adria oil pipelines. These pipelines have a capacity of about 422,000 bbl/d, but have not been used at full capacity. Transpetrol, the operator of the pipelines in Slovakia, transported about 187,000 bbl/d in 2000, of which about 106,000 bbl/d went to Slovnaft's refinery in Bratislava and the rest was shipped onward to the Czech Republic. Slovnaft is Slovakia's only refinery, and it has a capacity of 115,000 bbl/d. Slovnaft is 36.2% owned by MOL of Hungary.

In December 2001, the Slovak government approved the sale of a 49% stake with managing powers in Transpetrol to Russia's second-largest oil producer, Yukos. Yukos was chosen over domestic company Slovnaft. Yukos plans to use the pipelines' available capacity to supply more oil to western Europe, in particular to Germany through the

Druzhba and to Croatia's coast for shipment to Mediterranean countries through the Adria. The Adria pipeline connects to Croatia through Hungary.

Natural Gas

Slovakia, though a very small producer of natural gas, is very important as a transit country. It is estimated that about 25% of the natural gas consumed in western Europe transits through Slovakia. This represents about 70% of the Russian natural gas exported to western Europe. Slovakia produced only about 7 Bcf of natural gas in 1999. However, the country's per capita natural gas consumption was the highest amongst the Visegrad Group countries, as about 80% of Slovak households are connected to the natural gas network. Slovakia's state-owned natural gas monopoly, Slovensky Plynarensky Priemysel (SPP) plans to invest 1.643 billion crowns for additional gas mains in 2002 to connect additional households. In March 2001, a consortium of Gaz de France (GdF), Ruhrgas, and Gazprom submitted a 49% stake in SPP, which is being reviewed by the state's privatization committee. However, ruling Party of the Democratic Left leader Pavel Juncos has since declared that a 49% stake could not be sold for the $2.69 billion offered, but only a 34% stake. It is reported that the Slovak cabinet has agreed to the consortium's offer, but this has yet to be officially announced.

There are two major natural gas pipeline routes in Slovakia. Both receive natural gas from Russia via Ukraine; one transits onward to the Czech Republic and Germany, the other transits to Austria. The pipelines' Slovak sections are operated by SPP. The pipelines deliver about 3.18 Tcf per year to Western Europe. There are plans to build an extension of the Yamal II natural gas pipeline that would bypass Ukraine and instead transit Belarus and Poland to Slovakia. The planned 373-mile pipeline, 72 miles of which would pass through Slovakia, would have a capacity of 1.06 Tcf per year.

Slovakia's natural gas market is to be liberalized (i.e. customers will be able to choose their supplier) in stages, with liberalization beginning July 2002 for customers with an annual consumption of more than 882 million cubic feet (25 million cubic meters), in 2003 for customers with an annual consumption of more 530 million cubic feet (15 million cubic meters), and in 2008 for customers with an annual consumption of more than 177 million cubic feet (5 million cubic meters).

Coal

Slovakia's coal reserves and production are much smaller than that of the other members of the Visegrad group. Slovakia's coal reserves are estimated at just 190 million short tons, all of which is subbituminous and lignite. Most of the coal is used for electricity production. Production was about 2.5 million short tons in 1999. There are three coal mining companies in Slovakia, all of which are privately owned, and almost all the coal they produce is brown coal. The largest is Hornonitrianske bane Prievidza (HBP), with about 64% of all coal sales. Its main customer is Slovakian electricity company Slovenska Elektrarne (SE), however, HBP has plans to build its own coal-fired power station. The other two companies are Dul Dolina (also known as Bana Dolina) and Bana Zahorie.

Electricity

In 1999, Slovakia's installed electric power generating capacity was about 7.8 million kilowatts, about the same as that of Hungary, despite Slovakia having a smaller population. Slovakia's generating capacity is diversified, with coal, natural gas, hydro, and nuclear power plants each having less than a third of overall capacity in 1999. With two nuclear reactors coming on line in 1998 and 2000, Slovakia has become more reliant on nuclear generation and less reliant on coal and fuel oil (mazut) for electricity generation. Slovakia still has substantial unused hydroelectric potential. Slovakia generated about 22.6 Bkwh of electricity in 1999, and it is estimated that this total increased in 2000 and 2001. SE alone, which supplies about 85% of Slovakia's electricity, is estimated to have generated about 24.9 Bkwh in 2001. Slovakia was a small net electricity importer in 1999, but it is estimated to have become a net exporter in 2001, as preliminary estimates of electricity consumption in 2001 are about 26.9 Bkwh.

SE is Slovakia's dominant electric power company. It is state-owned, but it is likely to be partially privatized after undergoing organizational and financial restructuring. The government acknowledges that this restructuring will not be completed before the September 2002 elections. SE generates about 85% of Slovakia's electricity, operates the national transmission grid, and trades electricity. Distribution is carried out by three regional companies: Zapadoslovenske Energeticke Zavody (ZSE), Stredoslovenske Energeticke Zavody (SSE), and Vychodoslovenske Energeticke Zavody (VSE). The government has issued tenders for 49% stakes in these companies, and several foreign firms have expressed interest, including CEZ of the Czech Republic.

On January 1, 2002, consumers of more than 100 gigawatthours (Gwh) were supposed to have been allowed to choose their supplier. This covers about 19 large companies that rerpresent some 28% of the market. This liberalization was postponed by the Economy Ministry, however, because an independent electricity regulating agency has not yet been formed and the restructuring of SE is incomplete. Liberalization for customers using more than 40 Gwh is scheduled for 2003, and complete liberalization for 2007.

Nuclear

Slovakia has two nuclear power plants, which generated an estimated 59% of Slovakia's electricity in 2001. All of Slovakia's functioning reactors use the VVER-440 V213 Soviet design and are operated by SE. Slovakia's nuclear plants are regulated and monitored by the Slovak Nuclear Regulatory Authority (UJD). The Jaslovske Bohunice plant at Trnava has four, 408-MW reactors that are functioning, and one decommissioned reactor. The plant's two older reactors are due to be decommissioned in 2006 and 2008 as part of the energy chapter of Slovakia's acession agreement with the EU. An EU study in 1992 determined that the two older functioning reactors at the plant could not be modernized at a reasonable cost. The two newer reactors will require investment of 12.62 billion crowns by 2008 for their modernization, according the the Ministry of the Economy. The modernization is required by the UJD, the International Atomic Energy Agency (IEAA), and legislation. The Mochovce plant has two completed 412-MW reactors that went on line in 1998 and 2000 and two uncompleted reactors whose construction has been halted as government financial support for them has ended.

HUNGARY

Hungary transitioned from a Communist state to a democratic one without violence and held its first free, multi-party parliamentary election in 1990 after the former parliament and Communist Central Committee made a "democracy package" of key reforms in 1989. Hungary emerged from the Communist era with one of the most advanced economies of region, but still not nearly as developed as its neighbor and former partner in the Austro-Hungarian Empire, Austria. Hungary also had significant foreign debt. The first post-Communist government encountered problems in the transition to a market-based economy, with real GDP falling about 18% from 1990-1993. Industrial output also shrank, and the foreign debt, current account deficit, and budget deficit rose to high levels. The new government of 1995 instituted an austerity and privatization program as well as a new export-promoting foreign exchange regime to reduce the debt and deficit levels. By 1997, the country's finances were solid and Hungary no longer requires any assistance from the International Monetary Fund (IMF), and has repaid all of its debt to the Fund.

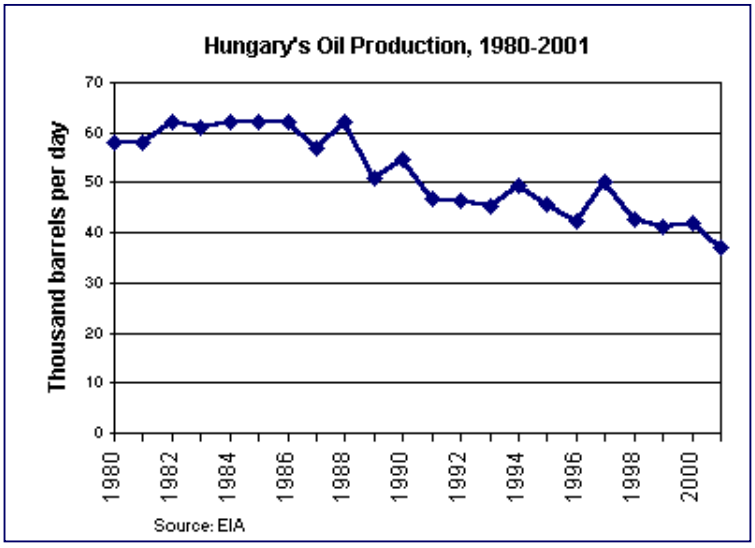
The Federation of Young Democrats (renamed Fidesz-Hungarian Civic Party (MPP) in 1995) captured a plurality of parliamentary seats in the May 1998 elections and forged a coalition with the Smallholders and the Democratic Forum. The head of Fidesz, Viktor Orban, became Prime Minister. The current government is more nationalistic

than the previous ones, and has championed the rights of Hungarian minorities living in surrounding countries. The government has also slowed the pace of liberalization in some sectors and has favored more state intervention than the previous government. A parliamentary election is scheduled for spring 2002. Hungary entered NATO in 1999 and has applied to become a member of the EU in 2004 or 2005. Hungary became a member of the International Energy Agency (IEA) in 1997

Hungary had strong economic growth of 5.2% in 2000 and this continued into 2001, with a growth rate of 3.8%, despite the global economic slowdown, especially in major trading partners Germany, Italy, and Austria. Hungary has had the strongest economy in the Visegrad group over the past three years. Hungary is dependent on exports for economic growth, and a 13% expansion in exports (especially services) in 2001 was a prime factor driving Hungary's growth and the reduction of Hungary's current account deficit to about 2.1% of GDP. Inflation began to fall in late 2001, and is predicted to be about 6.5% in 2002, the lowest level since Hungary became a market economy. The lower inflation has made it possible for the central bank to cut interest rates 50 basis points in January 2002.

Oil

Hungary is the largest producer of crude oil among the Visegrad Group by far, though still a small producer by international standards. Crude oil production rose very slightly in 2001 to about 27,000 bbl/d, but production of natural gas liquids fell by about 5,000 bbl/d. Hungary's oil production had been declining steadily since its peak in the mid-to-late 1980s of 62,000 bbl/d. Nearly half of Hungary's crude oil comes from the Algyo field in the south central part of the country, and the remainder is produced from numerous fields with production of less than 2,000 bbl/d. Oil reserves are about 110 million barrels. Hungary's oil and natural gas company MOL has undertaken increased domestic exploration, and the company estimates that only 60% of the country has been thoroughly explored.



Hungary consumed about 146,000 bbl/d of oil in 2001, so the country is reliant on imports, mostly from Russia. Consumption has declined steadily from a peak of 244,000 bbl/d in 1980. Russian oil is imported through part of the Druzhba pipeline. A smaller amount of oil is also imported from the Middle East.

Hungarian Oil and Gas Company (MOL) is Hungary's largest company in terms of net revenue, and is dominant in the upstream and downstream oil sectors. The company is responsible for almost all of Hungary's natural gas and oil exploration and production, transmission, stockpiling and wholesale trade. It has an 82% share of the wholesale oil market and a 42% share of the retail market. It was partially privatized through stock market flotations 1994-1998. The state retains a 25% "golden" share. In 2001 MOL merged its domestic and international upstream activities into one unit and decided to cease all oil exploration abroad with the exception of Yemen. MOL will, however, continue to acquire areas abroad where oil has already been discovered. MOL has attempted to purchase downstream assets in other central European countries, but its only successful purchase so far is a share of Slovakian refiner and retailer Slovnaft. In November 2001, MOL sold its 51% stake in oil storage firm Koolajtarolo to the Crude Oil and Oil Product Storage Association (KKKSz) for 6 billion forints.

In 2001, MOL shut down the crude processing facilities at its 60,000-bbl/d Tiszaujvaros and 10,000-bbl/d Zalaegerszeg refineries as part of a cost-cutting move. The Zalaegerszeg refinery will operate as an asphalt plant and the Tiszaujvaros refinery will still be used for a small amount of other processing, but the only remaining

crude oil refinery in Hungary is MOL's 161,000-bbl/d Szazhalombatta refinery. Retail oil products prices and trade were liberalized in the early 1990s.

Natural Gas

Hungary produced about 121 Bcf of natural gas in 2000. Hungarian natural gas production has been declining steadily for many years, though domestic production still accounts for a significant share of consumption. Consumption fell slightly, to an estimated 411 Bcf in 2000 from 437 Bcf in 1999, as both domestic production and imports declined. About 80% of Hungary's natural gas imports are from Russia through part of the Druzhba pipeline. Some Russia gas transits onward to the former Yugoslavia through Hungary. The Gyor-Baumgarten natural gas pipeline connects Hungary to Austria and western Europe's natural gas grid. This enables Hungary to import natural gas from GdF and Ruhrgas. Natural gas demand is expected to increase by about 20% by the end of the decade, so Hungary's natural gas imports will increase significantly in light of declining domestic production.

MOL is Hungary's only natural gas producer and importer and operates the natural gas pipelines. Natural gas distribution is the responsibility of regional companies. In addition to natural gas' use for electricity generation and industry (60% of total use), about 60% of Hungarian households are supplied with natural gas (40% of total use). Natural gas represented about 41% of energy consumption in Hungary in 1999.

MOL has been losing money for several years now, at a current rate of over $1 million per day, or about 118 billion forints in 2001. This results mainly from government price caps, which force MOL to sell imported natural gas at a loss. In September 2001, MOL lost a lawsuit against the government in the Constitutional Court. MOL charged that the government was violating laws on natural gas pricing in forcing the company keep natural gas price increases below levels necessary to recover costs. Because of this, MOL has attempted to sell off at least part of its natural gas division. However, the government is not eager to lose control of Hungary's natural gas assets. Hence, despite the interest of several foreign companies, including a local subsidiary of GdF and Ruhrgas, the state-owned Hungarian Development Bank is in exclusive talks to acquire 100% of MOL's natural gas division, effectively re-nationalizing the company and a step backward from the liberalization occurring in the region. Prime Minister Orban has stated that he wants price controls for natural gas to remain in place for up to eight more years.

Coal

Hungary is a much smaller coal producer than Poland or the Czech Republic, and about 95% of the coal produced is brown coal (including lignite). Nevertheless, coal is an important part of Hungary's energy mix, accounting for 14.6% of energy consumption in 1999 and about 25% of electric power generation. Coal's share is declining, however, and is expected to continue to do so in the next ten years. Hungary produced about 15.6 million short tons of coal in 2000. This is down sharply from about 22.4 million tons produced in 1989, at the end of the Communist era. This reflects a decline in certain energy-intensive heavy industries as well as closures of unprofitable mines that occurred in 1990s as the industry privatized. In addition, domestic lignite with high sulphur content has caused air pollution, and a new coal-fired power plant being built will use imported Russian coal. However, Hungary's lignite (about 85% of reserves) is inexpensive to produce through open-pit mines in the Matra and Bukk mountains, so there will continue to be a demand for it at older electricity generating plants. Hungary's coal consumption in 2000 was about 16.1 million short tons, down sharply from 25.3 million short tons in 1989.

Electricity

Hungary's electricity sector, like others in the region, is undergoing a process of liberalization and restructuring. Most of the sources of Hungary's capacity and generation are thermal, though Hungary's 4-unit nuclear plant at Paks generates slightly less than 40% of total electricity generated. Hydropower generates less than 1% of Hungary's electricity. It is estimated that Hungary generated about 34.9 Bkwh in 1999 and consumed about 33.5

Bkwh in 1999. Consumption peaked at 37 Bkwh in 1989, but declined in the early 1990s as Hungary's post-Communist economy grew less energy-intensive. Electricity consumption has since increased, but at less than the rate of economic growth. The Hungarian government predicts that electricity consumption will grow an average of 1.45% per year this decade, assuming 5% economic growth. According to the Hungarian government, power generating capacity currently exceeds consumption by about 30%. Nevertheless, Hungary is a net importer of electricity, mostly from Slovakia. Preliminary estimates of 2000 production show it declining, but 2000 consumption was steady, so electricity imports rose in 2000. The electricity sector accounts for about 4% of Hungary's GDP.

For years, the state-owned Hungarian Electricity Works (Magyar Villamos Muvek - MVM) generated most of Hungary's electricity, was the sole importer/exporter, and owned and operated the national electricity grid through subsidiary Mavir. This has changed, however, as Hungary's eight generation companies were unbundled from MVM over the past few years, and Mavir was acquired by the Ministry of Economic Affairs in February 2002, with the state privatization agency APV exercising ownership rights. In return, MVM is to be compensated financially by the government and by APV handing over stakes in a number of power plants to MVM. However, this may be problematic as liberalization proceeds, as no generator will be able to hold more than 30% of total market capacity. MVM already owns the Paks nuclear power plant and the Vertes power company, which are already about 30% of capacity. The eight generating companies (seven thermal and one hydroelectric) have been partially or fully privatized, but hydroelectric power company Tiszaviz Kft will likely be returned to full ownership by MVM as part of the compensation for Mavir by APV. Tiszaviz's two hydroelectric plants are slated to be modernized later this decade. There are also independent power producers (IPPs) in Hungary, which sell their power to distributors under long-term power agreements.

MVM/Mavir has made and continues to make improvements to Hungary's electricity network. In November 2001, MVM completed a 17 billion forint, network control system that connects the system to 166 other power plants and distributors and prepares the Hungarian power industry for the planned market opening in 2003. In September, MVM announced that it plans to restart investment projects on the national grid, including an expansion of the Sandofalva-Bekescsaba powerline for 18 billion forints and an expansion of the line between the southern city of Pecs and the nuclear power plant at Paks. In May 2001, MVM (represented by Mavir) became a member of European electricity transmission system Union for the Coordination of Transmission of Electricity (UCTE) as the result of a 12-year process. Hungary's power and transmission system operates in accordance with the systems of most other European countries, providing increased security of supply according to MVM.

Hungary has passed electric power liberalization legislation set to go into effect beginning in January 2003. It will begin with large consumers (about 200-300 large industrial users with annual consumption above 6.5 Gwh) that represent about 35% of the market. The legislation still requires lower-level regulations that will specify how much electricity these large users can purchase on the open market or from abroad. These regulations will also need to specify how so-called "frozen" costs will be distributed. These are additional costs that arise from the fact that consumers in a free market are unlikely to buy all the power that wholesaler MVM has already purchased through long-term contracts and will have to be reimbursed. Additional liberalization will be phased in gradually, but must conform with EU regulations by the time that Hungary accedes, as the country has not requested any special exemptions. New power stations were permitted to be built without long-term purchase contracts as of February 2002. Many analysts are skeptical of Hungary's liberalization plans, because Hungary's electricity producers have higher costs than outside European sources, but are protected by long-term contracts with MVM. It is unlikely that the government would simply allow many power plants to go out of business when exposed to competition. Another problem is that MVM is selling below cost to distributors because of price caps, and then being compensated by the government for losses. Currently, the government is considering allowing the large consumers to purchase no more than 50% of their electricity on the open market in 2003. Also, given the small size of Hungary's electricity market and the continuing prevalence of long-term contracts, the creation of a

physical spot or short-term market may be difficult. Nevertheless, in June 2001, the European Commission announced its satisfaction with Hungary's regulation of its electricity sector and concluded that the relevant legislation is in line with EU requirements.

Hungary has several new power plants planned or under construction. Central European Steel Group of Russia plans to build a 590-MW coal-fired plant near the border with Ukraine. Higher quality Russian coal will be used as the fuel source, and the plant's construction is expected to begin by the summer of 2002. Fortum Engineering of Finland and Budapest Power Plant plan to build a 110-MW gas-fired, combined cycle power plant in the Kispest area of Budapest. The plant will also produce 120 MW of district heat. E. On of Germany's Hungarian subsidiary built and owns over 90% of a combined-cycle 95-MW power plant in Debrecen that was officially opened in November 2001. The plant is an IPP, having no long-term contract with MVM. AES of the United States has been very active in Hungary, having purchased state-owned power producer Tizai Gorup in 1996. AES at the time promised to make several hundred million dollars in investments in return for long-term contracts with MVM that would support the costs of the investments. In October 2000, AES sued the Hungarian government and MVM and canceled new investment in Hungary because it claimed that MVM had failed to agree to the contracts. In January 2002, AES reached a compromise with the government and MVM that will have MVM obligated to purchase power from AES' 860-MW Tiza II oil and gas-fired plant for 15 years and for two more years from AES' smaller coal-fired power plants, after which the two coal-fired plants will be retired. AES also agreed not to build two new power plants the company had planned. NRG Energy of the United States has also invested in Hungary's power sector, having bought Powergen of the UK's Csepel II 389-MW combined cycle gas turbine power plant in April 2001.

Nuclear

The Paks nuclear power plant at Tolna Megye consists of four Soviet-design, second generation VVER-440/213 reactor units that each have a net generating capacity of 433 MW (the oldest unit has a net capacity of 430 MW). Paks is owned and operated by MVM subsidiary Paks Nuclear Power Plant Co. The Hungarian Atomic Energy Authority (HAEA) regulates the plant. The plant is undergoing a 60-billion-forint multiyear safety upgrade program to be finished at the end of 2002. HAEA is considering a request by the Paks Nuclear Power Plant Co. to extend the lifetime of the four reactors beyond their 30-year design lives and to uprate the power at each unit by about 10%. The four units went online between 1982 and 1987. In June 2001, an accidental fire occurred that caused the plant 1.15 billion forints in losses and 150 million forints in repairs, but the accident did not have to do with the nuclear reactor, so there were no significant safety issues raised. Hungary has bilateral agreements with the other countries of the region for notification and information sharing in the case of an emergency. The EU regards the plant as safe by Western nuclear power plant standards.

Table 1. Economic and Demographic Indicators for North Central Europe

Country	Gross Domestic Product (GDP), 2000E (Billions of U.S. $)	Real GDP Growth Rate, 2000 Estimate	GDP per capita, 2000 Estimate (U.S. $)	Population, 2001E (Millions)
Poland	158.3	4.0%	4,097	38.6
Czech Republic	50.8	2.9%	4,943	10.3

Slovak Republic	19.2	2.2%	3,555	5.4
Hungary	46.8	5.2%	4,680	10.0
Total/Weighted Average	275.1	3.9%	4,278	64.3

Source: DRI WEFA

Table 2. Energy Consumption and Carbon Dioxide Emissions in North Central Europe, 2000

Country	Total Energy Consumption (quadrillion Btu, 1999)	Oil (thousand barrels per day, 2001)	Natural Gas (billion cubic feet)	Coal (million short tons, all types)	Electricity (billion kilowatthours)	Energy-Related CO_2 Emissions (million metric tons of carbon, 1999)
Poland	3.84	431	444.6	155.3	138.8	84.5
Czech Republic	1.54	175	327.4	63.3	63.2	28.5
Slovak Republic	0.70	72	292.3	11.2	27.8	9.2
Hungary	1.07	149	411.2	16.1	38.2	16.2
Total	7.15	827	1,475.5	245.9	268	138.4

Sources: Energy Information Administration; PlanEcon

Table 3. Energy Supply Indicators in North Central Europe

Country	Crude Oil Reserves, Million Barrels, 1/1/02E	Natural Gas Reserves, Trillion Cubic Feet, 1/1/02E	Coal Reserves, Million Short Tons, 1999	Oil Production, Thousand Barrels per day, 2001	Natural Gas Production, Billion Cubic Feet, 2000	Coal Production, All Types, Million Short Tons, 2000	Electricity Generation, Billion Kilowatthours, 2000	Crude Oil Refining Capacity, Thousand Barrels per Day, 1/1/02
Poland	114.9	5.12	15,773	14.2	174.9	179	145.1	382
Czech Republic	15	0.14	6,809	6.4	2.9	71.3	73.1	198
Slovak Republic	9	0.53	190	1	14.1	4.1	29.9	115

Hungary	110.9	1.28	4,917	37.2	121.9	15.6	34.2	161
Total	249.8	7.07	27689	58.8	313.8	270	282.3	856

Sources: Energy Information Administration; PlanEcon

Sources for this report include: BBC; CIA World Factbook; Czech News Agency; DRI WEFA; Economist Intelligence Unit; Financial Times; Hungarian News Agency; PlanEcon; Platts Oilgram; Polish News Bulletin; Prague Business Journal; Slovak Spectator; U.S. Department of Commerce; U.S. Department of Energy and Energy Information Administration; Weekly Petroleum Argus; World Markets Online.

LINKS

For more information from EIA, please see:
EIA - Country Information on Poland
EIA - Country Information on the Czech Republic
EIA - Country Information on the Slovak Republic
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Links to other U.S. government sites:
CIA World Factbook - Poland
U.S. Department of Energy's Office of Fossil Energy, Energy Overview of Poland
U.S. Department of Energy's Office of Fossil Energy, Poland Energy Law
U.S. State Department's Consular Information Sheet - Poland
U.S. Commerce Department's Country Commercial Guide - Poland
U.S. State Department's Background Notes on Poland
Library of Congress Country Study on Poland (October 1992)
U.S. Commerce Department's Market Access and Compliance, Poland
U.S. Commerce Department's Market Access and Compliance, Electric Power Generation in Poland
U.S. Commerce Department's Market Access and Compliance, Profile of Polish Oil and Gas Company
U.S. Commerce Department's Market Access and Compliance, Profile of Polish Natural Gas Sector
Information from the U.S. International Trade Administration
U.S. Embassy in Poland
U.S. Department of Energy, Office of Fossil Energy's International Section -- Czech Republic
U.S. State Department Country Commercial Guide FY 1999
U.S. Department of Commerce's Country Commercial Guide FY 2000
U.S. Embassy in Prague
U.S. International Trade Administration, Central and Eastern European Business Information Center (CEEBIC)
U.S. Department of State Background note on Slovakia
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Poland's Embassy in the U.S.
World Bank on Poland
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Energy companies in Poland, compiled by BizPoland
EuroGas (follow "Current Projects" link to information about Poland)
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North Central Europe

North Central Europe is important to world energy markets because it is a significant producer and exporter of coal and an important transit point for Russian oil and natural gas pipelines

Note: Information contained in this report is the best available as of March 2002 and is subject to change.

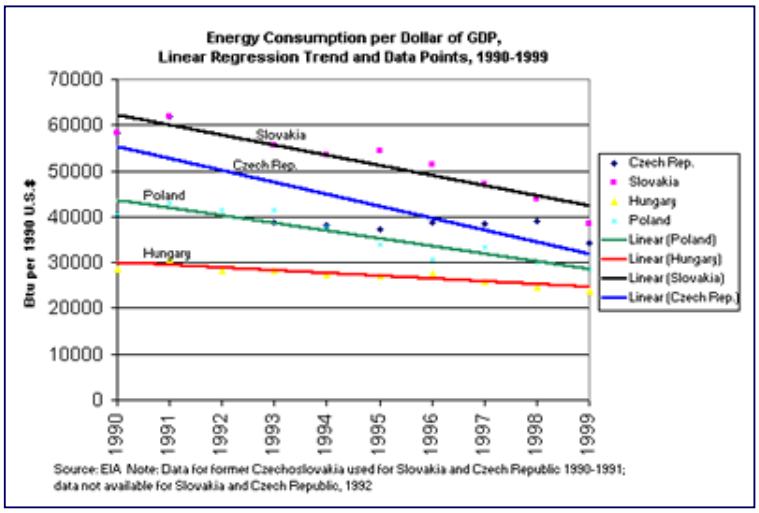
GENERAL BACKGROUND

Poland, the Czech Republic, the Slovak Republic (commonly referred to as Slovakia), and Hungary are all the members of the Visegrad Group and share certain common characteristics in addition to being geographical neighbors. The Czech Republic and Slovakia were the single country of Czechoslovakia formed from the former Austro-Hungarian Empire in 1918 (with an interruption during the Second World War) until Czechoslovakia's peaceful dissolution into the independent states of the Czech Republic and the Slovak Republic in 1993. Hence, the Visegrad group was known as the Visegrad Troika when it was formed February 15, 1991 in Visegrad, Hungary. Hungary, Poland, and Czechoslovakia had all been Communist states and members of the Warsaw Pact during the years following World War II until 1989-1990. All three states had developed heavy industry that was characterized by being very energy intensive and polluting. Poland is much larger than the other states of the Visegrad Group in area and population, having a greater population than the other three combined. Hungary's main ethnic group is not Slavic in origin, unlike the other two (now three) states. Hungary and Slovakia have large minority populations, with both having large populations of Roma, and Slovakia having a significant Hungarian minority. The issue of ethnic Hungarians living outside Hungary has become an important issue for the current Hungarian government, which passed a law granting economic, cultural, and educational benefits to ethnic Hungarians in neighboring countries. This has caused some friction with Slovakia, which sees the law as having an extraterritorial nature.

All four countries have successfully transitioned to democracy and have made great strides in moving to market-based economies. Slovakia was slower to change than the other three, especially in the area of democracy, and is unlikely to be among the first group of former Communist countries to enter the European Union (EU), although the country has made great strides of late. Poland remains a more rural society than the Czech Republic or Hungary. All four countries have applied for membership in the EU, with Poland, the Czech Republic, and Hungary probably acceding in 2004 or 2005. In 1999, Hungary, Poland, and the Czech Republic became the first former-Warsaw Pact countries to join the North Atlantic Treaty Organization (NATO). Slovakia is a member of

NATO's Euro-Atlantic Partnership Council. The Czech Republic became a member of the Organization for Economic Co-operation and Development in 1995, Hungary and Poland joined in 1996, and Slovakia in 2001. As members of the Visegrad Group, the four countries are also members of the Central European Free Trade Agreement (CEFTA). There is a customs union between the Czech and Slovak Republics, and most products have no tariffs or quotas for trade amongst the other countries, with the exception of agriculture. CEFTA was founded by the Visegrad Troika, but Slovenia, Romania, and Bulgaria have since joined.

The Visegrad countries are dependent on trade with the EU and in particular with Germany. Continuing economic challenges that these countries share include: technologically backward agricultural sectors that will find it difficult to compete internationally; industries that are still more energy intensive than their counterparts in western Europe (though energy intensity is on a declining trend as these economies become more similar to their western counterparts; see chart); costs from heavily-polluting industries and clean-up costs; the challenge of increasing standards of industries and services to the levels of the EU.



REGIONAL ENERGY ISSUES

Coal is the only fossil fuel of abundance in the region, and only Poland and the Czech Republic have substantial quantities of hard coal. Poland is the largest hard coal producer and exporter in absolute terms by far, though the Czech Republic exports over one-third of its production, whereas Poland only exports about one-fifth of its coal output. Of strategic importance is the fact that most of the crude oil and natural gas from Russia that is piped to western Europe passes through the Visegrad region, with the four countries only taking a small part of this for domestic consumption. Crude oil consumption in the region is small -- only about 56% of that of Spain alone. Not only is the region's total natural gas consumption (1.4 trillion cubic feet - Tcf) smaller than its neighbor Germany (over 3 Tcf), but Poland and Hungary each satisfied more than one third of their natural gas consumption from domestic sources in 2000. Preliminary estimates of imports of Russian natural gas into the region during January-November 2001 show Hungary importing 257.8 billion cubic feet (Bcf), the Czech Republic 243.7 Bcf, Poland 240.1 Bcf, and Slovakia about 236 Bcf.

The Czech Republic and Poland export coal to each other, and both countries have import quotas for the other. Unions in Poland have campaigned to have the quota for Czech imports lowered, whereas industries in the Czech Republic have campaigned to have the quota for Polish imports raised. Polish coal has become cheaper than Czech coal in the Czech Republic, but Polish unions claim that Czech coal is "dumped" in Poland. Neither government has changed its quotas so far.

Oil Transit

The northern branch of the 1-million-barrel-per-day capacity Druzhba ("Friendship") pipeline from Russia through Belarus brings oil to Poland which then can be transited onward to Germany. The 1.2-million-barrel-per-day capacity southern branch of the Druzhba pipeline runs from Russia through Ukraine into Slovakia. In August 2001, the Yuzhnyy-Brody pipeline was officially opened in Ukraine. This allows Caspian region oil that is piped to Black Sea ports to be shipped across the Black Sea to Yuzhnyy's Pivdenny terminal (near Odessa) and then transported in a new pipeline to Brody, where it connects with the southern Druzhba pipeline for shipment to Slovakia, Hungary, and onward. There is discussion of extending the Yuzhnyy-Brody pipeline north to Plotz in Poland where the pipeline could tie into the Druzhba northern route and/or an existing line to the Polish Baltic Sea

port of Gdansk and allow imports of Caspian crude oil to Poland, Germany, and other Baltic states. The southern Druzhba pipeline splits in Ukraine just before it reaches the borders of Slovakia and Hungary. Some of the oil imported into Hungary transits onward to the former Yugoslavia and the Croatian port of Omisalj on the Adriatic.

Natural Gas Transit

The region is extremely important as a transit center for Russian natural gas exports to western Europe. The Yamal pipeline from Russia will deliver about 1.1 Tcf per year into Poland by 2005 under current contracts. Most of this natural gas transits onward to Germany. Yamal is the only route that bypasses Ukraine. The Russians have considered adding additional routes that bypass Ukraine for their natural gas exports to Europe, partially because Russia has accused Ukraine of stealing natural gas transiting through the country and because of Ukraine's nearly $2 billion in debt to Russia for natural gas. The planned Yamal II pipeline would link Yamal with the Southern pipeline to make for an additional source for the pipelines in Slovakia that currently take natural gas transiting through Ukraine. Yamal II has not been formally approved yet and there are still disagreements about its route in Poland. Germany and Russia appear to favor a route that is more southerly, as that is where Germany has more natural gas demand, but Poland favors a more northerly route that could provide some natural gas to its industries as the pipeline passes through to Germany. A possible entirely new natural gas pipeline from Russia to Slovakia by way of Belarus and Poland appears to have been cancelled by Gazprom in February 2002. This pipeline differed from the planned Yamal II in that it would have had a new source pipeline in Russia, instead of just feeding off of existing Russian pipelines and would only have transited through the region to western Europe; it would not have provided natural gas to the intermediary countries. In March 2002, Poland's state auditor NIK urged the Polish government to renegotiate its long-term supply deal with Russia.

The Brotherhood (Druzhba), Progress, and Soyuz natural gas pipelines that go through Ukraine to Slovakia have annual capacities of about 1 Tcf each. There is still some excess capacity in the pipelines. From Slovakia, the natural gas transits to Austria and the Czech Republic. The natural gas that passes through Slovakia represents about 25% of the natural gas consumed in western Europe and about 70% of the Russian natural gas exported to western Europe. The Druzhba pipeline splits in the Ukraine, with one part going to Hungary. Hungary takes some of the natural gas, and the rest continues on to the Balkans. At a meeting of the Visegrad Group's Economic Forum in September 2001, the possibility of providing Polish natural gas imports from Norway and/or Denmark to Slovakia and/or Hungary was discussed, with favorable statements by leaders. The region's leaders worry about being too dependent on Russia.

Regional Integration

There have been attempts by various energy companies in the region to merge in order to compete with larger rivals from the west and from Russia. The two largest oil companies in the region, Nafta Polska's PKN Orlen of Poland and MOL of Hungary have been in so-far unsuccessful talks to sell a 17.58% share of PKN Orlen for some time. OMV of Austria has now been permitted to be involved in these talks by the new Polish government, which have been extended now to April 15, 2002. The result of such a sell-off likely would create a loosely-tied regional oil company. MOL did purchase a 36.2% share of Slovakian oil company Slovnaft in 2001, which is the only integration of the region's oil companies so far, though MOL in particular continues to look for ways to expand in the region.

The region shares the CENTREL electricity system, which links the Czech Republic, Slovakia and Hungary. In 1995, the CENTREL system was connected with Western Europe's system. Poland also has electricity connections with Ukraine and Belarus. Currently, both north-south and east-west connections are being expanded, as part of the EU's Trans-European Energy Network project, including a new link to Lithuania. The four countries of the region are also members of European electricity transmission system Union for the Coordination of Transmission of Electricity (UCTE). UCTE coordinates the interests of transmission system operators in 20 European countries.

There has been some interest in a regional energy exchange market, but rivalries over where it would be based as well as the regions's eventual integration into the EU that might make such a market superfluous have delayed this idea. Poland and the Czech Republic are developing electricity exchanges, while such exchanges are still in the planning stages in Hungary and Slovakia. Hungary imports a large amount of electricity from Slovakia, and is the region's only net power importer. Much of Poland and the Czech Republic's electricity exports go to western markets, Germany in particular.

POLAND

Poland was one of the first of the former Soviet satellite countries to hold free elections and to successfully introduce market reforms (1989). A new constitution was approved by a national referendum in May 1997. On September 23, 2001, Poland held legislative elections in which no party won an outright majority. In October 2001, a coalition government was formed by the Democratic Left Alliance (the former Communist Party) that won 41% of the popular vote, but was still 15 seats short of an absolute majority. After joining with the Polish Peasants Party in a coalition, Leszek Miller of the Democratic Left Alliance became prime minister on October 19, 2001. The new coalition has called for a relaxing of monetary policy by Poland's Central Bank in order to promote economic growth and to reduce the country's high (over 16%) unemployment rate. Poland's real GDP growth rate slowed from 4% in 2000 to 1.3% in 2001. It is estimated that Poland's high rate of foreign direct investment ($10.6 billion in 2000) fell considerably in 2001. The economic downturn has also reduced government revenue, to as little as 49% of the target for January-July 2001. The budget deficit was estimated by the previous government to be about $7 billion, or 4% of GDP, in July 2001. The current government has taken measures, including a new tax, to ensure that the budget deficit does not exceed $9.4 billion, especially in light of continuing low economic growth rates. Poland's inflation rate is at a recent historical low.

Poland is planning to enter the EU in the group's next expansion, and the country is in the midst of reforms necessary to meet membership criteria. Coal and steel industry restructuring is expected to be completed by the end of 2001, and the energy sector will be open to competition by about 2004. Many Polish farmers are opposed to joining the EU, as they believe it will entail agricultural reforms that will render them unable to compete with imports. Poland has a current account deficit and is working to make its exports more competitive. On balance, EU membership is expected to benefit Poland, decreasing trade barriers with key trade partners such as Germany and enhancing political stability. In turn, Poland is a key to EU expansion plans, as Poland is by far the largest country, in terms of both population and gross domestic product, among the twelve states that have begun discussion of accession to the EU.

Energy

In April 1997, the Polish government passed a new Energy Act, which required the Government Economic Committee to pass "Guidelines on Poland's Energy Policy Through 2020." The document spells out long-term energy forecasts and action plans for the Polish government. The key objectives include: increased security of energy supplies, (including diversification of sources); increased competitiveness for Polish energy sources in domestic and international markets; environmental protection; improving energy efficiency; and reducing energy-related carbon emissions. Coal is Poland's most important domestic energy source. While coal production is

declining and will continue to decline over the coming years, it will remain a key energy source. In 2001, the Supreme Board of Inspection (NIK) released a report stating that energy sector reform is moving too slowly. The report cited insufficient privatization in the oil sector, a halt in natural gas sector restructuring due to a dispute with the regulator, and problems with coal sector reforms. Poland will have to have a 90-day oil reserve by 2008 as part of its EU agreements.

Oil

With proven oil reserves of only 115 million barrels, Poland relied on imports for 97% of its 2001 oil consumption. Poland's oil demand is expected to increase by as much as 50% by 2020. Polish oil production increased from 10,000 barrels per day (bbl/d) in 2000 to 14,000 bbl/d in 2001, but this is still a small fraction of oil demand (434,000 bbl/d). Polish oil production comes primarily from fields in southern and western Poland, with the southern reserves nearly exhausted. However, the Barnówko - Mostno - Buszewo "BMB" field discovered in 1996 in the Polish part of the Permian Basin (near the German border directly east of Berlin) has potential reserves of about 73 million barrels and the Miedzychod field is estimated to have even more, so Poland should be able to increase its production as these fields come on line.

Poland's oil and gas industries were consolidated in 1981 into a single entity, the state-owned Polish Oil and Gas Company (PGNiG), which dominates the natural gas and upstream oil industries. In 1996, PGNiG became a joint-stock company. The company is slated for privatization after restructuring is completed, bringing the country into line with EU regulations. While a specific privatization plan remains forthcoming, major components of the company are expected to become independent from each other, rather than having a single holding company. There could be one upstream company; one company responsible for gas trade, transmission and storage; and four regional gas distribution companies. The upstream company and the four distribution companies would be privatized first, while the transmission and storage company could remain state-owned for longer.

Oil imports from Russia through the Druzhba ("Przyjazn" in Polish) pipeline traditionally have been the main Polish oil source. Following the breakup of the Soviet Bloc, Poland attempted to diversify its oil sources and to reduce its dependence on Russian oil. For this reason, the "Naftoport" oil terminal at Gdansk was constructed in the 1990s, with a capacity to receive about 600,000 bbl/d. However, Russian oil has remained relatively inexpensive, and economic factors have resulted in Poland actually increasing its imports of Russian oil. In addition, Poland imports oil from Russia's Kaliningrad enclave through the Naftoport.

Russian oil is not imported through direct agreements with Russian suppliers. Rather, there is a complex network of middlemen, the most important of which is the J&S Company of Cyprus. In 2000, 60% of the crude oil purchased by PKN Orlen and 70% of the oil purchased by Rafineria Gdansk (RG) was from J&S. It is estimated that J&S supplies between 60% and 70% of of all crude oil processed by Polish refineries. To the Russians, these middlemen are referred to as "operators" and because of a host of regulations, important documents, and licenses, the operators do all the paperwork and financial transfers. Some Polish politicians have questioned this system.

Poland and Ukraine reached an agreement in February 1999 to complete jointly an extension of the 500,000-bbl/d Odesa-Brody pipeline for Caspian Sea oil to go through Ukraine to Poland.

In July 2000, Germany-based EuroGas, Inc. won ten concessions to explore and develop oil and natural gas deposits in southeast Poland. The company believes that the area, the Karpaten Flysch oil province near the city of Sanok, potentially has a 350-million-barrel oil field, or an equivalent quantity of natural gas, which would represent one of the larger oil and gas discoveries in the region. In November 2000, EuroGas signed an agreement with PGNiG to jointly develop the area through EuroGas' subsidiary. As part of the agreement, PGNiG acquired 30% of EuroGas' Polish subsidiary, EuroGas Polska.

Downstream

Most of Poland's refineries, which were built in the 1960s and 1970s, need modernization in order to meet the current shift in demand towards lighter products such as gasoline and diesel fuel. Refinery capacity also will need to expand to meet growing oil demand. PKN Orlen's 260,000-bbl/d Plock refinery has had some improvements done and others are planned in its efforts to eventually conform to EU standards.

The state's oil companies are held through Nafta Polska, a state holding company and privatization vehicle. Nafta Polska's PKN Orlen controls about 60% of the wholesale and about 40% of the retail fuel markets. In September 2001, the sale of 75% of the 90,000-bbl/d Gdansk refinery to Rotch Energy of the United Kingdom was approved. Rotch paid about $250 million for its stake and agreed to invest $600-$700 million in expansion over the next few years to boost the refinery's capacity to about 150,000 bbl/d.

Gasoline and diesel demand has fallen slightly in recent months, due to higher prices and an economic slowdown. However, the demand for heating oil (which is sometimes used as a vehicle fuel) and liquefied petroleum gas (LPG) has risen sharply, and about 530,000 vehicles in Poland are capable of using LPG, with many vehicles being converted every year.

Natural Gas

Poland has an estimated 5.1 trillion cubic feet (Tcf) of natural gas reserves. The country imported over 65% of its 442-billion cubic feet (Bcf) consumption in 1999. Natural gas production remained fairly stable throughout the 1990s, hovering between 150 Bcf and 180 Bcf, and was about 183 Bcf in 2001. This rate of production is expected to continue into the 21st century, as new exploration takes the place of depleting reserves. FX Energy, a U.S.-based company active in Poland with a 49% stake in the Fences gasfield (51% is owned by PGNiG), began production at its Kleska well in March 2001 at an initial rate of 2 million cubic feet per day. PGNiG is planning to launch 200 new drilling sites in 2002 at a cost of Zl 700-800 million and invest Zl 600 million in domestic oil and natural gas exploration. The company also plans to liquidate 1,500 old and exploited drilling sites within the next five years.

The outlook for natural gas imports into Poland is problematic over the next few years. Despite the fact that Poland's real GDP has grown by about 21% since 1997, natural gas demand has remained flat and is predicted to remain so over the next decade. Even optimistic unofficial Polish government forecasts estimate demand in 2005 to be between 484 and 572 Bcf. Much of the reason for this is that natural gas is simply uneconomical for power generation in Poland compared with coal. Yet, at the same time, diversification of natural gas sources is a high priority for Poland, and those traders with diversified sources will have priority. Russia supplied over 60% of all Polish natural gas in 2000, with smaller amounts coming from or through Germany as well as over 30% from domestic sources. Poland and Russia disagree about the route of the proposed extension of the Yamal pipeline (Yamal II). Poland's contracts with Gazprom are for imports to increase to 441 Bcf per year by 2010. However, in January 2002, Polish Economy Minister Jacek Piechota stated that the contract with Russia as well as the specifics of the extension of the Yamal pipeline will have to be renegotiated.

PGNiG recently has reached agreements to import Danish and Norwegian natural gas. In July 2001, an agreement was signed with Dansk Olie og Naturgas (DONG) of Denmark to import 16 billion cubic meters (565 Bcf) over eight years, starting in 2003. This would be done through the planned $330-million, 186-mile BalticPipe pipeline, scheduled to be constructed beginning in the summer of 2002. The pipeline's capacity, 283 Bcf per year, is four times the volume that PGNiG will import from DONG annually, prompting some to question whether the pipeline will be financially viable. In September 2001, PGNiG and Norway's (now defunct) Gas Negotiating Committee (GFU) agreed to the delivery of 74 billion cubic meters (2.6 Tcf) over 16 years. This replaces the previous contract with Norway for 500 million cubic meters (18 Bcf) per year until 2006. These deliveries would not start until 2008, and would gradually increase over the first three years. Norwegian exports to Poland would require the

construction of the $1.1-billion, 683-mile Austerled pipeline. Given probable increasing domestic natural gas production and flat demand, it will be very difficult for Poland to maintain its Russian, Danish, and Norwegian contracts in their present state. The new government already has signaled that it will probably amend or even cancel some or all of these contracts.

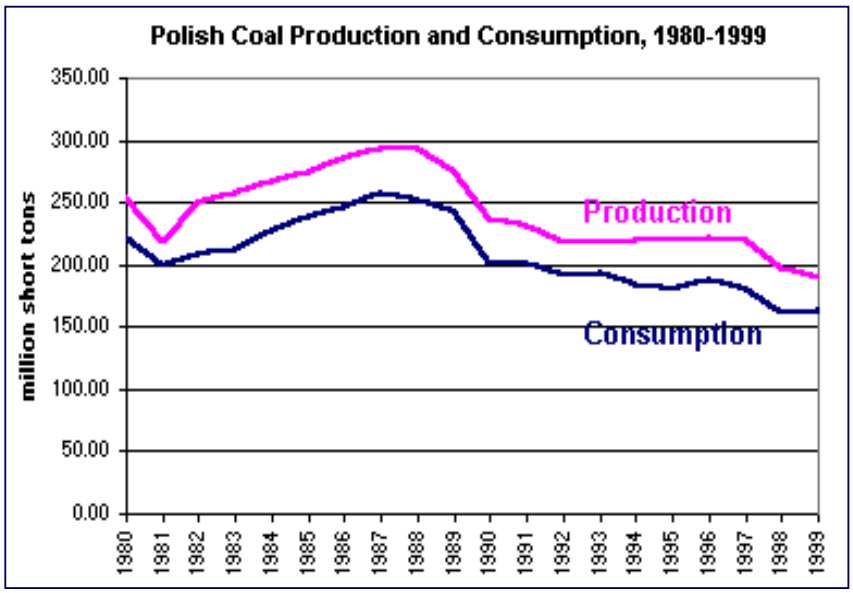
Poland needs to increase its environmental standards as part of its application to achieve member status in the EU. Increased consumption of natural gas, as an alternative to coal, is considered to be a key component of Poland's plan to meet the stricter regulations. The Polish government forecasts that about 14% of electricity will be generated from natural gas by 2020, up from just 2% in 2000, but still a relatively small share. Poland also will need to liberalize at least 28% of its natural gas market by August 2003, according to EU directives.

The Yamal pipeline connecting Poland to Siberian natural gas sources, began operations in September 1999. The $35-billion pipeline was designed to carry natural gas supplies from the Yamal (West Siberia) field in Russia to Germany and other Western European countries through Belarus and Poland. Under a 25-year contract signed in October 1996, annual throughput capacity of the pipeline is slated to increase to 32 billion cubic meters (about 1.1 Tcf) by 2005. The Polish section is operated by EuroPol Gaz and is 48% owned by PGNiG and Gazprom each, with the remaining 4% owned by a consortium of Polish firms called Gas Trading. Russia is seeking to link this new pipeline with the Southern pipeline, which would allow additional Russian gas to reach Western European markets while bypassing Ukraine (Yamal II). The exact route was discussed at senior-level Russo-Polish talks in January 2002, though no decision has been taken. Also in January 2002, Gazprom and PGNiG announced that feasibility tests will begin soon for the second stretch of the pipeline. Gazprom estimates that when all sections of the Yamal pipeline as well as two new compressor stations are complete, the total capacity will be 2.26 Tcf. Plans for an entirely new natural gas pipeline from Russia through Belarus and Poland to Slovakia appear to have been put aside indefinitely by Gazprom following friction between the Polish, Ukrainian, and Russian governments over the issue. There was some worry by Polish officials of damaging relations with Ukraine, because the diversion will cost Ukraine transit fees.

PGNiG is undertaking a program to add more than 6,200 miles to its gas distribution network by 2010. The company is also planning to invest $670 million over the next three years to upgrade its transmission system. PGNiG is appealing a ruling by the government gas regulatory agency that the company cannot raise its rates. PGNiG believes that raising rates for some customers is vital to its restructuring.

Coal

Although coal represents only 2% of Poland's total GDP, it is by far the dominant fuel in the country's economy, accounting for 95% of primary energy production in 2000. Polish coal, though of high quality, has various geological features that make it difficult to mine. Hard coal (mostly bituminous) provides about 65% of electricity generation, with brown coal (lignite) providing nearly all of the rest of the fuel consumed in Poland's power plants (many of which provide heat and hot water as well as electricity). Poland is the world's ninth-largest coal exporter, with coal going primarily to customers in Europe and the former Soviet Union. These exports historically have represented a major source of foreign exchange.



There are currently seven state-owned coal holding companies. They are: Bytomska Spolka Weglowa (six mines); Rudska Spolka Weglowa (4); Gliwicka Spolka Weglowa SA (5); Katowicki Holding Weglowy (9); Nadwislanska Spolka Weglowa (5); Rybnicka Spolka Weglowa (5); and Jastrzebska Spolka Weglowa (5), for a total of 39 operating mines. Weglokoks is the country's largest coal exporter. The company was created in 1993 as the successor to the state-owned coal monopoly; it is owned by the State Treasury. The other coal exporting company is Kopex, which may merge with Weglokoks in the future.

Coal Yards at Port of Gdansk

In May 1998, Poland announced a comprehensive restructuring program for its coal industry aimed at maximizing efficiency and paying off some of the industry's $4.5-billion debt. Before Poland's democratization, the industry had been heavily subsidized. In 2000, Poland closed 22 coal mines and partially closed seven others, with about 16,000 miners leaving the industry. This reduced production by about 10.3 million metric tons (11.4 million short tons), but the coal mining industry became profitable for the first time, and has continued to be profitable in 2001, though this has been attributed to a write-off of part of the industry's debt. Production rose very slightly, 0.5%, to 103.9 million metric tons (114.5 million short tons).

Privatization of Polish coal mines is just beginning, with the Bogdanka mine, one of Poland's most profitable, approved for a 45% sale to Management Bogdanka, a private company that is a consortium of investors. The fully private Jadwiga mine in Zabrze is expected to begin functioning February or March 2002. PricewaterhouseCoopers is advising the Ministry of the Economy on further privatization and restructuring, and three tentative plans have been drawn up that vary in the degree that the size of the sector that is maintained and the degree of subsidies and privatizations that would be put in place. A new plan proposed by the current government would create a new holding company called Polish Coal (PW) that would take over the shares of the seven state-owned companies and act as the manager until the coal sector is fully privatized. Another aim of this plan is to control the price of coal in Poland so as to avoid regional disparities that make imports cheaper in some parts of the country. It is estimated that various mining reform programs will cost $2.26 billion through 2006.

The changes brought about by the coal restructuring program have had some positive economic and environmental implications, which are important for Poland's accession to the EU. Despite this, Polish coal miners have been extremely resistant to the changes, and have held protests and strikes in opposition. The Polish coal industry is one of the country's most important employers and has a powerful union, so there are important political considerations to all reforms of the sector, as well as commensurate efforts to find employment for displaced miners.

Electricity

With installed electric capacity of over 30 million kilowatts in 1999, and electric generation of 134 billion kilowatt hours (bkwh), the Polish power generation sector is the largest in Central and Eastern Europe. As noted above, most of Poland's electricity comes from coal-fired plants, which are highly polluting and operate with outdated technology. The Polish government expects electricity demand to grow by over 50% by 2020. Poland produces more electricity than it consumes and exports the excess to neighboring countries. Polenergia, a new company, was established by Polish grid operator PSE, a German distributor, and a private Polish company, to sell privatized electricity, including electricity from Russia, to Western European markets.

Poland's electricity is produced by a combination of independent power producers that sell to the state-owned grid operator PSE SA, as well as by PSE itself. There are 17 power plants and 19 power and heating (CHP) plants. PSE

transfers power to 33 local distributors, of which the G8 Group is the largest. PSE is in the process of initiating an hourly balancing market for Poland. There has been some consolidation of producers, the most important of which is Poludniowy Koncern Energetyczny (PKE) with total capacity of 4,640 MW. It is expected that only consolidated producers will be able to compete with Western companies as the Polish market continues to open.

Poland's status as an EU applicant makes it more important that efficiency and environmental goals are met in a timely fashion. In November 1998, Poland ambitiously committed to adapting its electricity market regulations to EU standards within four years. Renovation of the sector is expected to cost about $15 billion by 2010. For these reasons, Poland's power generation is in need of investment. Multilateral lending institutions, most notably the World Bank and the European Bank for Reconstruction and Development, are involved heavily in financing and participating in projects ranging from building new, non-coal facilities to providing cleaner technologies for existing coal-fired plants.

Privatization is seen as the key to modernization and efficiency of the electricity sector. In September 1996, a law was passed that laid the foundation for de-monopolization and privatization of the industry. Plans called for reducing the number of generating companies from 35 to 7 and for privatizing power generation by the end of 2001. A law that took effect in December 1997 sets the groundwork for third-party access to the power grid and vests authority in an independent Energy Regulatory Office. However, the privatization has been delayed. According to the head of the Energy Regulatory Office, it will be two to four years until Poland's energy market is truly competitive. Outstanding long-term supply contracts between power generators and the national grid company, PSE, need to be resolved before market pricing can take effect. Currently, companies consuming more than 40 gigawatthours (GWh) of electricity annually can legally choose between suppliers, but this has yet to be fully implemented. Regulations are still seen as insufficiently defining PSE's position in the new system, such that as PSE continues to regulate itself, the opening up of the grid is restricted.

Electricite de France (EdF) is one of the larger investors in the Polish electricity sector thus far. It has a 57.9% share of the El. Krakow CHP plant and a 11.5% share of the ZEW Kogeneracja CHP plant. Working with Gaz de France, EdF in June 2000 won a tender to buy a 45% stake of the cogeneration company Zespol Electrocieplownia Wybrzeze (ZEcW), which serves Gdansk. EdF already owns a controlling stake in Elektrocieplownia Krakow, serving Krakow, and a smaller stake in a cogeneration group in Wroclaw. In November 2001, EdF's Zecw Group in Poland and Dalkia, a subsidiary of French multinational Vivendi, reached an agreement to purchase 45% of two thermal electric power plants at Torun. EdF is looking to invest in the distribution side as well. Sweden's Vattenfall has already invested in the distribution side, owning 32% of the large southern GZE distribution group as well as 55% of Warsaw's district heating plant in Siekierki. Vattenfall plans to gain majority shares as soon as possible. Belgium's Tractabel recently acquired a 25% stake in the Polaniec power plant, which is Poland's fourth-largest power generator. In August 2001, the Polish government granted Spanish utility Iberdrola the exclusive right to negotiate the acquisition of 25% of the G8 Group electricity distributor. In southern Poland, a new coal-fired plant is under construction by a subsidiary of U.S.-based PSEG. This will replace the Chorzow plant, now over 100 years old. American utility PSEG signed a deal to puchase 35% of the Skawina power plant for $24.8 million in January 2002. PSEG plans to invest $56 million in the plant, part of which will be used to make the plant compliant with stricter environmental regulations.

Environment

As the transition to democracy proceeds in Poland, environmental issues have become increasingly important. During the 1980s, Poland was one of the most polluted countries in Europe, and while democratic reforms have brought about reductions in the level of air pollution, there remains much room for improvement. In fact, as Poland negotiates with the European Union (EU) for membership, the EU has spotlighted Poland's environmental record, making the country's accession to the exclusive group contingent on improvements in Poland's environmental record.

Similar to the pattern seen in other transition countries, Poland's energy consumption has decreased in the past 10 years as inefficient factories and industries were closed down. However, unlike the majority of the former Eastern Bloc, production has rebounded in Poland. Although the country's carbon emissions have dropped since 1989, Poland's dependence on coal, along with the explosion in private automobile use among Poles, correlates to high levels of energy and carbon intensity in Poland.

Poland's renewable energy sector is small, with only a few hydroelectric power plants. However, as Poland enters the 21st century, the country is beginning to shift away from non-ecological coal mining and related industries towards a more service-oriented, less pollution-intensive economy. In November 2001, Poland's Southern Energy Concern (PKE SA) announced plans to start up two 12-MW wind farms on the coast and in the southern mountains.

CZECH REPUBLIC

The Czech Republic saw its second straight year of positive economic growth in 2001 following three years of recession. The country's real gross domestic product (GDP), which had been in decline since 1997 following an economic boom during the mid-1990's, rose 2.9% in 2000 and 3.5% in 2001. Growth forecasts for 2002 have been cut back to 3.3% because of continued low demand for Czech exports in the European Union (EU) as growth there has remained slow. Trade with the EU represents about 69% of the Czech Republic's overall foreign trade. The Czech Republic is highly dependent on trade, with exports of goods and services being about 70% of GDP. Increasing exports are making a substantial contribution to growth, but imports have increased even faster, so that the current account deficit is estimated to have increased by $1.1 billion from 2000 to 2001. Foreign direct investment in the Czech Republic peaked in 1999 at $4.9 billion, and remained high in 2000 at $4.6 billion, but declined in 2001, with just $2.3 billion invested in the first three quarters of the year. The slowdown in exports has widened the current account deficit to about $2.9 billion, though there is a surplus in the capital account that makes this sustainable.

Since the end of the Communist era in 1989, when 100% of industries were state-owned, the Czech Republic has made great progress in privatization. It is estimated that only 10% of Czech industry was state-owned at the start of 2001. The government has plans for further privatizations in the chemical, energy and mining, telecommunications, and steel sectors. The structural reforms and economic rebound have strengthened the Czech Republic's fast-track status for membership in the EU, which is currently slated for 2003-2005.

The Czech Republic's unemployment figure, at about 8.5%, is about the European average, is expected to remain steady over the next two years. In late 2001, growth in industrial production began to slow in response to falling demand in key foreign markets, especially Germany, though domestic demand remains fairly strong. Czech inflation is low, falling to an annual rate of 4.1% in December 2001.

Following an October 1999 European Commission report which warned that the Czech Republic was lagging behind other so-called "firstwave" countries in the introduction of European Union (EU) laws and structural reforms, the opposition Civic Democrats and the ruling Social Democrats (the country's two major parties) agreed

to make approval of EU legislation a priority and to speed up the pace of reforms and the stalled privatization process. One issue to be dealt with for the Czech Republic's accession to the EU is the need for further restructuring of the country's energy sector and the end of energy subsidies. The energy chapter was included in the accession talks between the Czech Republic and the EU in November 1999, and while the Czech Republic applied for a phase-in period that would postpone full liberalization of its electricity market until 2005 and of its natural gas market until 2008, the EU called on the Czech Republic to look for ways of re-evaluating its application. In addition, it is estimated that achieving environmental compliance with EU standards by 2004 will cost about $15 billion. The Czech Republic became a member of the International Energy Agency (IEA) in 2001.

The decision in October 2000 by Czech authorities to activate the controversial, Soviet-era Temelin nuclear power plant in southern Bohemia led to a diplomatic confrontation with neighboring Austria, which argues that the plant is unsafe. A compromise was reached between Austria and the Czech Republic that allowed EU inspectors to assess the plant in December 2000, before it began operating commercially. In November 2001, the premiers of Austria and the Czech Republic came to an agreement to make certain bilateral duties in regards to the Temelin plant part of the Czech Republic's accession process to the EU in return for Austria not blocking the Czech Republic's accession. The other members of the EU must agree to this unusual step of having a protocol attached to the accession treaty. (See Electricity section for more on the Temelin plant.)

Oil

The Czech Republic has very limited oil reserves, and therefore relies almost exclusively on imported oil for its consumption need. Domestic oil production, which is extracted by the firm Moravske naftove doly (MND), reached 6,400 barrels per day (bbl/d) in 2001. In January 2002, Czech oil company Ceska Naftarska Spolecnost made a discovery at its Breclav block in southern Moravia, near the Vienna Basin. Oil is flowing from a test well, but estimates of production from the field are not set yet. Also in January, Australian-based Carpathian Resources discovered a natural flow of crude oil at its Postorna 1 Well in the Vienna Basin.

Czech oil consumption, which totaled 172,000 bbl/d in 2001, is projected to remain about the same in 2002. Oil imports are piped primarily from Russia, via the Druzhba pipeline, and Germany, via the Mero pipeline, which allows the land-locked Czech Republic to import crude oil from the Italian port of Trieste via the Trans-alpine pipeline network.

The Druzhba pipeline, with a capacity of 73 million barrels per year (200,000 bbl/d) to the Czech Republic, historically has been the source of the majority of the country's foreign oil. The completion of the Mero pipeline, which has the same capacity as the Druzhba, allows the Czech Republic to reduce its reliance on Russian oil. As the country continues to re-orient its economy to the West, imports of oil from Russia are declining while oil imports from the EU are rising. Overall, however, the Czech Republic's desire is to reducing its dependence on oil imports by reducing its consumption. High world oil prices in 2000 meant that the Czech Republic's increase in oil imports was slight in 2000, but imports may increase more in 2001 due to relatively lower world oil prices. In April 2001, the EU agreed to the Czech Republic's request to extend the transition period for building a 90-day state oil reserve until December 2005. Mero CR, which operates the Czech oil pipelines, is constructing three storage tanks, each with a capacity of 786,000 barrels, as part of the plan to raise reserves to comply with the EU directive. Completion is expected in 2004.

Refining

The Czech Republic has two major refineries, at Litvinov and Kralupy. The refineries, which have been privatized and are now owned and operated by Ceska Rafinerska, have a combined capacity of 178,000 bbl/d. These refineries supply slightly less than 50% of the gasoline and diesel market in the Czech Republic. Ceska Rafinerska is owned by holding company Unipetrol, which is 63% owned by the government. There are four companies that are still competing for the 63% government share when full privatization occurs, which is expected sometime in

2002. Ceska Rafinerska began producing gasoline and diesel fuel from a new, czech koruna-8-billion cracking unit at Litvinov in April 2001. The added capacity will raise the production of light products, mainly petrols and diesel oil, while the production of heavier fuel oils, the demand for which is decreasing, will be reduced. Ceska Rafinerska sold about 1.1 million barrels of processed fuels to Poland in 2000, and plans to export about 1.9 million barrels in 2001. There also is a smaller refinery in Pardubice owned by Paramo, A.S. It has a capacity to refine about 20,000 bbl/d.

Natural Gas

As the Czech Republic strives to meet EU membership criteria, natural gas is becoming increasingly important to the country's energy mix. With the need to improve its environmental conditions, the Czech Republic is turning to cleaner-burning natural gas for its energy needs rather than coal. As a result, natural gas consumption has increased by 30% since 1993, from 259 billion cubic feet (Bcf) in 1993 to 337.3 Bcf in 1999. The Energy Regulation Office (ERU) has annouced that household natural gas prices will rise 5%-10% in January 2002.

The Czech Republic relies almost exclusively on imports for its natural gas consumption (approximately 98% of consumption). Most of the limited domestic gas production that does occur is carried out by a British company, Ramco Energy's Medusa Oil & Gas, near the Austrian border. MND also also extracts a small amount of natural gas. The the vast majority of gas consumed is imported from Russia. According to the Czech Statistical Office, in 1999 the Czech Republic imported approximately 78% of its natural gas from Gazexport, Russia's Gazprom subsidiary, with about 15% of its gas coming from Norway, 6% from Germany, and only about 1% from Slovakia. The percentage coming from Norway is expected to increase in the coming years, at the expense of Russian exports.

Transgas, the major gas utility in the Czech Republic, is responsible for purchasing natural gas for Czech consumption. Although the Czech natural gas industry was restructured in 1994, Transgas remained state-owned and operated until January 2002. On January 29, 2002, the National Property Fund of the Czech Republic and RWE Gas of Germany signed a contract for the sale of 97% of the shares of Transgas for koruna 117.3 billion. Transgas currently sells natural gas to eight regional gas distribution companies, the largest of which is Jihomoravska Plynarenska in southern Moravia. For an additional koruna 16 billion, RWE has acquired shares between 46% and 58% in these regional suppliers. The deal is contingent on final approval by the Czech and German anti-monopoly offices and the European Commission. RWE will become Europe's fifth-largest integrated natural gas company and the Czech Republic's largest foreign investor. Reforms have increased Transgas' profitability, from koruna 1.8 billion in 2000 to about koruna 3.8 billion in 2001. Transgas sold 346 Bcf of natural gas in 2001.

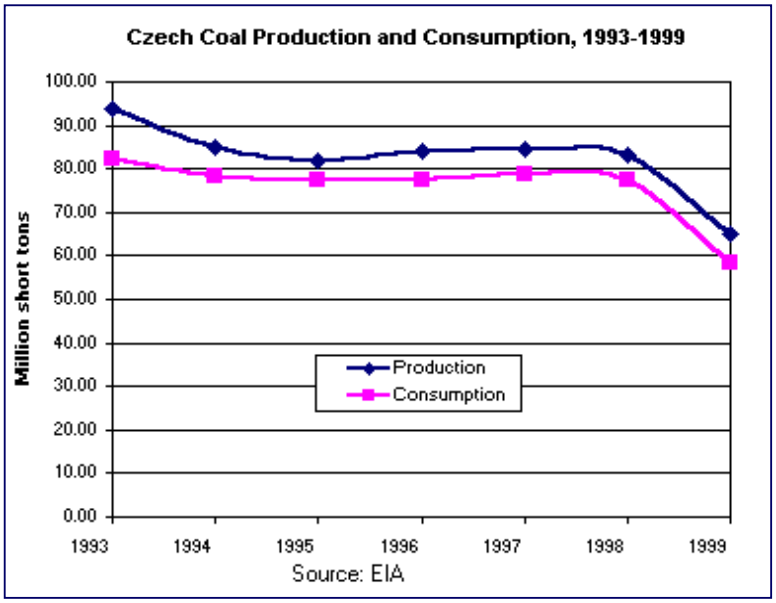
Pipelines

With nearly 32,000 miles of natural gas pipelines, the Czech Republic is a major transit center for Russian gas. Transgas is responsible for transporting Russian natural gas for export to Western Europe. Natural gas is piped to two points on the Czech-German border: Waidhaus, the main point, which delivers gas to Bavaria and points west and south; and Hora Svata Kateriny, on the border with eastern Germany, from which gas travels to Berlin and northern European destinations. The pipelines have been utilized at capacity levels since 1997.

At the beginning of November 1999, Transgas concluded with Gazexport a long-term contract for the transit of Russian natural gas across the territory of the Czech Republic until the year 2020. Until the year 2008, the contract guarantees the current volume of conveyed natural gas at the level of 28 billion cubic meters per year (91.9 Bcf). After 2009, however, the contract guarantees the conveyance of only 13 billion cubic meters (42.7 Bcf) annually. The reduction is connected with the start of the Yamal gas pipeline across Poland, which bypasses both the Czech Republic and Slovakia.

Coal

The Czech Republic's coal mining industry, which used to be one of the traditional pillars of the domestic economy, has experienced a thorough restructuring and paring down of activities over the past few years. The reasons behind this include a reduced demand for coal for electric power generation as the industry moves away from coal-fired power plants, the use of more environment-friendly fuels (such as natural gas) by domestic industry, and competition from cheaper imported coal. Coal mining production has fallen almost by half since 1989, and by 28.8 million short tons during the period 1993-1999. Coal's share of energy consumption has fallen to under 50% over the 1990s, to 43.9% in 1999.



A program for restructuring the Czech coal industry was approved by the government in December 1992. On the basis of this program, former state-owned coal mining companies were transformed into five large and two small commercial mining companies. In addition, the Czech government has reduced the number of inefficient mines in operation, cut the labor force associated with coal mining, and increased awareness of environmental issues related to the industry to bring the country in line with EU standards. The Czech Republic also has stated that it will accept the European Commission's decisions on coal prices in the common market.

As a result, the production of lower-quality brown coal, used mainly by power-producing and heavy industries, has been reduced significantly in the past ten years, especially the production of lignite. According to producer estimates, production of brown coal fell 12% in 2001 to 49.6 million short tons. The launching of operations at the Temelin nuclear power plant in southern Bohemia (see nuclear section, below), probably will cause brown coal mining to fall even more in 2002. Severocekse doly is the largest producer of brown coal, followed by Mostecka uhelna spolecnost and Sokolovska uhelna.

Black or hard coal, mined in particular by the Ostravsko-karvinske doly (OKD) company in northern Moravia, has also experienced a noteworthy decline, but the fall has been not as drastic, and furthermore, black coal continues to have better export markets. In 2000, OKD's production of black coal was 12.3 million short tons. In 1999, Severoceske doly Chomutov accounted for 46% of overall Czech mining production, followed by Mostecka uhelna spolecnost, with a 33% share, and Sokolovska uhelna with 21%. Of late, the domestic market for black coal has improved, and Czech industry, particularly steel, has demanded more than the import quota amount of coal from abroad.

The sharp reduction in coal mining over the last ten years has resulted in total employment in the four largest mining companies falling to less than 40,000. In comparison, OKD alone employed about 100,000 at the beginning of the 1990s. Further cuts in the mining workforce are expected.

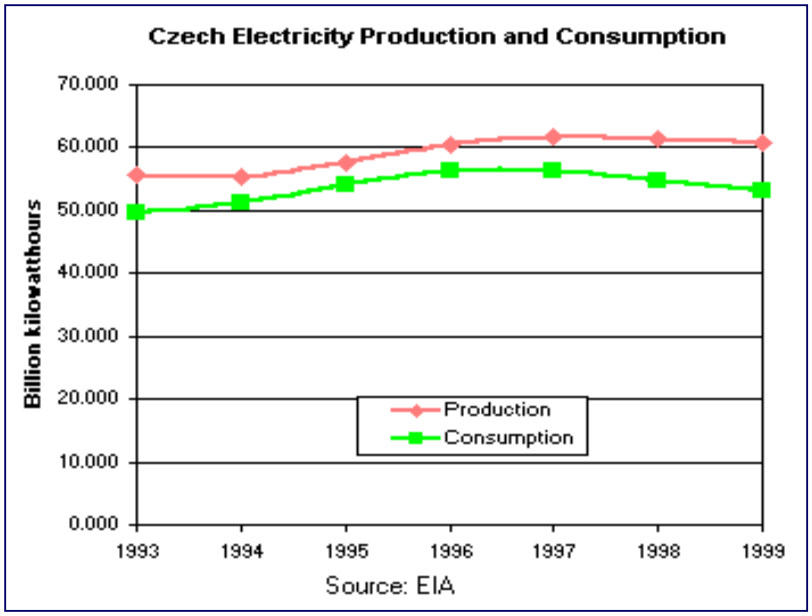
Czech coal consumption has fallen by 28% during the period 1993-1999, as the country switches to other fuels for electricity generation. Net exports of coal were 6.4 million short tons in 1999. Net exports have declined in the past few years, in part because of cheaper Polish coal exports in the region.

Electricity

Both electricity generation and consumption generally have been rising in the Czech Republic. From 1993 to 1999, electricity production in the country rose 9.2%, from 55.6 billion kilowatt-hours (Bkwh) to 60.7 Bkwh.

During the same time period, electricity consumption increased 7%, from 49.6 Bkwh to 53.1 Bkwh. By November 2001, it was estimated that the country's consumption was 68.2 Bkwh on an annual basis, though the net figure (excluding consumption of power stations) was 63 Bkwh. The country is a net exporter of electricity, with the annual amount estimated at about 0.73 Bkwh.

Ceske Energeticke Zavody (CEZ) is the Czech Republic's dominant electric power utilities company. The company produces about 70% of the country's electricity, operating 28 power plants, of which 10 run on fossil fuels, 13 are hydroelectric plants, two are wind power stations, two are nuclear power plants, and one is a solar power station. CEZ owns 10,700 MW of generation capacity in the Czech Republic, as well as the national transmission grid, which CEZ operates under control of the company's recently established, wholly-owned subsidiary Ceska Prenosova (CEPS).



In an effort to liberalize its electricity sector to conform with EU standards, the Czech Republic has attempted to privatize CEZ. The privatization of the company, which is 67.6% owned by the state, is to be bundled with majority shares in six distribution companies and total control of the transmission grid company CEPS. In January 2002, the Czech government canceled a tender for the privatization of CEZ. The government stated that the bids submitted by Electricite de France (EdF) and a consortium of Enel and Iberdrola (of Italy and Spain, respectively) failed to meet the conditions of the tender. The companies wanted certain concessions regarding purchasing of brown coal and a state guarantee for the Temelin nuclear power plant, and there were also issues with the prices offered. Another concern for the government was its ability to handle such a large influx of foreign exchange at this time when the sale of Transgas would already bring in about $3.6 billion.

The largest heat and electric independent power producer (IPP) is Elektrany Opatovice a.s., and there are a number of smaller foreign and domestic IPPs operating in the Czech Republic. In order to enter the EU, the Czech Republic must open up 26.48% of its electricity market to competition. The Energy Act adopted in November 2000 opens up the market gradually from 2002 onward, such that 30% of the electricity market will be subject to competition by 2002, 50% by 2005, and 100% by 2006. Producers with over 10MW of installed capacity and consumers with annual consumption above 40 gigawatthours (about 60 large industrial firms) will be in a competitive market at some point this year. Additionally, subsidies for household electricity prices are to be eliminated by the year 2002, meaning that prices will rise over 10% in January, as announced by regulatory agency ERU recently. However, prices for transmission and distribution services will continue to be regulated by the state due to their monopoly character. Another objective is to increase the share of renewable resources in overall electricity consumption from the current 1.7% to 3%-6% by the year 2010.

Electricity export have become increasingly important for the Czech Republic over the past few years, peaking in the first six months of 2001, when the country exported 6.69 terawatt-hours of electricity. The majority of the electricity was imported by Germany. However, since then exports to Germany have fallen by over 30% as German utility E. On canceled its contract with CEZ on July 1, 2001, due to concerns about the Temelin nuclear power plant and pressure by environmentalists over cheap electricity from polluting power plants being "dumped" on the EU. However, E. On has signalled that it may again become a buyer of Czech electricity by purchasing only non-nuclear-produced electricity. In November 2001, CEZ, along with coal producers Severoceske Doly,

Mostecka Uhelna Spolecnost, and Sokolovska Uhelna, and trading company Carbounion Bohemia, formed a new company called Coal Energy that will be essentially a marketing company for CEZ's coal-produced electric power. Coal Energy is looking to expand electricity exports to Serbia, Romania, Slovenia, and other Balkan countries.

Nuclear

The Czech Republic has two operable nuclear power plants, at Dukovany and Temelin. Both are of Soviet design. The plant at Dukovany is equipped with four, 408-MW generators of the relatively new (1980s vintage) VVER-440-213 pressurized water reactor design. Dukovany provides approximately 20% of total Czech electricity output.

After years of delay, the controversial Temelin nuclear power plant, located just 30 miles from the Austrian border in southern Bohemia, was cleared for operations by the Nuclear Safety Authority on October 9, 2000. Although the plant is of Soviet design, Westinghouse was contracted to bring the plant up to Western safety standards during its construction. It consists of two VVER-981V320 generators, each with a capacity of 890-MW. The first reactor was connected to the national grid in December 2000, but was shut down in May 2001, because of circuit and turbine problems and remained closed to allow an EU inspection team time to assess the plant's safety. In August 2001, the EU inspection team found some minor flaws that could be remedied, but declared the plant safe. The first reactor was restarted, but shut down again within a week due to technical problems. Workers claim that the technical problems are not associated with the reactors, hence the plant is safe. The first reactor is currently undergoing tests and its trial operation is expected to be launched in spring 2002. The second reactor is expected to be launched in the beginning of 2003. When the plant is fully operative, it will provide over 20% of the Czech Republic's power needs.

Temelin has been controversial since construction first began in 1986. Opponents have argued that the plant is unnecessary, noting that the Czech Republic already produces more electricity than it consumes, and that additional electricity can be generated by improving the existing distribution network rather than installing new generating capacity. Critics have also accused CEZ of offering to supply energy to other countries at prices that are below production costs (dumping), a practice CEZ has publicly denied.

Although CEZ has stated that Temelin meets and even exceeds EU safety standards for nuclear power plants, Czech and Austrian environmentalists who oppose the project have accused CEZ of failing to conduct adequate safety checks. Ironically, one argument in favour of Temelin is an environmental one; specifically, that it will relieve the northern Czech Republic, whose aging coal-burning stations and extensive strip mines have turned the area into one of Europe's most polluted regions, of continued environmental degradation. The Czech government is eager to privatize Temelin when it sells its shares in CEZ.

SLOVAK REPUBLIC

Slovakia, unlike the country it was formerly joined with, the Czech Republic, has experienced significant political difficulties in its transition from a Communist state to a market economy seeking to join the European Union. The leader of Slovakia after its dissolution from the Czech Republic in 1993, Prime Minister Vladimir Meciar, was accused during his term of office of thwarting democratic principles and imposing a biased election law. However, the election of Mikulas Dzurinda as Prime Minister in 1998, and

Rudolf Shuster as President in 1999 began an era of increasing democracy and integration with the rest of Europe and the possibility of EU and NATO membership. New parliamentary elections are set for the autumn of 2002.

The government began a structural reform program in 1999 that aims to privatize several state-owned companies, control the budget deficit, and reform the healthcare and social security pensions systems. The government has had some success, with budget deficits of 5% of GDP during the Meciar era reduced to 3.7% in 2001 and targeted for 3.5% or less in 2002. Proceeds from privatizations in the steel, energy, telecoms, and financial sectors have also helped reduce the deficit. After growth rates of 1.9% in 1999 and 2.2% in 2000, growth finally went above 3% in 2001 to 3.1%. Slovakia needs solid economic growth to reduce its high unemployment rate, one of the highest in Europe at about 17.5%, but as high as 40% in some areas of eastern Slovakia.

A possible drag on Slovakia's growth in 2002 is continued low growth in the EU, and particularly in Germany, Slovakia's most important trading partner. Trade accounts for about 76% of Slovakia's GDP, and Slovakia's trade deficit grew substantially in 2001, with exports declining 3.7% and imports rising 6.5%. Slovakia's trade deficit has been sustainable because of substantial inward investment flows, but it is unclear whether they will continue. Another drag on the economy has been the recent collapse of BMG Invest, an investment scheme that had 200,000 investors who will most likely not be compensated for their losses.

Slovakia closed the energy chapter of its EU accession talks in November 2001. The country agreed to close the two oldest of four blocks at the Jaslovske Bohunice nuclear power plant. The Economy Ministry sets energy policy.

Oil

Slovakia's oil production is the smallest of the four countries in the Visegrad Group, with production of only about 1,000 bbl/d in 2001. This is an increase over the previous year, with most of the gain coming from Nafta Gbely's Gajary Baden reserves in western Slovakia. Nafta Gbely is one of 18 members of the Nafta Group, Slovakia's oil and natural gas extraction company. Slovakia is a small oil consumer at about 72,000 bbl/d in 2001, and is nearly completely dependent on imports.

Slovakia imports its crude oil from Russia through the Druzhba (Friendship) and Adria oil pipelines. These pipelines have a capacity of about 422,000 bbl/d, but have not been used at full capacity. Transpetrol, the operator of the pipelines in Slovakia, transported about 187,000 bbl/d in 2000, of which about 106,000 bbl/d went to Slovnaft's refinery in Bratislava and the rest was shipped onward to the Czech Republic. Slovnaft is Slovakia's only refinery, and it has a capacity of 115,000 bbl/d. Slovnaft is 36.2% owned by MOL of Hungary.

In December 2001, the Slovak government approved the sale of a 49% stake with managing powers in Transpetrol to Russia's second-largest oil producer, Yukos. Yukos was chosen over domestic company Slovnaft. Yukos plans to use the pipelines' available capacity to supply more oil to western Europe, in particular to Germany through the Druzhba and to Croatia's coast for shipment to Mediterranean countries through the Adria. The Adria pipeline connects to Croatia through Hungary.

Natural Gas

Slovakia, though a very small producer of natural gas, is very important as a transit country. It is estimated that about 25% of the natural gas consumed in western Europe transits through Slovakia. This represents about 70% of the Russian natural gas exported to western Europe. Slovakia produced only about 7 Bcf of natural gas in 1999. However, the country's per capita natural gas consumption was the highest amongst the Visegrad Group countries, as about 80% of Slovak households are connected to the natural gas network. Slovakia's state-owned natural gas monopoly, Slovensky Plynarensky Priemysel (SPP) plans to invest 1.643 billion crowns for additional gas mains in 2002 to connect additional households. In March 2001, a consortium of Gaz de France (GdF), Ruhrgas, and

Gazprom submitted a 49% stake in SPP, which is being reviewed by the state's privatization committee. However, ruling Party of the Democratic Left leader Pavel Juncos has since declared that a 49% stake could not be sold for the $2.69 billion offered, but only a 34% stake. It is reported that the Slovak cabinet has agreed to the consortium's offer, but this has yet to be officially announced.

There are two major natural gas pipeline routes in Slovakia. Both receive natural gas from Russia via Ukraine; one transits onward to the Czech Republic and Germany, the other transits to Austria. The pipelines' Slovak sections are operated by SPP. The pipelines deliver about 3.18 Tcf per year to Western Europe. There are plans to build an extension of the Yamal II natural gas pipeline that would bypass Ukraine and instead transit Belarus and Poland to Slovakia. The planned 373-mile pipeline, 72 miles of which would pass through Slovakia, would have a capacity of 1.06 Tcf per year.

Slovakia's natural gas market is to be liberalized (i.e. customers will be able to choose their supplier) in stages, with liberalization beginning July 2002 for customers with an annual consumption of more than 882 million cubic feet (25 million cubic meters), in 2003 for customers with an annual consumption of more 530 million cubic feet (15 million cubic meters), and in 2008 for customers with an annual consumption of more than 177 million cubic feet (5 million cubic meters).

Coal

Slovakia's coal reserves and production are much smaller than that of the other members of the Visegrad group. Slovakia's coal reserves are estimated at just 190 million short tons, all of which is subbituminous and lignite. Most of the coal is used for electricity production. Production was about 2.5 million short tons in 1999. There are three coal mining companies in Slovakia, all of which are privately owned, and almost all the coal they produce is brown coal. The largest is Hornonitrianske bane Prievidza (HBP), with about 64% of all coal sales. Its main customer is Slovakian electricity company Slovenska Elektrarne (SE), however, HBP has plans to build its own coal-fired power station. The other two companies are Dul Dolina (also known as Bana Dolina) and Bana Zahorie.

Electricity

In 1999, Slovakia's installed electric power generating capacity was about 7.8 million kilowatts, about the same as that of Hungary, despite Slovakia having a smaller population. Slovakia's generating capacity is diversified, with coal, natural gas, hydro, and nuclear power plants each having less than a third of overall capacity in 1999. With two nuclear reactors coming on line in 1998 and 2000, Slovakia has become more reliant on nuclear generation and less reliant on coal and fuel oil (mazut) for electricity generation. Slovakia still has substantial unused hydroelectric potential. Slovakia generated about 22.6 Bkwh of electricity in 1999, and it is estimated that this total increased in 2000 and 2001. SE alone, which supplies about 85% of Slovakia's electricity, is estimated to have generated about 24.9 Bkwh in 2001. Slovakia was a small net electricity importer in 1999, but it is estimated to have become a net exporter in 2001, as preliminary estimates of electricity consumption in 2001 are about 26.9 Bkwh.

SE is Slovakia's dominant electric power company. It is state-owned, but it is likely to be partially privatized after undergoing organizational and financial restructuring. The government acknowledges that this restructuring will not be completed before the September 2002 elections. SE generates about 85% of Slovakia's electricity, operates the national transmission grid, and trades electricity. Distribution is carried out by three regional companies: Zapadoslovenske Energeticke Zavody (ZSE), Stredoslovenske Energeticke Zavody (SSE), and Vychodoslovenske Energeticke Zavody (VSE). The government has issued tenders for 49% stakes in these companies, and several foreign firms have expressed interest, including CEZ of the Czech Republic.

On January 1, 2002, consumers of more than 100 gigawatthours (Gwh) were supposed to have been allowed to choose their supplier. This covers about 19 large companies that rerpresent some 28% of the market. This

liberalization was postponed by the Economy Ministry, however, because an independent electricity regulating agency has not yet been formed and the restructuring of SE is incomplete. Liberalization for customers using more than 40 Gwh is scheduled for 2003, and complete liberalization for 2007.

Nuclear

Slovakia has two nuclear power plants, which generated an estimated 59% of Slovakia's electricity in 2001. All of Slovakia's functioning reactors use the VVER-440 V213 Soviet design and are operated by SE. Slovakia's nuclear plants are regulated and monitored by the Slovak Nuclear Regulatory Authority (UJD). The Jaslovske Bohunice plant at Trnava has four, 408-MW reactors that are functioning, and one decommissioned reactor. The plant's two older reactors are due to be decommissioned in 2006 and 2008 as part of the energy chapter of Slovakia's acession agreement with the EU. An EU study in 1992 determined that the two older functioning reactors at the plant could not be modernized at a reasonable cost. The two newer reactors will require investment of 12.62 billion crowns by 2008 for their modernization, according the the Ministry of the Economy. The modernization is required by the UJD, the International Atomic Energy Agency (IEAA), and legislation. The Mochovce plant has two completed 412-MW reactors that went on line in 1998 and 2000 and two uncompleted reactors whose construction has been halted as government financial support for them has ended.

HUNGARY

Hungary transitioned from a Communist state to a democratic one without violence and held its first free, multi-party parliamentary election in 1990 after the former parliament and Communist Central Committee made a "democracy package" of key reforms in 1989. Hungary emerged from the Communist era with one of the most advanced economies of region, but still not nearly as developed as its neighbor and former partner in the Austro-Hungarian Empire, Austria. Hungary also had significant foreign debt. The first post-Communist government encountered problems in the transition to a market-based economy, with real GDP falling about 18% from 1990-1993. Industrial output also shrank, and the foreign debt, current account deficit, and budget deficit rose to high levels. The new government of 1995 instituted an austerity and privatization program as well as a new export-promoting foreign exchange regime to reduce the debt and deficit levels. By 1997, the country's finances were solid and Hungary no longer requires any assistance from the International Monetary Fund (IMF), and has repaid all of its debt to the Fund.

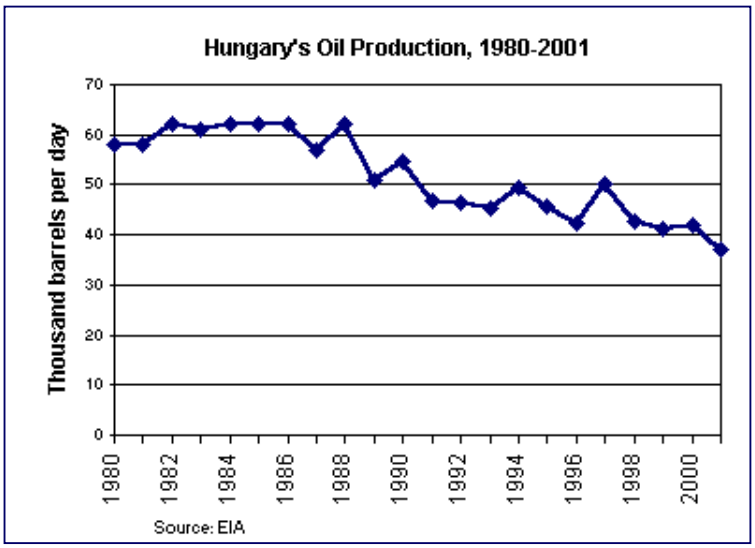
The Federation of Young Democrats (renamed Fidesz-Hungarian Civic Party (MPP) in 1995) captured a plurality of parliamentary seats in the May 1998 elections and forged a coalition with the Smallholders and the Democratic Forum. The head of Fidesz, Viktor Orban, became Prime Minister. The current government is more nationalistic than the previous ones, and has championed the rights of Hungarian minorities living in surrounding countries. The government has also slowed the pace of liberalization in some sectors and has favored more state intervention than the previous government. A parliamentary election is scheduled for spring 2002. Hungary entered NATO in 1999 and has applied to become a member of the EU in 2004 or 2005. Hungary became a member of the International Energy Agency (IEA) in 1997

Hungary had strong economic growth of 5.2% in 2000 and this continued into 2001, with a growth rate of 3.8%, despite the global economic slowdown, especially in major trading partners Germany, Italy, and Austria. Hungary has had the strongest economy in the Visegrad group over the past three years. Hungary is dependent on exports for economic growth, and a 13% expansion in exports (especially services) in 2001 was a prime factor driving Hungary's growth and the reduction of Hungary's current account deficit to about 2.1% of GDP. Inflation began to

fall in late 2001, and is predicted to be about 6.5% in 2002, the lowest level since Hungary became a market economy. The lower inflation has made it possible for the central bank to cut interest rates 50 basis points in January 2002.

Oil

Hungary is the largest producer of crude oil among the Visegrad Group by far, though still a small producer by international standards. Crude oil production rose very slightly in 2001 to about 27,000 bbl/d, but production of natural gas liquids fell by about 5,000 bbl/d. Hungary's oil production had been declining steadily since its peak in the mid-to-late 1980s of 62,000 bbl/d. Nearly half of Hungary's crude oil comes from the Algyo field in the south central part of the country, and the remainder is produced from numerous fields with production of less than 2,000 bbl/d. Oil reserves are about 110 million barrels. Hungary's oil and natural gas company MOL has undertaken increased domestic exploration, and the company estimates that only 60% of the country has been thoroughly explored.



Hungary consumed about 146,000 bbl/d of oil in 2001, so the country is reliant on imports, mostly from Russia. Consumption has declined steadily from a peak of 244,000 bbl/d in 1980. Russian oil is imported through part of the Druzhba pipeline. A smaller amount of oil is also imported from the Middle East.

Hungarian Oil and Gas Company (MOL) is Hungary's largest company in terms of net revenue, and is dominant in the upstream and downstream oil sectors. The company is responsible for almost all of Hungary's natural gas and oil exploration and production, transmission, stockpiling and wholesale trade. It has an 82% share of the wholesale oil market and a 42% share of the retail market. It was partially privatized through stock market flotations 1994-1998. The state retains a 25% "golden" share. In 2001 MOL merged its domestic and international upstream activities into one unit and decided to cease all oil exploration abroad with the exception of Yemen. MOL will, however, continue to acquire areas abroad where oil has already been discovered. MOL has attempted to purchase downstream assets in other central European countries, but its only successful purchase so far is a share of Slovakian refiner and retailer Slovnaft. In November 2001, MOL sold its 51% stake in oil storage firm Koolajtarolo to the Crude Oil and Oil Product Storage Association (KKKSz) for 6 billion forints.

In 2001, MOL shut down the crude processing facilities at its 60,000-bbl/d Tiszaujvaros and 10,000-bbl/d Zalaegerszeg refineries as part of a cost-cutting move. The Zalaegerszeg refinery will operate as an asphalt plant and the Tiszaujvaros refinery will still be used for a small amount of other processing, but the only remaining crude oil refinery in Hungary is MOL's 161,000-bbl/d Szazhalombatta refinery. Retail oil products prices and trade were liberalized in the early 1990s.

Natural Gas

Hungary produced about 121 Bcf of natural gas in 2000. Hungarian natural gas production has been declining steadily for many years, though domestic production still accounts for a significant share of consumption. Consumption fell slightly, to an estimated 411 Bcf in 2000 from 437 Bcf in 1999, as both domestic production and imports declined. About 80% of Hungary's natural gas imports are from Russia through part of the Druzhba pipeline. Some Russia gas transits onward to the former Yugoslavia through Hungary. The Gyor-Baumgarten natural gas pipeline connects Hungary to Austria and western Europe's natural gas grid. This enables Hungary to import natural gas from GdF and Ruhrgas. Natural gas demand is expected to increase by about 20% by the end of

the decade, so Hungary's natural gas imports will increase significantly in light of declining domestic production.

MOL is Hungary's only natural gas producer and importer and operates the natural gas pipelines. Natural gas distribution is the responsibility of regional companies. In addition to natural gas' use for electricity generation and industry (60% of total use), about 60% of Hungarian households are supplied with natural gas (40% of total use). Natural gas represented about 41% of energy consumption in Hungary in 1999.

MOL has been losing money for several years now, at a current rate of over $1 million per day, or about 118 billion forints in 2001. This results mainly from government price caps, which force MOL to sell imported natural gas at a loss. In September 2001, MOL lost a lawsuit against the government in the Constitutional Court. MOL charged that the government was violating laws on natural gas pricing in forcing the company keep natural gas price increases below levels necessary to recover costs. Because of this, MOL has attempted to sell off at least part of its natural gas division. However, the government is not eager to lose control of Hungary's natural gas assets. Hence, despite the interest of several foreign companies, including a local subsidiary of GdF and Ruhrgas, the state-owned Hungarian Development Bank is in exclusive talks to acquire 100% of MOL's natural gas division, effectively re-nationalizing the company and a step backward from the liberalization occurring in the region. Prime Minister Orban has stated that he wants price controls for natural gas to remain in place for up to eight more years.

Coal

Hungary is a much smaller coal producer than Poland or the Czech Republic, and about 95% of the coal produced is brown coal (including lignite). Nevertheless, coal is an important part of Hungary's energy mix, accounting for 14.6% of energy consumption in 1999 and about 25% of electric power generation. Coal's share is declining, however, and is expected to continue to do so in the next ten years. Hungary produced about 15.6 million short tons of coal in 2000. This is down sharply from about 22.4 million tons produced in 1989, at the end of the Communist era. This reflects a decline in certain energy-intensive heavy industries as well as closures of unprofitable mines that occurred in 1990s as the industry privatized. In addition, domestic lignite with high sulphur content has caused air pollution, and a new coal-fired power plant being built will use imported Russian coal. However, Hungary's lignite (about 85% of reserves) is inexpensive to produce through open-pit mines in the Matra and Bukk mountains, so there will continue to be a demand for it at older electricity generating plants. Hungary's coal consumption in 2000 was about 16.1 million short tons, down sharply from 25.3 million short tons in 1989.

Electricity

Hungary's electricity sector, like others in the region, is undergoing a process of liberalization and restructuring. Most of the sources of Hungary's capacity and generation are thermal, though Hungary's 4-unit nuclear plant at Paks generates slightly less than 40% of total electricity generated. Hydropower generates less than 1% of Hungary's electricity. It is estimated that Hungary generated about 34.9 Bkwh in 1999 and consumed about 33.5 Bkwh in 1999. Consumption peaked at 37 Bkwh in 1989, but declined in the early 1990s as Hungary's post-Communist economy grew less energy-intensive. Electricity consumption has since increased, but at less than the rate of economic growth. The Hungarian government predicts that electricity consumption will grow an average of 1.45% per year this decade, assuming 5% economic growth. According to the Hungarian government, power generating capacity currently exceeds consumption by about 30%. Nevertheless, Hungary is a net importer of electricity, mostly from Slovakia. Preliminary estimates of 2000 production show it declining, but 2000 consumption was steady, so electricity imports rose in 2000. The electricity sector accounts for about 4% of Hungary's GDP.

For years, the state-owned Hungarian Electricity Works (Magyar Villamos Muvek - MVM) generated most of Hungary's electricity, was the sole importer/exporter, and owned and operated the national electricity grid through

subsidiary Mavir. This has changed, however, as Hungary's eight generation companies were unbundled from MVM over the past few years, and Mavir was acquired by the Ministry of Economic Affairs in February 2002, with the state privatization agency APV exercising ownership rights. In return, MVM is to be compensated financially by the government and by APV handing over stakes in a number of power plants to MVM. However, this may be problematic as liberalization proceeds, as no generator will be able to hold more than 30% of total market capacity. MVM already owns the Paks nuclear power plant and the Vertes power company, which are already about 30% of capacity. The eight generating companies (seven thermal and one hydroelectric) have been partially or fully privatized, but hydroelectric power company Tiszaviz Kft will likely be returned to full ownership by MVM as part of the compensation for Mavir by APV. Tiszaviz's two hydroelectric plants are slated to be modernized later this decade. There are also independent power producers (IPPs) in Hungary, which sell their power to distributors under long-term power agreements.

MVM/Mavir has made and continues to make improvements to Hungary's electricity network. In November 2001, MVM completed a 17 billion forint, network control system that connects the system to 166 other power plants and distributors and prepares the Hungarian power industry for the planned market opening in 2003. In September, MVM announced that it plans to restart investment projects on the national grid, including an expansion of the Sandofalva-Bekescsaba powerline for 18 billion forints and an expansion of the line between the southern city of Pecs and the nuclear power plant at Paks. In May 2001, MVM (represented by Mavir) became a member of European electricity transmission system Union for the Coordination of Transmission of Electricity (UCTE) as the result of a 12-year process. Hungary's power and transmission system operates in accordance with the systems of most other European countries, providing increased security of supply according to MVM.

Hungary has passed electric power liberalization legislation set to go into effect beginning in January 2003. It will begin with large consumers (about 200-300 large industrial users with annual consumption above 6.5 Gwh) that represent about 35% of the market. The legislation still requires lower-level regulations that will specify how much electricity these large users can purchase on the open market or from abroad. These regulations will also need to specify how so-called "frozen" costs will be distributed. These are additional costs that arise from the fact that consumers in a free market are unlikely to buy all the power that wholesaler MVM has already purchased through long-term contracts and will have to be reimbursed. Additional liberalization will be phased in gradually, but must conform with EU regulations by the time that Hungary accedes, as the country has not requested any special exemptions. New power stations were permitted to be built without long-term purchase contracts as of February 2002. Many analysts are skeptical of Hungary's liberalization plans, because Hungary's electricity producers have higher costs than outside European sources, but are protected by long-term contracts with MVM. It is unlikely that the government would simply allow many power plants to go out of business when exposed to competition. Another problem is that MVM is selling below cost to distributors because of price caps, and then being compensated by the government for losses. Currently, the government is considering allowing the large consumers to purchase no more than 50% of their electricity on the open market in 2003. Also, given the small size of Hungary's electricity market and the continuing prevalence of long-term contracts, the creation of a physical spot or short-term market may be difficult. Nevertheless, in June 2001, the European Commission announced its satisfaction with Hungary's regulation of its electricity sector and concluded that the relevant legislation is in line with EU requirements.

Hungary has several new power plants planned or under construction. Central European Steel Group of Russia plans to build a 590-MW coal-fired plant near the border with Ukraine. Higher quality Russian coal will be used as the fuel source, and the plant's construction is expected to begin by the summer of 2002. Fortum Engineering of Finland and Budapest Power Plant plan to build a 110-MW gas-fired, combined cycle power plant in the Kispest area of Budapest. The plant will also produce 120 MW of district heat. E. On of Germany's Hungarian subsidiary built and owns over 90% of a combined-cycle 95-MW power plant in Debrecen that was officially opened in November 2001. The plant is an IPP, having no long-term contract with MVM. AES of the United States has been

very active in Hungary, having purchased state-owned power producer Tizai Gorup in 1996. AES at the time promised to make several hundred million dollars in investments in return for long-term contracts with MVM that would support the costs of the investments. In October 2000, AES sued the Hungarian government and MVM and canceled new investment in Hungary because it claimed that MVM had failed to agree to the contracts. In January 2002, AES reached a compromise with the government and MVM that will have MVM obligated to purchase power from AES' 860-MW Tiza II oil and gas-fired plant for 15 years and for two more years from AES' smaller coal-fired power plants, after which the two coal-fired plants will be retired. AES also agreed not to build two new power plants the company had planned. NRG Energy of the United States has also invested in Hungary's power sector, having bought Powergen of the UK's Csepel II 389-MW combined cycle gas turbine power plant in April 2001.

Nuclear

The Paks nuclear power plant at Tolna Megye consists of four Soviet-design, second generation VVER-440/213 reactor units that each have a net generating capacity of 433 MW (the oldest unit has a net capacity of 430 MW). Paks is owned and operated by MVM subsidiary Paks Nuclear Power Plant Co. The Hungarian Atomic Energy Authority (HAEA) regulates the plant. The plant is undergoing a 60-billion-forint multiyear safety upgrade program to be finished at the end of 2002. HAEA is considering a request by the Paks Nuclear Power Plant Co. to extend the lifetime of the four reactors beyond their 30-year design lives and to uprate the power at each unit by about 10%. The four units went online between 1982 and 1987. In June 2001, an accidental fire occurred that caused the plant 1.15 billion forints in losses and 150 million forints in repairs, but the accident did not have to do with the nuclear reactor, so there were no significant safety issues raised. Hungary has bilateral agreements with the other countries of the region for notification and information sharing in the case of an emergency. The EU regards the plant as safe by Western nuclear power plant standards.

Table 1. Economic and Demographic Indicators for North Central Europe

Country	Gross Domestic Product (GDP), 2000E (Billions of U.S. $)	Real GDP Growth Rate, 2000 Estimate	GDP per capita, 2000 Estimate (U.S. $)	Population, 2001E (Millions)
Poland	158.3	4.0%	4,097	38.6
Czech Republic	50.8	2.9%	4,943	10.3
Slovak Republic	19.2	2.2%	3,555	5.4
Hungary	46.8	5.2%	4,680	10.0
Total/Weighted Average	275.1	3.9%	4,278	64.3

Source: DRI WEFA

Table 2. Energy Consumption and Carbon Dioxide Emissions in North Central Europe, 2000

Country	Total Energy Consumption (quadrillion Btu, 1999)	Oil (thousand barrels per day, 2001)	Natural Gas (billion cubic feet)	Coal (million short tons, all types)	Electricity (billion kilowatthours)	Energy-Related CO_2 Emissions (million metric tons of carbon, 1999)
Poland	3.84	431	444.6	155.3	138.8	84.5
Czech Republic	1.54	175	327.4	63.3	63.2	28.5
Slovak Republic	0.70	72	292.3	11.2	27.8	9.2
Hungary	1.07	149	411.2	16.1	38.2	16.2
Total	7.15	827	1,475.5	245.9	268	138.4

Sources: Energy Information Administration; PlanEcon

Table 3. Energy Supply Indicators in North Central Europe

Country	Crude Oil Reserves, Million Barrels, 1/1/02E	Natural Gas Reserves, Trillion Cubic Feet, 1/1/02E	Coal Reserves, Million Short Tons, 1999	Oil Production, Thousand Barrels per day, 2001	Natural Gas Production, Billion Cubic Feet, 2000	Coal Production, All Types, Million Short Tons, 2000	Electricity Generation, Billion Kilowatthours, 2000	Crude Oil Refining Capacity, Thousand Barrels per Day, 1/1/02
Poland	114.9	5.12	15,773	14.2	174.9	179	145.1	382
Czech Republic	15	0.14	6,809	6.4	2.9	71.3	73.1	198
Slovak Republic	9	0.53	190	1	14.1	4.1	29.9	115
Hungary	110.9	1.28	4,917	37.2	121.9	15.6	34.2	161
Total	249.8	7.07	27689	58.8	313.8	270	282.3	856

Sources: Energy Information Administration; PlanEcon

Sources for this report include: BBC; CIA World Factbook; Czech News Agency; DRI WEFA; Economist Intelligence Unit; Financial Times; Hungarian News Agency; PlanEcon; Platts Oilgram; Polish News Bulletin; Prague Business Journal; Slovak Spectator; U.S. Department of Commerce; U.S. Department of Energy and Energy Information Administration; Weekly Petroleum Argus; World Markets Online.

LINKS

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CIA World Factbook - Poland
U.S. Department of Energy's Office of Fossil Energy, Energy Overview of Poland
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U.S. State Department's Consular Information Sheet - Poland
U.S. Commerce Department's Country Commercial Guide - Poland
U.S. State Department's Background Notes on Poland
Library of Congress Country Study on Poland (October 1992)
U.S. Commerce Department's Market Access and Compliance, Poland
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October 2001

Regional Indicators: European Union (EU)

The European Union, with increasingly integrated economies and energy sectors, is the world's second-largest energy consumer (behind the United States). EU members include: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

Note: Information contained in this report is the best available as of October 2001 and is subject to change.

BACKGROUND

The European Union (EU) was founded as the European Economic Community (EEC) by the Treaty of Rome in 1957 to promote economic and political integration in Europe. The founding of the EEC followed the creation of the European Coal and Steel Community, established after World War II as a means of promoting integration among former enemies. The EEC has expanded from its original six members (Belgium, France, the Federal Republic of Germany, Italy, Luxembourg, and the Netherlands) to include the United Kingdom, Ireland, and Denmark in 1973; Greece in 1981; Spain and Portugal in 1986; and Austria, Finland, and Sweden (former members of the European Free Trade Association) in 1995. The Treaty on European Union (known as the Maastricht Treaty) ushered in a new stage in European history when it entered into force on November 1, 1993. Maastricht renamed the community (now known as the EU), created European citizenship, strengthened the power of the European Parliament, laid out plans for Economic and Monetary Union (EMU), and committed members to negotiate for expansion of the EU to include Central and Eastern European countries. In 2000, EU members were estimated to account for 29% of world economic activity (see Table 1), a share that remained about constant during the 1990s. The United States has extensive trade relations with the EU. In 2000, 22% of U.S. exports ($152 billion) went to EU members, and 19% of U.S. imports ($195 billion) originated in EU countries.

As part of EMU, 11 EU member countries (Belgium, France, Germany, Italy, Spain, Portugal, Finland, Austria, the Netherlands, Ireland and Luxembourg) adopted a new common European currency, called the "euro," on January 1, 1999. The European Central Bank (ECB) is housed in Frankfurt, Germany. This means that a single monetary policy for the 12 particpating countries is elaborated at the ECB. Euro banknotes and coins are scheduled to begin circulating in all participating countries no later than January 1, 2002, and the euro is to replace completely all participating countries' national currencies by July 1, 2002. Most countries' banks have already been frontloaded with coins and banknotes, starting in September 2001.

Greece was the only EU member country that applied but was denied entry to EMU at its introduction; in June 2000, Greece's application was accepted and Greece became a member of the euro-zone on January 1, 2001. The

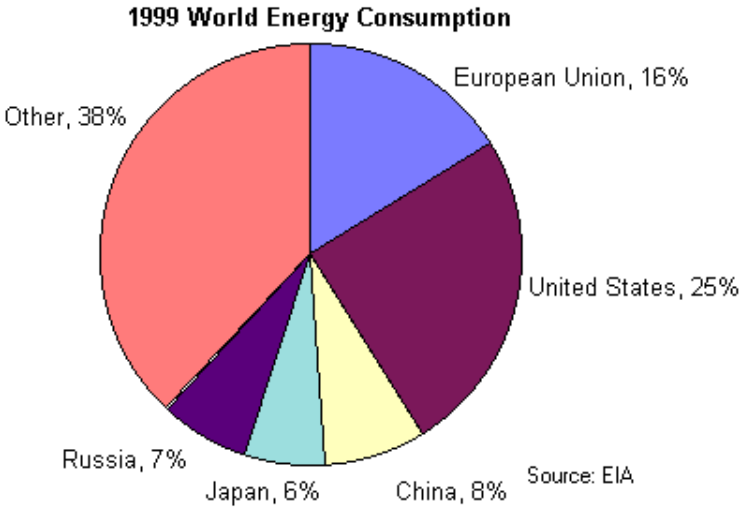
United Kingdom and Denmark opted out and Sweden purposely did not meet requirements. The euro-zone represents about 80% of the EU's GDP. The euro currently functions as a base currency for the currencies of all the countries participating in the euro; they are all fixed to the euro, and although the euro is not used as banknotes or coinage, the euro is the only currency that fluctuates in value with other currencies, including the U.S. dollar. The euro fell in value intially against the dollar, from being worth $1.18 in January 1999, to about $1.00 by the end of 1999, and $0.85 in October 2000, before rising again to $0.93 in January 2001. Since then, the euro has stabilized at between $0.93 and $0.85, being valued most recently at $0.91.

In 2001, the Treaty of Nice was signed by member governments. This treaty changes the way the institutions of the EU operate in order to make possible the admission of new member states in the future. Central and Eastern European EU applicants expected to join in the next phase of EU expansion include Poland, Hungary, the Czech Republic, Estonia, Slovenia and Cyprus. Some EU members are calling for a target date by which these applicants will be admitted officially. No date has been set, but membership is expected to extend to these six countries by about 2005. Slovakia, Bulgaria, Romania, Latvia, Lithuania, Turkey and Malta also have begun discussions of accession.

EU legislation has played a significant role in member countries' domestic energy policies. The EU Directive on Electricity was passed in January 1997 and required members to begin opening up their electricity markets to competition within two years (Greece, Belgium and Ireland were granted waivers). The EU Natural Gas Directive was passed in June 1998 (Greece, Belgium,and Ireland again were granted waivers), requiring the opening of EU members' gas markets. The Gas Directive has also affected Norway, as it is a member of the European Economic Area (EEA).

ENERGY CONSUMPTION

In 1999, EU countries consumed 62.7 quadrillion British thermal units (Btu) of energy (16% of the world's total) and generated 915 million metric tons of energy-related carbon emissions (15% of the world's total). Oil is the dominant fuel (see Table 2), accounting for 44% of 1999 total energy consumption in the region, followed by natural gas at 22%. In 1999, EU members consumed about 34% of the world's nuclear power, 18% of the world's oil, 16% of the world's natural gas, and over 10% of the world's coal. Over the past decade, natural gas has been the fastest growing fuel source in the EU, mainly at the expense of coal, whose share has declined sharply. This is in part due to environmental considerations, but also due to increased availability of natural gas supplies because of pipelines from Algeria, Norway, and Russia. Nuclear power generation has grown only slightly over the past decade. Nuclear power is gradually being phased out in Germany over the next twenty years, so its share of EU energy consumption is likely to drop. Hydroelectric power generation has remained about constant over the past decade. Other "renewables" (geothermal, biomass, solar, wind) doubled between 1992 and 1999, from a relatively small base level. Renewable energy and natural gas are expected to be the two fastest growing fuels in the EU over the next 20 years.



The combined economies of the EU are similar in size to the U.S. economy ($8.5 trillion gross domestic product for the EU in 2000 and $10 trillion for the United States), and the EU population of 379 million exceeds the U.S. population of 278 million. However, EU total energy consumption for 1999 of 63 quads is less than the U.S.

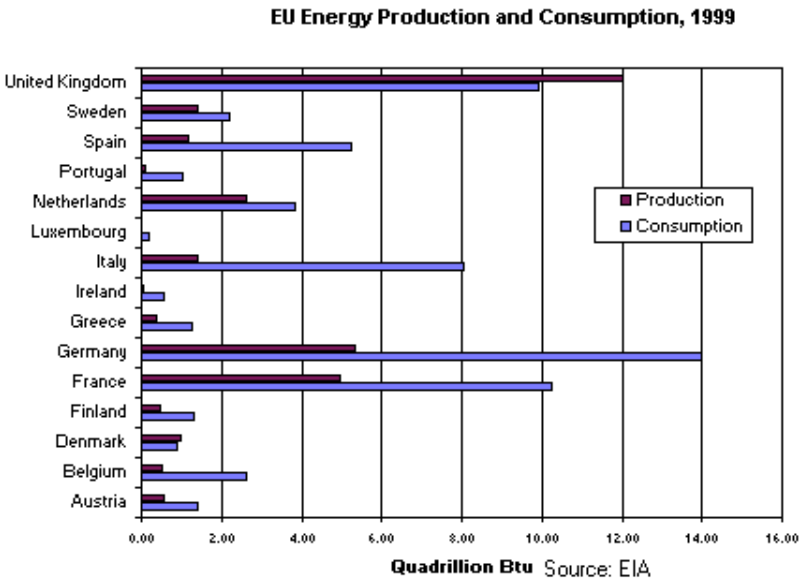
consumption of 97 quads.

ENERGY RESOURCES AND SUPPLY

EU members possess only about 0.7% of the world's proven reserves of oil and 2.2% of the world's natural gas reserves (see Table 3). However, they have 7.4% of proven coal reserves, 16% of the world's capacity for refining crude oil into petroleum products, and 16% of the world's electric generating capacity. In 1999, they produced 5% of the world's crude oil, 9% of the world's natural gas, and 8% of the world's coal.

IMPORT DEPENDENCY

The EU region is a net importer of energy. In 1999, while the EU's 15 members consumed 16% of the world's energy, they produced only 8%. Import dependency varies by fuel and individual country, with an overall import dependency for the entire EU of around 50%. In 1999, the EU was a net importer of coal (8% of world production in terms of tonnage vs. 11% of consumption in terms of tonnage); natural gas (9% of world production vs. 16% of consumption); and oil (5% of world production vs. 18% of consumption). Germany, Italy, and France are the EU's largest net importers of energy; the United Kingdom is the only significant net exporter. EU oil is imported primarily from Russia, the Persian Gulf region, Norway, and North Africa.



ENERGY USE AND CARBON EMISSIONS

The 15 EU countries collectively emitted 915 million metric tons (Mmt) of carbon from the consumption of fossil fuels in 1999. This accounted for 15% of world carbon emissions in that year. Of the EU countries, Germany emitted the most carbon (230 Mmt), followed by the United Kingdom (152 Mmt), Italy (121 Mmt) and France (109 Mmt). Overall, the EU emitted 2.4 metric tons of carbon per person in 1999, compared to a U.S. average of 5.6 metric tons per person. Under the December 1997 Kyoto Protocol, the EU is obligated to reduce its greenhouse gas emissions 8% from 1990 levels (in that year, the EU emitted 913 Mmt of carbon) by 2008-2012. All EU member states signed the Kyoto Protocol on April 29, 1998. On June 17, 1998, the EU agreed on how it would meet the 8% reduction. Under this agreement, different EU member states are assigned varying degrees of emission cuts, ranging from a 4% increase in the case of Sweden, to a reduction of 28% in the case of Luxembourg, with other countries somewhere in between.

Table 1. Economic and Demographic Indicators for EU Countries

	Gross Domestic Product (GDP) (purchasing power parity)				
	2000E (Billions of U.S. Dollars)	Real GDP Growth Rate		Per Capita, 2000E(U.S. Dollars)	Population, 2001E (Millions)
		2000 Estimate	2001 Projection		

Austria	$203	3.1%	2.6%	$25,000	8.2
Belgium	$259.2	4.1%	2.5%	$25,300	10.3
Denmark	$136.2	2.8%	2.2%	$25,500	5.4
Finland	$118.3	5.6%	4%	$22,900	5.2
France	$1,448	3.1%	2.7%	$24,400	59.6
Germany	$1,936	3%	2.4%	$23,400	83
Greece	$181.9	3.8%	3.9%	$17,200	10.6
Ireland	$81.9	9.9%	8.4%	$21,600	3.8
Italy	$1,273	2.7%	2.5%	$22,100	57.7
Luxembourg	15.9	5.7%	5.5%	$36,400	0.4
Netherlands	$388.4	4%	3.2%	$24,400	16
Portugal	$159	2.7%	2.8%	$15,800	10
Spain	$720.8	4%	4.4%	$18,000	40
Sweden	$197	4.3%	2.8%	$22,200	8.9
United Kingdom	$1,360	3%	2.4%	$22,800	59.6
Total	**$8,478.6**	**3.3%**	**2.8%**	**$22,446**	**378.7**

Source: CIA, WEFA World Economic Outlook.

Table 2. Energy Consumption and Carbon Emissions in EU Countries, 1999

	Energy Consumption								**Carbon Emissions (Million metric tons)**
	Total (Quadrillion Btu)	**Petroleum**	**Natural Gas**	**Coal**	**Nuclear**	**Hydroelectric**	**Other Renewable Electricity**	**Net Electricity Imports**	
Austria	1.39	39%	22%	9%	0%	30%	1%	-1%	18

Belgium	2.61	46%	23%	12%	18%	0.1%	0.4%	0.3%	38
Denmark	0.89	53%	23%	22%	0%	0.03%	5%	-3%	17
Finland	1.31	34%	11%	11%	17%	10%	8%	9%	13
France	10.26	41%	14%	6%	38%	7%	0.2%	-6%	109
Germany	13.98	41%	21%	23%	12%	1%	1%	0.1%	230
Greece	1.28	63%	4%	29%	0%	4%	0.3%	0.1%	26
Ireland	0.56	62%	23%	12%	0%	2%	0.5%	0.4%	10
Italy	8.04	51%	30%	6%	0%	6%	1%	5%	121
Luxembourg	0.19	49%	15%	2%	0%	2%	0.4%	31%	2
Netherlands	3.85	45%	40%	8%	1%	0.03%	1%	5%	64
Portugal	1.02	68%	8%	15%	0%	7%	1%	-1%	17
Spain	5.23	57%	11%	14%	11%	5%	1%	1%	82
Sweden	2.20	34%	1%	4%	30%	33%	1%	-4%	16
United Kingdom	9.92	35%	35%	16%	11%	1%	1%	%	152
Total	**62.73**	**44%**	**22%**	**13%**	**14%**	**5%**	**1%**	**0.4%**	**915**

Source: Energy Information Administration *Note: Percentages may not add to 100% due to independent rounding.*

Table 3. Energy Supply Indicators--EU Countries								
	Fossil Fuel Proved Reserves			**Fossil Fuel Production, 1999**				
	Crude Oil, 1/1/01(Million barrels)	**Natural Gas, 1/1/01 (Trillion cubic feet)**	**Coal (Billion short tons)**	**Oil (Crude, liquids, and processing gain; Thousand barrels/day)**	**Natural Gas (Trillion cubic feet)**	**Coal (Million short tons)**	**Electric Generating Capacity, 1/1/99 (Million kilowatts)**	**Crude Oil Refining Capacity, 1/1/01 Thousand barrels/day)**

Austria	86	0.9	0.0	21	0.1	1.3	14	209
Belgium	0	0.0	0.0	12	0.0	0.4	13	768
Denmark	1,069	3.4	0.0	304	0.3	0.0	13	176
Finland	0	0.0	0.0	0	0.0	0.0	16	200
France	145	0.5	0.1	80	0.1	6.3	108	1,895
Germany	380	11.5	73.9	132	0.8	226.1	108	2,259
Greece	10	0.0	3.2	4	0.0	67.2	9	407
Ireland	0	0.7	0.0	1	0.0	0.0	4	71
Italy	622	8.1	0.0	147	0.6	0.0	66	2,359
Luxembourg	0	0.0	0.0	0	0.0	0.0	0	0
Netherlands	107	62.5	0.5	114	2.6	0.0	14	1,204
Portugal	0	0.0	0.0	2	0.0	0.0	10	304
Spain	21	0.0	0.7	20	0.0	26.7	45	1,294
Sweden	0	0.0	0.0	0	0.0	0.0	33	423
U.K.	5,003	26.8	1.7	2,967	3.5	40.9	70	1,771
Total	**7,443**	**114.4**	**80.1**	**3,804**	**8.0**	**368.9**	**523**	**13,340**

Sources: Energy Information Administration, *Oil & Gas Journal*.

Sources for this report include: Energy Information Administration, International Energy Agency; European Union; Oil and Gas Journal.

LINKS

Links to other U.S. government sites:
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July 2001

Background | Oil | Natural Gas | Electricity | Links

Balkans Region

The Balkans have been the scene of political turmoil since the dissolution of the former Yugoslavia in the early 1990s. Even so, the Balkans are becoming an important transit center for energy supplies from the Black Sea area and beyond to Europe.

Note: All information contained in this report is the best available as of July 2001 and can change.

GENERAL BACKGROUND

The Balkans at its broadest conception can be considered to comprise the entire landmass south of Ukraine, Slovakia, and Austria, and east of Italy. However, for the purposes of this report, the countries that once encompassed the former Yugoslavia (Bosnia and Herzegovina, Croatia, The Former Yugoslav Republic of Macedonia (F.Y.R.O.M.), Slovenia, and the current Federal Republic of Yugoslavia (Serbia and Montenegro)), as well as Albania, will be the focus. Coverage will include energy projects and relationships of larger regional significance. Note that Bosnia and Herzegovina consists of two autonomous entities: the Federation of Bosnia and Herzegovina (FBiH) and the Republika Srpska (RS). The Former Yugoslav Republic of Macedonia will be referred to as simply "Macedonia." Serbia, one of the two constituent republics of Yugoslavia, consists of Serbia proper, as well as two

autonomous provinces: Vojvodina and Kosovo.

Prior to its dissolution, the former Yugoslavia had an energy infrastructure and general level of economic development comparable to that of other eastern block states such as the former Czechoslovakia and Hungary, but there was considerable diversity within the former Yugoslavia, with Slovenia being the most advanced and the Kosovo province of the Serbian Republic being the least developed. With the exception of Slovenia, the warfare and political instability that has occurred since 1991 has damaged the economic, and specifically, the energy infrastructures of all the constituent republics of the former Yugoslavia. Albania, prior to the demise of its isolationist communist regime in 1991, was far less developed economically than any part of the former Yugoslavia, and was the poorest country in Europe. Since that time, the Albanian economy has progressed, but it is still among the least developed in Europe. However, with the exception of Macedonia, the region appears poised for a more peaceful and prosperous decade than the 1990s. Slovenia is likely to be one of the countries to join the European Union (EU) when it expands, having completed many of the requirements of the *acquis communitaire*.

At the beginning of 2001, ethnic Albanian guerillas in Macedonia started a rebellion in Tetovo, the country's second-largest city, that has now caused months of fighting and has partially disrupted the country's economy. Negotiations between the government and ethnic-Albanian parties began after a partially effective cease-fire was put into effect in mid-June, but those negotiations broke down. Special envoys from the United States and EU conducted an urgent assessment of the deteriorating situation in the country on July 25, 2001, one day after riots in the capital and intense fighting between government forces and ethnic Albanian rebels renewed fears of civil war. Later that night, the Macedonian government announced that it had reached a new, NATO-brokered cease-fire with ethnic Albanian rebel forces, which had reached the outskirts of Tetevo. NATO plans to send peacekeepers if a permanent accord can be reached.

Following the end of former Yugoslav President Slobodan Milosevic's government in October 2000 and the initiation of democratic changes in Yugoslavia, all oil sanctions against Yugoslavia were lifted. In June 2001, the Serbian government handed Milosevic over to the United Nations War Crimes Tribunal in The Hague, where is currently imprisoned. Following this move, a conference of western nations pledged to donate $1.3 billion for the rebuilding of Yugoslavia, including at least $100 million from the United States. Montenegro was much less heavily damaged in the Kosovo crisis than was Serbia.

The total population of the former Yugoslavia and Albania is approximately 26.2 million, slightly less than the population of Bulgaria and Romania combined. Total GDP in 1999 (purchasing power parity) was $85.3 billion. Growth rates in 2001 are expected to be above

3% for all of the countries, although it is worth noting that there is significant uncertainty regarding Macedonia because of the political situation, and that Yugoslavia and to a lesser extent Bosnia, are still recovering from massive economic loss due to warfare during the 1990s.

In June 2001, seven Balkan countries - Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, and Yugoslavia - signed an agreement to create a free trade zone for certain goods to come into effect by the end of 2002.

OIL

The countries of the former Yugoslavia and Albania are very small consumers of oil, and even smaller producers, on a world scale, accounting for less than 0.01% of total world production and consumption. The region imported about 218,000 barrels per day (bbl/d) in 1999, mostly overland from Russia and from tankers at Adriatic ports. Total proven oil reserves for the area are 335 million barrels, all in Croatia, Yugoslavia, and Albania. Nevertheless, the region is likely to become relatively more important as a transit center (Figure 1).

International Projects

Currently, there is little cooperation between Balkan countries in oil production development. Some large international oil companies from outside the region have begun to invest in a few projects, but as the production potential of the area is limited, so is international investment. Most international interest is in Albania, which has the second-largest oil reserves in the Balkans, after Romania. Lundin AB of Sweden, Occidental, Forest Oil, OMV of Austria, Hellenic Petroleum (HP) of Greece, and INA of Croatia have all purchased shares of blocks in Albania. Exploration is active, but none are producing yet. U.K.-based Premier Oil is developing part of the Patos-Marinza field, which is already in production by Albanian state oil company Albpetrol. Premier expects initial peak production of 15,000 bbl/d.

Pipelines and Transit

The most important oil pipeline project in development in the Balkans is the AMBO pipeline. The Albanian Macedonian Bulgarian Oil Corporation (AMBO, U.S.-based) will construct a 567-mile, $1.13-billion crude oil pipeline from the Bulgarian port of Burgas to the Albanian port of Valona (Vlore) through Macedonia. The estimated capacity will be 750,000 bbl/d. The pipeline would reduce tanker traffic through the Bosphorus Straits and the Aegean Sea as Black Sea (and indirectly Caspian) oil could be shipped from the Adriatic. AMBO began to assemble financing for the project in June 2001, after letters of acceptance from the three governments and a positive feasibility study. Once the financing is in place, construction is expected to take three years. Also in Macedonia, the construction of

the Skopje-Thassaloniki (Greece) oil pipeline was formally launched in November 1999. This 143-mile, $107-million pipeline has the capacity to carry about 50,200 bbl/d. It is being built by a subsidiary of HP, El Pet Balkiniki. This pipeline will be able to provide a supply nearly triple Macedonia's current requirement. Meanwhile, Greece and Bulgaria have a pipeline planned from Burgas on the Black Sea to Alexandroupolis on the Aegean that would be another alternative to the Bosphorus. Russian backing to supply the oil is crucial to the project going forward.

Another key project is the reversal of the 400,000 bbl/d-capacity Croatian Adriatic Oil (Adria) Pipeline run, by Jadranski Naftovod (JANAF) of Croatia. Currently, oil that arrives by tanker at the Croatian Adriatic port of Omisalj is taken by the pipeline into the interior of Croatia, where it bifurcates at Sisak, with one branch going to Hungary and the other branch going to Yugoslavia (Vojvodina), touching the border with Bosnia at the refinery at Srpski (Bosanski) Brod, before heading on to a connection with a pipeline to Novi Sad (Figure 2). The reversal of the pipeline, accompanied by integration of the Adria and Druzba pipelines (Druzba runs from Russia to Hungary), will mean that Russian oil could be exported by tankers from the Adriatic. Russian oil major YUKOS has signed a $20-million contract with JANAF to finance the upgrading of the Adria pipeline in order to integrate it with the Druzhba pipeline. YUKOS is setting up the company YUKOS-Adria to implement the project, which will allow the export of up to 5 million tons per year (100,000 bbl/d) of Russian crude oil via Belarus, Ukraine, Slovakia, Hungary, and the deep-water port at Omisalj. YUKOS has guaranteed the supply of 2.5 million tons (50,000 bbl/d) for the pipeline, which will give Russian exporters a direct route to world markets via the Adriatic Sea, instead of through the Bosphorus. This pipeline is already used internationally - in March 2001, there was an agreement between JANAF and Serbian Oil Industry (NIS) to transport 13.9 million barrels of oil from Omisalj to refineries in Novi Sad and Pancevo during 2001.

NATURAL GAS

Total natural gas reserves in the former Yugoslavia and Albania are 3,037 billion cubic feet (Bcf), with most of that in Yugoslavia and Croatia, and a small amount in Albania. This is less than 0.01% of total world reserves. This is far smaller than neighboring Romania (13,200 Bcf). Production is likewise small; only Albania, the smallest consumer by far, is self sufficient. Total imports were 206.6 Bcf in 1999. Imports are expected to rise, and new pipelines are being planned and constructed to deliver these imports.

International Projects

Croatia is attempting to increase its domestic production by developing five gasfields in the northern Adriatic, through the Inagip joint venture with ENI of Italy (INA of Croatia and

ENI subsidiary Agip). The $187-million Ivana platform's construction is nearly complete. It is expected to have production of 67 million cubic feet per day (Mmcf/d). The field is estimated to contain 279 Bcf, though gas can only be piped to Italy, then back to Croatia through Slovenia's pipeline network. Under the agreement, Croatia will receive half of all gas produced. Inagip announced that in its exploration of the central Adriatic seabed it had discovered a new gasfield (Marica) in the Aiza Laura block with unproven reserves of 106 Bcf. Gas production at the remaining four northern Adriatic gasfields (IKA, IDA, Irina, Anna Maria) is expected to commence in the near future. These projects open the possibility of building a gas pipeline to the Croatian coast, according to Croatian Prime Minister Ivica Racan.

Pipelines and Transit

There are several new natural gas pipeline projects in progress in the region, in an effort to import more natural gas that originates in Russia, the world's largest natural gas exporter. Bulgaria has been at the forefront of these efforts, investing $44 million in 2001 to expand its natural gas pipeline network in order to pump more Russian gas to its Balkan neighbors, particularly Turkey, Greece, and Macedonia. Under an agreement between Bulgaria (Bulgargas) and Gazprom of Russia, transit volumes to Turkey, Greece, and Macedonia should increase to 494 Bcf after 2002 and to some 671 Bcf by 2010. About 90% of the gas goes to Turkey. Current transit volume to these three countries from Bulgaria is 424 Bcf annually.

Hungary is another country that is becoming increasingly important as a transit center for natural gas. Serbia and Bosnia (through Serbia) import all their natural gas through Hungary's Bratsvo (Brotherhood) pipeline that carries Russian natural gas to Central Europe, and enters Serbia from Horgos, Hungary (near Szeged). Recent agreements between Gazprom and NIS of Yugoslavia that resolve a debt dispute and increase imports from 9 Bcf in 2000 to 53 Bcf in 2001 will assure Hungary's importance as a transit center in the Balkans. Energoinvest imports the Russian gas into Bosnia and Herzegovina from the pipeline connection at the border town of Zvornik. It has an exclusive contract with Gazprom (the details of which are not released), to avoid problems with the often disputing state-owned natural gas companies of Bosnia and Herzegovina's two administrative entities. The pipeline from Belgrade bifurcates at Zvornik, and serves various parts of the two entities, though there are still areas of Bosnia and Herzegovina reliant on truck-delivered canisters. BH gas handles the actual transport arrangements for Energoinvest. MRKS-Holding of Switzerland is planning to build a $100-million, 283-mile pipeline from Zvornik to Novigrad (outside Sarajevo) that would service areas of the RS that currently have no gas supply. Throughput capacity would be over 35.3 Bcf per year, and the pipeline will be connected to the existing Belgrade-Sarajevo pipeline at Zvornik. It is unclear whether

ITERA of Russia or Gazprom will supply the gas.

Romania is expanding its pipelines to supply more gas to its Balkan neighbors. The first 56 miles of a pipeline between Isaccea and Negru Voda in southeastern Romania was completed in December 2000. Tranzgas of Romania concluded an agreement with Gazprom in February 2001, to deliver the gas for this pipeline expansion at preferential rates. Romania aims to transit 988 Bcf annually to Turkey, Bulgaria, Greece, and Macedonia starting sometime in 2002.

Slovenia and Russia are in talks to lay a new Russian natural gas pipeline to Italy through Slovenia. The 186-mile project is estimated to cost $500 million and would have an annual capacity of 777 Bcf.

ELECTRICITY

All of the countries of the former Yugoslavia and Albania were net importers of electricity in 1999, except Slovenia, the second-largest total generator, and the largest generator on a per capita basis (Figure 3). Total net electricity imports were 3.6 billion kilowatt hours (BkWh) in 1999. Total electrical generation capacity in 1999 was 231.3 gigawatts (GW), and total amount of electricity generated was 72.2 BkWh. Generation sources in 1999 for the former Yugoslavia and Albania were 54% thermal, 39% hydro, 6% nuclear, 1% other. Croatia is very hydro-dependent (over 50% of capacity), and Albania is extremely hydro-dependent (over 80% of capacity). Slovenia has the region's only nuclear plant, though its output will soon be shared with Croatia.

Prior to its dissolution in the early 1990s, the former Yugoslavia had a single electricity grid, the Union for the Coordination of the Transmission of Electricity (UCTE) network. UCTE was connected to the Western European power grid. Only Croatia, Slovenia, and the FBiH have been reconnected to the UCTE. However, Yugoslavia (Serbia and Montenegro) is still a major importer from neighboring countries. In February 2001, Czech and Serbian industry/energy ministers signed a memorandum of cooperation in the energy sector, covering mining, power station construction, and the construction, maintenance, and reconstruction of distribution networks. In June 2001, energy ministers from Albania, Bosnia and Herzegovina, Bulgaria, Greece, Macedonia, and Romania signed a memorandum for the creation of a competitive energy market in the Balkans. The Regional Association of Energy Regulators (ERRA) was established in December 2000, in order to create a common power market in South Eastern Europe and the Former Soviet Union. The countries that co-established ERRA are Albania, Armenia, Bulgaria, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia and Ukraine. Albania and Macedonia are members of the Black Sea Regional Energy Center (BSREC), an organization for cooperation the energy field, comprising Albania, Armenia, Azerbaijan,

Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Macedonia, Turkey and Ukraine. Programs concern promotion of energy policy development, diversification of energy supply, and the development of energy interconnections.

In June 2001, the long-running dispute between Slovenia and Croatia over the 664-megawatt (MW) Krsko Nuclear Plant, the only nuclear plant in the former Yugoslavia and Albania, was resolved. The plant is located in Slovenia, but was built jointly by Croatia and Slovenia prior to the dissolution of the former Yugoslavia. Slovenia had made the Krsko plant into a public company, and stopped supplying Croatia with power from the plant in 1998. Under the current agreement, Croatia will be co-owner of the plant (including assuming partial responsibility for the nuclear waste produced), and will begin receiving electric power from the plant again by July 2002.

Croatia is planning to build a hydroelectric plant on the Drava River, which is the border with Hungary. Croatia has agreed to cooperate with Hungary, and will not take unilateral steps to advance the project. However, the Trebisnjica hydro plant in Bosnia and Herzegovina (in the RS), and the nearby Dubrovnik hydro plant in Croatia are involved in a dispute over power sharing. Croatia agreed to send the output from one of the generators of its 2X108 MW Dubrovnik hydro plant to Albania in January 2001, as Albania has had to increase imports because of low rainfall. Albania's grid, however, is unable to support the maximum potential from the Dubrovnik unit. Macedonia offered Albania the use of its heavy oil-fired, 210-MW Negotino plant at cost in November 2000. In 2000, Macedonia also allowed more water from Lake Ohrid to drain into the Black Drin River in an attempt to increase flow to Albanian hydro stations further down the river. In anticipation of more rainfall in future years, Enelpower of Italy plans to build a 100-MW hydro plant on the river Vjosa in Albania, with power sold to any or all of Albania, Greece, and Italy (by submarine cable).

Although Albania has had to import exceptional amounts of electricity in 2000-2001 because of a drought, electricity import/export is becoming more important throughout the Balkans (see table). Albania, in addition to borrowing neighboring electric plants as mentioned above, has new agreements to import power from Slovenia and Slovakia (by using spare capacity associated with Croatia's Dubrovnik hydro plant), and continues to import from Greece. Yugoslavia has also suffered shortages, first from damage due to the 1999 Kosovo crisis and then from a drought and increased demand as the economy began to recover from the downturn of 1999. Yugoslavia imports from Bulgaria, Greece, Hungary, and the RS in Bosnia and Herzegovina. Slovenia, the only net power exporter of the former Yugoslavia in 1999, has export agreements with Croatia, although Slovenia's net exports are declining as it consumes more and more power domestically. Bulgaria is planning to expand its electricity exports in the Balkans to become a major hub. In 2000, Bulgaria exported 4.4

BkWh to Turkey, Greece, Macedonia, and Serbia, and added exports to Kosovo in 2001.

A new 400-kilovolt (kV) transmission line between the Macedonian and Bulgarian grids is under construction, and another 400-kV line to Bulgaria is planned (Dubrovo-Radomir). An internal 400-kV line from the power plants in Bitola to Skopje was constructed in 1999. A 220-kV transmission line from Vrutok to Bureli (Burrel) in Albania is also planned.

Albania

Albania, despite a lack of warfare and the lowest per capita energy consumption in Europe, has had enormous difficulties in meeting the country's energy demand. Albania's energy infrastructure uses out-of-date technology, and much of it is in a state of disrepair. Given Albania's heavy reliance on hydropower (85.8% of generating capacity in 1999), a recent severe drought has brought about an energy crisis in Albania, characterized by constant power cuts. Albania can produce only 12 GWh per day, and the power grid cannot handle importing more than the current 5 GWh per day.

Albania's oil industry, though small by international standards, is Albania's most important industry. Crude oil production was just 5,575 bbl/d in 1999, though proven reserves of 165 million barrels are the second-highest in the Balkans, after Romania. The state oil company, Albpetrol, is the dominant upstream and downstream player. Since 1993, foreign companies have been able to drill on-shore in Albania, and exploration wells recently have been spudded by a number of companies. However, currently producing fields are off-limits to foreign companies. Albanian production is characterized by numerous wells producing very small amounts of oil, though one field, Marinz-Patros in the southern part of the western plateau, accounts for nearly half of total production. Albania imports slightly less than half of its oil consumption. Its two operational refineries, run by Albpetrol at Ballshi and Fier, have refining capacities of 17,800 bbl/d and 8,500 bbl/d, respectively. There is a 122-mile, 12-inch internal pipeline that connects some of the country's producing fields, Tirana (the capital), and Albania's refineries. Most oil imports are brought in by truck or rail, though there is a small oil pipeline from Montenegro to Shkoder, near the border, from which oil and oil products must still be put in trucks or trains.

Albania's small natural gas reserves are estimated at 100 Bcf. Production was 706 Mmcf for 1999, all of which was consumed domestically. Albania does not have an international pipeline to import natural gas, though it does have an internal natural gas grid connecting some of Albania's cities and natural gas fields. All of Albania's oil and gas pipelines are corroding and in need of repair.

Coal reserves in Albania have been estimated at 772 million tons, though this figure is uncertain. Production was 49.6 thousand short tons in 1999, almost all lignite. There are

eight mines in operation, which are operated by various state-owned stock companies. All coal is consumed domestically, not just for electricity generation, but also for home and commercial heating.

Korporata Elektroenergjetika Shqiptare (KESH) is Albania's state-owned electric power monopoly (generation, transmission, distribution). The utility suffers from enormous problems, including an unbalanced capacity mix that leaves Albania vulnerable to droughts, high levels of electricity theft and non-collection of bills, flat rates that do not encourage conservation, an infrastructure unable to support needed electricity imports, and inefficient polluting power plants. KESH is implementing plans to improve billing and collection, reduce theft, make billing commensurate with usage, and import electricity throughout the year. The World Bank, IMF, and other multilateral agencies have made loans and grants to improve Albania's infrastructure contingent on such reforms being successfully implemented. KESH is also rehabilitating a 150-MW thermal plant at Fier that is offline and plans to add 99 MW to the plant. KESH is attempting to get foreign investment in new thermal (gas) and even hydro plants, though many of the problems in Albania's power sector have made investors wary. In March 2001, China agreed to build a hydro power plant on the Drini River that is expected to produce 350 MmkWh annually. KESH announced on July 26, 2001,that it was imposing daily power cuts of up to 10% on consumption to conserve its water reserves until the rainy season arrives. This comes after the IMF urged the government to take swift measures to avoid a repetition of last year's crisis, when a drought the previous summer led to black-outs of up to 12 hours a day during the winter.

Countries of the former Yugoslavia

1. Bosnia and Herzegovina

Bosnia and Herzegovina suffered greatly during the war in the first half of the 1990s, and as of July 2001, its energy production, consumption, and infrastructure have still not returned to pre-war levels. Per capita energy consumption is the second-lowest in Europe. Bosnia and Herzegovina produced 0.03 quadrillion Btu (quads) of energy and consumed 0.09 quads in 1999, thereby importing more than half its energy needs.

Bosnia and Herzegovina has no crude oil or natural gas production. In 1999, it imported about 22,000 bbl/d of oil, all refined products as Bosnia has no refineries of its own. Natural gas is imported from Russia (Gazprom) through Hungary and Serbia (Yugoslavia). The natural gas company servicing the RS is the RS-owned Gaspromet Pale and the company servicing the FBiH is the FBiH-owned Bosnia Herzegovina (BH) Gas. There have been financial disagreements between the two companies that have resulted in Gaspromet Pale on occasion reducing the flow of gas into the FBiH that comes through the RS. There is a gas pipeline from Serbia to the border town of Zvornik that bifurcates, with one branch going to

Sarajevo and onward to Zenica in the FBiH, and another branch going to Birac and Bijeljina in the RS. Another pipeline is planned, also from Zvornik, to service areas of the RS that currently rely on gas cylinders. It has not been decided whether Gazprom or ITERA will supply the gas. The RS announced a tender for construction of the 283-mile pipeline in June 2001. Its planned capacity is over 35.3 Bcf per year.

Bosnia and Herzegovina's electricity network was heavily damaged by war during the 1990s. It is estimated that by 1996, at the end of the war, more than half of Bosnia and Herzegovina's generating capacity was not in operation and about 60% of the transmission and distribution network was seriously damaged. In addition, Elektroprivreda Bosnia and Herzegovina, which had been Bosnia and Herzegovina's monopoly producer, transmitter, distributor and supplier, was disbanded after the Dayton Peace Accords. Three vertically integrated systems were created: two for the FBiH (Elektroprivreda of Bosnia and Herzegovina (EPBiH) and Elektroprivreda Hrvatske Zajenice Herceg-Bosne (EPHZHB), and one for the RS (Elektroprivreda of Republika Srpska (EPRS). These three utilities trade extensively. Currently, about 80% of pre-war capacity has been restored, which is sufficient at present as electricity consumption remains below 50% of pre-war levels. Bosnia and Herzegovina is now able to be a net exporter of electricity (about 20% of generated electricity in 2000), after being a net importer of electricity in 1999. International donors have contributed about $513 million since 1996 toward improving Bosnia and Herzegovina's electricity infrastructure. The World Bank is currently negotiating Bosnia and Herzegovina's third power reconstruction project (Power III), which not only aims to reconstruct several thermal and hydro power plants, but also to rehabilitate the 400-kV transmission grid.

2. Croatia

Although Croatia's economy was damaged by warfare in the early 1990s, and still has not reached pre-1991 levels of energy consumption or production, the country made a substantial economic recovery in the latter part of the 1990s. Croatia's total energy consumption increased 24% from 1993 through 1999 but its total energy production fell by about 10% in the same period. Oil, gas, and power appear to have increased in 2000 and into 2001, but not enough to overcome the trend of increasing energy consumption in Croatia's growing economy. Croatia's electricity and petroleum/natural gas monopolies are slated for break-up and subsequent privatization in 2001-2002. In July 2001, Croatia's parliament passed a set of laws liberalizing the energy sector in preparation for privatization, and also in compliance with European Union regulations.

Croatia's oil reserves have been estimated at 92 million barrels. Although the country has reserves in the north along the border with Hungary and also along the Adriatic coast, the majority of Croatia's oil fields are in the eastern region of Slavonia. When the region came under rebel Serb control in 1991, Croatia was deprived of a valuable economic resource, and

despite the return of eastern Slavonia to Croatian control in 1998, production in this area has yet to recover to pre-war levels. Overall, Croatia's oil production is still lower than pre-1991 levels, with output estimated at 33,000 barrels per day (bbl/d) in 2000. Croatia's oil consumption in 2000 was estimated at 85,000 bbl/d. However, oil production rose slightly in the first four months of 2001. Industrija Nafte (INA) Oil and Gas is Croatia's state-owned oil and gas company, with authority over drilling, refining, and processing crude oil throughout the country. Prior to 1991, INA had supplied all of the former Yugoslavia. As Yugoslavia split into six separate countries and amidst tense fighting however, INA saw its production drop by more than 50%, had one of its storage sites severely damaged, and lost significant market share. Although INA is still suffering losses, according to INA President Tomislav Dragicevic, by mid-June 2000, INA had recovered 70% of its pre-1991 market in Croatia, 60% of its market in Bosnia and Herzegovina, and 30% of its market in Slovenia--the company is re-establishing links in the former Yugoslavia. INA has small producing fields in Russia, Egypt, and Angola. Most of Croatia's oil is imported via the Adria pipeline, which has a 400,000-bbl/d capacity and connects Slovenia, Hungary, Slovakia, Serbia, and Croatia. It runs from Croatia's Adriatic port of Omisalj eastwards to Sisak, where it splits into a northern route to Hungary, as well as an eastern route to Serbia. INA has three refineries in operation, two in Zagreb and one in Rijeka, with a total capacity of 253,000 bbl/d.

Croatia has estimated natural gas reserves of 1.2 trillion cubic feet (Tcf), with considerable reserves located in the Adriatic Sea. In 1999, Croatia's 17 gas fields produced a total of 54.7 billion cubic feet (Bcf) of gas. With natural gas demand at 93.9 Bcf in 1999, Croatia is forced to import natural gas to meet domestic demand. The Croatian city of Karlovac is laying 559 miles of a local pipeline network at a cost of $46 million. The network will connect to a planned trunkline from the existing gas-pipeline network that goes to Slovenia, Zagreb, and Croatia's small on-shore gas fields in the north of the country. Croatia is expected to face gas shortages if new sources do not come on line soon because of its declining annual gas production from depleted on-shore fields. Imports of 40-42 Bcf of gas annually from Russia are not likely to be sufficient to cover future demand. With natural gas consumption predicted to increase as the country's economy recovers and gas-fired plants come on-line, Croatia has begun exploring for natural gas with foreign partners. In 1996, INA and Agip (Italy) signed a $320-million production sharing agreement to explore for and exploit the natural gas reserves in the northern Adriatic in the Ivana area. INA will contribute $154 million to exploit four gas fields, which have total proven gas reserves of about 282 Bcf. Construction of the INA/Agip gas platform Ivana in the Adriatic is nearly complete, and drilling should commence soon. Production is expected to be 67 Mmcf/d. The field is estimated to contain 279 Bcf, though gas can only be piped to Italy, then back to Croatia through Slovenia.

Croatia has a very small coal industry. The country has 43 million short tons (Mmst) of coal

reserves, 36 Mmst of which is lignite or subbituminous. In 1999, Croatia's coal consumption, which at 0.42 Mmst was less than half of its 1993 total of 0.85 Mmst, still far outpaced the country's minimal 0.02 Mmst of coal production.

Croatia has an electricity-generating capacity of approximately 3.6 gigawatts (GW). Although Croatia's electricity generation has increased from 8.6 billion kilowatt-hours (Bkwh) in 1992 to nearly 11.0 Bkwh in 1999, the country's electricity consumption, which has risen from 10.9 Bkwh in 1992 to 13.6 Bkwh in 1999, continues to exceed domestic generation, forcing Croatia to rely on electricity imports to meet domestic demand. Hydroelectric power is Croatia's largest source of domestic energy, accounting for approximately 35% of domestic energy production and around 20% of total energy consumption. The country's hydroelectric plants are located along the Adriatic coastline at Obrovac, Senj, and Zakucac, as well as along Croatia's border with Slovenia and Hungary at Varazdin. Croatia also has three oil-fired plants in Zagreb, Sisak, and Urinj, and several smaller gas and coal-fired plants that account for about 40% of the country's total electricity generation. The Krsko nuclear plant in Slovenia will begin to supply Croatia with electricity by July 2002, and Croatia will become joint owner of the plant in January 2002. Croatia built the plant jointly with Slovenia, although it is located in Slovene territory. Enron is developing, constructing and will own a $175 million, 240-MW natural gas combined cycle power plant at Jertovec, north of Zagreb, to be completed at the end of 2002.

Croatia's power sector is dominated by the state-owned Hrvatska Elektroprivreda (HEP). HEP supplies about 95% of the total electricity requirements of the country, with the remaining 5% is produced in industrial co-generation plants mainly for consumers' own needs and in small private hydro power plants. The Transmission Division of HEP controls the power transmission grid in Croatia. Electricity distribution is operated exclusively by HEP's Distribution Division through 21 distribution regions that largely correspond to the country's counties.

3. The Former Yugoslav Republic of Macedonia

Macedonia is a small energy producer and consumer. Macedonia produced 0.076 quads in 1999 and consumed 0.129 quads in 1999. Per capita energy consumption was 64.7 million Btu in 1999. According to the Macedonian Ministry of the Economy's estimates, total energy use will be 23% higher in 2001 than it was in 2000.

Macedonia has neither domestic crude oil production nor any crude oil reserves, and imported 24,000 bbl/d in 1999. Crude oil refining capacity was 51,180 bbl/d as of January 1, 2001, with Macedonia's sole refinery the OKTA facility near Skopje. Most oil supplies are imported via the Greek port of Thessaloniki and then by tanker truck. Hellenic Petroleum (HP) has acquired a majority share of OKTA. The Macedonian Ministry of the Economy

expects oil usage to increase by 18% in 2001 over 2000, much of this increase for the mazut-fired (heavy viscous oil) Negotino thermoelectric plant which was put back in use due to declining coal reserves and reduced hydro capacity. This plant is a heavy polluter. ESM is planning to convert it to gas eventually, and construct a gas pipeline from Skopje to the plant.

Macedonia's natural gas consumption was 1.4 Bcf in 1999, all of which was imported. A natural gas pipeline from Skopje feeds into Bulgaria's natural gas network. Macedonia's state-owned gas company is GAMA, but Makpetrol owns a significant share. Efforts are under way to expand the pipeline network and increase natural gas consumption by constructing gas-fired plants and converting other thermoelectric plants to gas.

Macedonia produced 8 million short tons of coal in 1999, most of it brown lignite. Most of the coal is consumed domestically, and coal is used to generate about 60% of Macedonia's electricity. Macedonia's net exports of coal are negligible, while some anthracite and coke must be imported for the proper mix in power plants and for industry. Reserves have been estimated at more than 1 billion tons, but declining.

Macedonia's electrical generating capacity was 1,440 MW in 1999, with about 70% thermal and 30% hydro. Electricity generation was 6.4 billion Kilowatt hours in 1999. According to Macedonia's sole power utility, Elektrostopanstvo Na Makedonija (ESM), electricity consumption rose by 2.8% for households and 10% for commercial customers in 2000. ESM expects demand to rise by 20% in 2001. ESM is planning major investments (upwards of $1.4 billion) over the next 14 years in Macedonia's power sector, in order to increase generating capacity by about 809 MW and make use of natural gas imports. ESM will also invest some of this amount in the improvement and expansion of the electricity grid. Among the most important projects is a gas-fired combined heat and power (CHP) plant near Skopje to be constructed by ESM and Toplifikacija with an installed capacity of 200 MW. Completion is expected in 2005. Several hydro plants will be built and several others will be renovated. Macedonia also imports a small amount of electricity from Bulgaria to make up for insufficient capacity, mostly in months when hydro capacity is low. Since the conflict with rebel ethnic-Albanians began, the debts of ESM have increased dramatically, to $130.7 million.

4. Slovenia

Slovenia is a small energy producer and consumer. It produced 0.135 quads and consumed 0.274 quads in 1999. Per capita energy consumption of 137.8 million Btu in 1999 was slightly higher than that of Spain (132.6), and much higher than the other former Yugoslav republics.

Slovenia has insignificant crude oil and natural gas production; over 99% of total petroleum and natural gas consumption is imported. Oil reserves have been estimated as high as 50 million barrels. In April 2001, Nafte Lendava and Nemmoco Slovenia signed a $25 million agreement to pump oil in the northeastern part of the country. The Nafte Lendava refinery (jointly owned by the government and Petrol) processes 13,500 bbl/d of crude oil. Petrol, the Slovene Petroleum Company, accounts for 75% of the downstream oil market. Slovenia has signed a letter of intent with Energetika Lubljana and Toplotna Oskrba Maribor for setting up a 90-day reserve of oil and oil products as required by the EU for accession. Most of Slovenia's natural gas is imported from Russia or Algeria (by way of Italy). Slovenia has 552 miles of gas pipelines that supply up to 45 Bcf per year of gas. Slovenia is connected to Austria, Italy, and Croatia. Geoplin, the state-owned gas company, is involved in trade and transit of natural gas and is supported by 12 distribution companies.

Slovenia has some coal reserves (65 million tons), which has enabled it to be almost entirely self-sufficient in coal, an energy source that accounted for about 19% of total energy consumption in 1999.

Slovenia's electricity generating capacity and production are quite small, though on a per capita basis close to the European average. Slovenia's generating capacity is diverse in origin, with thermal, hydro, and nuclear plants all having a substantial share. Slovenia was able to export (net) 1.56 billion kilowatthours in 1999, about 12% of total generation. The growing economy in the past few years has meant increasing electricity demand in Slovenia, which is estimated at having grown between 4% and 6% for 2000. Despite reduced hydro output because of unfavorable weather, total power output increased, but not as much as demand, so electricity imports rose and exports fell, though net trade was still positive. Slovenia operates a single reactor of Western design at Krsko, soon to be on a 50/50 basis with Croatia. The reactor is a U.S. built pressurized water reactor and is operated to Western standards. The only possible problem with the reactor could arise over the capability of the plant to withstand seismic shocks. There is a Slovenian Nuclear Safety Administration (SNSA) responsible for ensuring the safety of the Krsko plant and the disposal of its waste. On April 29, 1999 an arrangement between the SNSA and the United States Nuclear Regulatory Commission for the Exchange of Technical Information and Co-operation in Nuclear Safety Matters was signed in Ljubljana.

ELES (Elektro-Slovenija) was the state-owned trading and transmission monopoly, but the first stage of deregulation of the internal electricity market went into effect in April 2001. Large users now can choose among other distribution companies competing with ELES, though prices are controlled during a six-month transition period. In January 2003, the deregulation will extend to households. Prices are expected to fall for large industrial customers, but rise for household customers, bringing Slovenia in line with European prices.

The Slovene Energy Agency has received over 20 applications from companies vying to be independent distributors. The Slovene Energy Agency will also set tariffs charged for using the grid, thereby retaining some government control of consumer prices. In June 2001, Slovenia's three state-owned hydropower producers merged into one holding company, Slovenske Hidroelekrarne, which is intended to make them better able to compete in a deregulated internal market and internationally. The new company has been granted a government concession to develop a chain of five new hydro plants on the Lower Sava River with a total installed capacity of 207 MW.

5. Federal Republic of Yugoslavia (Serbia and Montenegro)

Yugoslavia's energy infrastructure has not fully recovered from the breakup of the former Yugoslavia and the subsequent wars in the Balkans during the first half of the 1990s, let alone the Kosovo war of 1999. Montenegro suffered comparatively little compared to Serbia and its two autonomous provinces. At end-2000, former Yugoslav Minister of Energy and Mining Saboljud Antic estimated energy infrastructure needs at $7 billion.

Serbia produces 18,000 bbl/d of crude oil in the autonomous province of Vojvodina in the north, enough to supply about one-third of domestic oil consumption. The first discovery was in 1949, and to date 45 small oil fields and 43 natural gas fields have been discovered. The Serbian region near Pozarevac is also believed to contain hydrocarbons, and there is an oil shale deposit at Aleksinac north of the Serbian town of Nis. In addition, Ramco (U.K.) is conducting upstream work in Montenegro through a joint venture with Montenegrin state oil company Jugopetrol Kotor. Ramco operates the Ulcinj Block, which covers the southern part of Montenegro's continental shelf together with an adjacent strip along the coast. In July 2001, Yugoslavian officials discussed oil barter deals with Iraq, and the first deal worth about $45 million may already be set.

Nafta Industrija Srbije (NIS) Jugopetrol is the state-run oil and gas company. Privatization efforts have begun, according to the Serbian government, along with efforts to settle the company's debts with Russia's Gazprom. NIS assumed total control over oil imports on March 6, 2001. Previously, up to two-thirds of oil trade was undertaken on the black market, leading to tax and revenue losses for the government. However, the government's decision to monopolize oil imports was challenged in May 2001, when private traders created the Nafta shareholding society. Nafta plans to import light crude oil from sources such as Syria and Russia and have it processed into high octane gasoline. Serbia has two refineries -- at Novi Sad and Pancevo, and several smaller oil facilities for making lubricants and other oils. The refineries are thought to be operating at a capacity of about 60,000 bbl/d, after being damaged in the Kosovo conflict and partially repaired. If and when they are fully repaired, capacity will be about 158,000 bbl/d, and include more refined products. These refineries receive much of their crude oil supplies via the eastern spur of the Adria pipeline, which

runs from the Adriatic Sea port of Omisalj (Croatia) to Sisak (Croatia), before splitting into an northern spur to Hungary and an eastern spur to Serbia. Shipments resumed in November, 2000, although imports have been limited by the ability of Yugoslavia to pay for imported oil.

Although a small amount of natural gas is produced domestically in the autonomous province of Vojvodina in the north, imports (all from Russia) accounted for more than 60% of Serbian gas consumption in 2000. Natural gas is used by industry to make fertilizer and synthetic rubber, by power plants, and for district heating, particularly in Vojvodina, where most of the natural gas reserves and the bulk of the natural gas distribution network are located. Russian natural gas exports stopped in June 2000 after Serbia fell behind in payments. Russian exports resumed in November 2000 after credit was arranged by the Russian government, but were reduced in December after Serbia again failed to pay for all of the gas that they received. Negotiations have since begun over payment of Serbia's outstanding debt to Russia's Gazprom.

Yugoslavia is the only country in the Balkan region with large coal deposits. Proven coal reserves of 18.2 billion short tons are found in five basins: Kostolac, Kolubara, Kosovo, Metohija and Pljevlja. Over 95% of this coal is lignite accessible by surface mining, but only about 10% has been mined. Serbia estimates that as much as one-third of the coal resources in Yugoslavia are in Kosovo. Kosovo's lignite is particularly valuable because of its low sulfur content. Annual coal production at the two main mines in Kosovo accounted for a quarter of Yugoslavia's total coal output in recent years. Total coal production in Yugoslavia increased by over 8% in 2000.

Most of Serbia and Montegnegro's electricity production, transmission, and distribution is carried out by two state-run companies: Elektroprivreda of Serbia (EPS) and Elektroprivreda of Montenegro (EPCG), which has been slated for privatization in 2001. Electricity is Yugoslavia's primary source of energy, and prior to the crisis in Kosovo electricity accounted for about 75% of domestic energy needs. The primary fuel for power generation is coal, with Yugoslavia containing sufficient reserves potentially to become a significant exporter of electric power. Hydroelectricity represents Yugoslavia's other major source of electric power. Hydropower plants are located on the Danube, Drina, and Morava rivers in Serbia, and the Moraca, Piva and Zeta rivers in Montenegro. The electrical grid was hurt by the overall lack of investment by the Milosevic regime and because of the war, past sanctions, and the lack of payment by electricity customers. Serbia was an electricity exporter prior to the breakup of the former Yugoslavia, but during the 1990s poor maintenance and state-imposed below-market prices have made Serbia into an importer, with daily imports of about 25-30 million kWh in early 2001. Because of the electricity's low cost, it is used extensively for home heating. Prior to the Kosovo crisis, Serbia (i.e.

excluding Montenegro) had a generating capacity of 9,560 MW, but at end-2000 operable capacity was estimated at 5,300 megawatts. Serbian officials have indicated that as little as one third of required maintenance was performed on the Serbian grid in 2000. The failure to invest in and maintain infrastructure has led to frequent power cuts in recent months, with cuts often lasting for four or five hours per day, though these cuts are also due to the same drought and dependence on hydropower that have led to severe power problems in Albania. Serbian officials plan to raise electricity prices and complete the half-constructed 2 x 350 MW Kolubara B power complex (coal-fired) and rehabilitate other power plants if international funds are provided.

Table 1. Economic and Demographic Indicators for Selected Balkan Countries

	Gross Domestic Product (GDP)				Population, 2000E (Millions)
	1999E (Billions of US$ -- PPP*)	Real GDP Growth Rate		Per Capita GDP, 1999E (US$ -- PPP)	
		1999 Estimate	1999-03 Projection		
Bosnia and Herzegovina	$6.2	5%	11%	$1,770	3.8
Croatia	$23.9	0%	N.A.	$5,100	4.3
F.Y.R.O.M.	$7.6	2.5%	5.3%	$3,800	2
Slovenia	$21.4	3.5%	N.A.	$10,900	1.9
Yugoslavia	$20.6	-20%	N.A.	$1,800	10.7
Subtotal/weighted average	$79.7	-3.59%	N.A.	$3,357	22.7
Albania	$5.6	8%	7.7%	$1,650	3.5
Total/weighted average	$85.3	-2.845%	N.A.	$3,133	26.2

Sources: CIA World Factbook; Energy Information Administration estimates; World Bank. N.A. = not available *PPP = Purchasing Power Parity exchange rates.

Table 2. Energy Consumption and Carbon Dioxide Emissions in Selected Balkan Countries, 1999

	Energy Consumption									Carbon Dioxide Emissions* (Million metric tons of carbon)
	Total (Quadrillion Btu)	Petroleum	Natural Gas	Coal	Nuclear	Hydro-electric	Other Electricity	Net Electricity Imports	Per Capita (Million Btu)	
Bosnia and Herzegovina	0.09	52%	8%	18%	0%	19%	0%	3%	23.1	1.2
Croatia	0.41	48%	24%	2%	0%	16%	0.03%	9%	87.5	5.49
F.Y.R.O.M.	0.13	39%	1%	50%	0%	9%	0.4%	0%	64.7	2.71
Slovenia	0.27	44%	13%	19%	16%	14%	0%	-6%	137.8	4.16
Yugoslavia	0.61	22%	11%	48%	0%	18%	0%	2%	57.5	10.94

Subtotal/weighted average	1.52	36.5%	13.6%	28.8%	3.0%	15.9%	0.01%	2.2%	65.40	24.5
Albania	0.08	26%	1%	1%	0%	67%	0%	6%	20.3	0.42
Total/weighted average	1.59	36.0%	13.0%	13.0%	2.8%	18.5%	0.01%	2.4%	58.88	24.91

***Includes carbon dioxide emissions from the consumption of petroleum, natural gas, and coal, and from the flaring of natural gas. Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667.**

Source: Energy Information Administration, International Energy Database, July, 2001.

Table 3. Energy Supply Indicators-- Selected Balkan Countries

	Fossil Fuel Proved Reserves			Fossil Fuel Production, 2000			Electric Generating Capacity, 1/1/99 (Million kilowatts)	Crude Oil Refining Capacity, 1/1/01 (Thousand barrels per day)
	Crude Oil, 1/1/01 (Thousand barrels)	Dry Natural Gas, 1/1/01 (Billion cubic feet)	Coal, 12/31/96 (Million short tons)	Petroleum[1] (Thousand barrels per day)	Dry Natural Gas (Trillion cubic feet)	Coal[2] (Million short tons)		
Bosnia and Herzegovina	0	0	N.A.	0	0	1.98	3.58	0
Croatia	92,196	1,237	43	24.45	0.0612	0.017	3.6	252.6
F.Y.R.O.M.	0	0	N.A.	0	0	8.03	1.44	51.18
Slovenia	0	N.A.	65	0.002	0.0018	5.29	2.65	13.5
Yugoslavia	77,500	1,700	18,157	16.17	0.0257	36.1	11.78	158.25
Subtotal	169,696	2,937	18,265	40.622	0.0887	51.407	23.06	475.53
Albania	165,000	100	N.A.	6.23	0.0053	0.05	1.684	26.3
Total	334,696	3,037	18,265	46.852	0.094	51.467	24.74	501.83

[1] *Crude oil only.* [2] *1999 figures.*

Sources: Crude Oil and Natural Gas Reserves: PennWell Publishing Co., *Oil & Gas Journal*, 12/28/00. Crude Oil Refining Capacity: PennWell Publishing Co., *Oil & Gas Journal*, 12/28/00. Crude oil and and natural gas production figures: PlanEcon, April 2001. All Other Data: Energy Information Administration, International Energy Database, July 2001.

Table 4. Electricity Generation, Imports, and Exports, Billion Kilowatthours, 1999, Selected Balkan Countries

	Electricity Generation	Exports	Imports	Net Exports (- means Net Imports)
Bosnia and Herzegovina	2.59	0.15	0.43	-0.28
Croatia	10.96	1	4.45	-3.45
F.Y.R.O.M.	6.40	0.03	0.08	-0.05
Slovenia	12.45	2.2	0.65	1.56
Yugoslavia	34.46	0.96	1.92	-0.96
Subtotal	66.85	4.34	7.52	-3.18
Albania	5.33	0.1	0.52	-0.42
Total	72.18	4.44	8.04	-3.60

Source: Energy Information Administration, International Energy Database

Sources for this report include: CIA World Factbook 2000; Central Europe Review; Central Europe Online; U.S. Department of Commerce's Central and Eastern European Business Information Center; Economist Intelligence Unit ViewsWire; U.S. Energy Information Administration; Electricity Daily; Financial Times; Oil and Gas Journal; Petroleum Economist; Radio Free Europe/Radio Liberty; Reuters; WEFA Eurasia Economic Outlook; World Markets Online.

LINKS

For more information from EIA on the Balkans, please see:
EIA - Country Information on Bosnia and Herzegovina
EIA - Country Information on Croatia
EIA - Country Information on Former Yugoslav Republic of Macedonia
EIA - Country Information on Slovenia
EIA - Country Information on Yugoslavia
EIA - Country Information on Albania

Links to other U.S. government sites:
2000 CIA World Factbook
U.S. International Trade Administration, Energy Division
Radio Free Europe/Radio Liberty - Balkans Report
U.S. Department of Commerce Trade Compliance Center: Market Access Information
Central and Eastern Europe Business Information Center (CEEBIC) of the U.S. Department of Commerce
U.S. Library of Congress Country Study: former Yugoslavia

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Southeastern Europe

The countries of Southeastern Europe--including Romania, Bulgaria, and Moldova--occupy a strategic location on the west side of the Black Sea, exporting electricity through much of the Balkan Peninsula and transporting Russian natural gas to Western Europe and Turkey. Southeastern Europe also is a potentially significant transit region for Caspian oil exports to Europe.

Note: Information contained in this report is the best available as of November 2001 and is subject to change.

GENERAL BACKGROUND

The countries of southeastern Europe--here including Romania, Bulgaria, and Moldova--share a troubled history in addition to their geographical location. Since the Eastern European revolutions of 1989 and the fall of the Soviet Union in 1991, the three countries have been independent democracies, but each has had significant problems in transitioning from a centrally-planned economic system to a market-based economy. While Bulgaria and Romania avoided the warfare and bloodshed that devastated the Balkans region in the 1990s, they were both significantly affected by the economic embargo placed on Yugoslavia, suffering several billion dollars' worth of losses due to disrupted trade, transport, and investment.

Moldova, although relatively less affected economically by the wars in the former Yugoslavia, suffered through a civil war of its own in the 1990s. Fighting broke out shortly after the country received its independence, paralyzing the country's already stagnant economy. Russian settlers and Moldovans on the industrialized left bank of the Dnistr River set up the secessionist Trans-Dnistrian Republic as the conflict stalemated. Moldova's economy has crept along as fighting has subsided, but there is no formal resolution to the conflict in sight and Western investment, which is desperately needed, is nearly non-existent.

Unlike in central Europe and in the Baltic countries, the process of shedding the totalitarian past has proceeded slowly in southeastern Europe. Political reform did not match the sweeping changes elsewhere in the former Eastern bloc, and as a result, former Communist leaders were able to hold on to the administrative controls of government. As a result, economic and structural reform in southeastern Europe was delayed. Although the pace of reform has picked up, the transition to democracy and a market-based economy in Romania, Bulgaria, and Moldova has lagged behind other parts of Europe.

In the past year, Romania, Bulgaria, and Moldova all have held general elections. In Romania in December 2001, voters elected Ion Iliescu to the presidency, returning the former Communist Party official to the post that he held from 1990 to 1996. In Moldova, the Communist Party swept to a resounding victory in February 2001 elections, winning an absolute majority in the parliament and installing Vladimir Voronin as president. In Bulgaria, former King Simeon II, returning to his homeland after the monarchy was abolished by the Communists in 1946 and entering politics for the first time, rode his National Movement for Simeon II to a victory in June 2001 parliamentary elections, then swore allegiance to a republican constitution and accepted the post of prime minister.

REGIONAL ENERGY ISSUES

Romania, Bulgaria, and Moldova occupy a strategic location in the world energy picture. Although none of the three countries is a major oil or gas producer, their geographic location between major producers and major consumers makes southeastern Europe an important transit point for oil and gas supplies. In addition, Romania is an important regional oil refiner, while Bulgaria is the region's major electricity exporter.

Caspian Oil Transit

Increasing oil and gas production in and around the Caspian Sea, along with forecast increases of oil consumption in the European Union (EU), means that Bulgaria, Romania, and Moldova may play a strategic role in the European transport corridor to bring Caspian oil exports to European markets. The recent launch of the Tengiz-Novorossiisk Caspian Pipeline Consortium (CPC) pipeline from Kazakhstan to Russia means that additional oil will be transported via the Black Sea through the Bosporus Straits, which is already a major chokepoint for oil tankers. The difficulty in navigating the narrow straits, exemplified by a number of accidents, has led Turkey to raise environmental concerns over the increase in tanker traffic through the Bosporus.

The projected increase in oil exports from the Caspian Sea region in general, and Kazakhstan in particular, has led to the proposal of a number of Bosporus bypass options. Bulgaria, Romania, and Moldova all have made proposals to allow Caspian oil exports to bypass the Bosporus, although Moldova, lacking a Black Sea port, is highly unlikely to transport any Caspian oil exports coming via the Black Sea. Ukraine has an advantage over the countries of southeastern Europe in capturing Caspian oil export transit, since its Odesa-Brody pipeline already has been completed. Nevertheless, several Bosporus bypass pipeline options running through Bulgaria or Romania are being seriously considered.

Burgas-Alexandropoulis Pipeline

In January 1997, Bulgaria, Greece, and Russia agreed on a plan to build an oil pipeline linking the Bulgarian Black Sea port of Burgas with Alexandropoulis on the Mediterranean coast of Greece. The proposed 178-mile, underground pipeline would allow Russia to export oil through the Black Sea while bypassing the Bosporus. However, the $600-million project has been stalled by a wide range of technical and economic disputes. Russia has ensured that the pipeline, with proposed capacity ranging from 600,000 barrels per day (bbl/d) to 800,000 bbl/d, will work at least at 50% of its capacity, and Russian oil major Yukos has expressed its interest in the project, which may ease concerns over filling the pipeline.

Russia, Bulgaria, and Greece have agreed on a memorandum of trilateral cooperation on the project, with plans to establish the Trans-Balkan Oil Company. In February 2001, the three countries agreed to conduct a $2.2-million feasibility study for the pipeline, and results of the second stage of the feasibility study were delivered on October 31, 2001. In addition to Yukos, a number of Greek and Bulgarian companies have indicated their interest in investing in the pipeline. In October 2001, officials for the three countries held a tri-lateral meeting, continuing negotiations to launch a joint-stock company to develop and construct the pipeline

Burgas-Vlore Pipeline

A 750,000-bbl/d pipeline connecting Burgas with the Albanian Adriatic port of Vlore via Macedonia also has been proposed. This pipeline proposal has received letters of acceptance from the governments of Albania, Bulgaria, and

Macedonia, and a $980,000 feasibility study, partially funded by the U.S. Trade and Development Agency, concluded that the 560-mile pipeline project was feasible. The Albanian-Macedonian-Bulgarian Oil (AMBO) Pipeline Corporation has been established with exclusive rights to construct the pipeline, which is estimated to cost between $850 million and $1.1 billion.

A joint venture to carry out the project was to be set up between AMBO and potential investors. Fundraising for the project already has begun, with construction originally scheduled to start in 2001 and completion by 2005. However, luring foreign investment to the troubled region has been difficult, and ethnic violence that erupted in Macedonia in February 2001 near the proposed route further hindered efforts to fund the pipeline's construction. In September 2001, AMBO's Ted Ferguson said that AMBO is hoping to begin construction of the pipeline by the end of 2001.

Constanta-Trieste Pipeline

Romanian government officials have advocated that a pipeline to transport crude oil from the Caspian Sea to European markets pass through its territory, claiming that Romania, which has sought to develop its infrastructure to increase its chances of sharing in the Caspian oil bonanza, offers the shortest route, best refining technology, and links via waterways to major ports in the West. The proposed 660,000-bbl/d Constanta-Trieste pipeline would allow crude oil from Kazakhstan to be shipped via the Novorossiisk port on the Black Sea to the Romanian port of Constanta, where it would then be piped to Italy across the Balkan Peninsula.

The pipeline, estimated to cost $900 million to construct, would be used mostly to provide oil to the countries along the route, and would incorporate existing pipelines connecting Constanta with 10 refineries. Several alternatives exist for the route, with a proposed northern route transiting southern Hungary and central Slovenia before terminating at Italy's oil terminal of Trieste. From there, the Constanta-Trieste pipeline would be linked with the Trans Alpine Pipeline (TAP), which would carry the oil further to customers in Austria, Germany, and the Czech Republic. The southern route for the pipeline, sometimes know as the South-East European Line (SEEL), would transport Caspian oil from Constanta via a similar route as the northern route, but instead would pass through Yugoslavia and an intermediate transit point at Croatia's Adriatic port of Omisalj before crossing Slovenia and ending at Trieste. The SEEL pipeline also would link to the TAP to deliver oil to Central Europe.

Feasibility studies have shown that both proposed Constanta routes are viable, but neither pipeline has moved forward as potential investors await a political accord providing security guarantees for the lines. Representatives of Romanian, Yugoslav, and Croatian oil companies have agreed that an inter-governmental accord likely would boost the pipeline's prospects and help to secure financial resources to construct the pipeline, which would provide Romania with a significant amount of revenue in the form of transit tariffs.

In addition to serving as a transit point for Caspian oil, Romania is hoping to offload some Caspian crude at Constanta and deliver it to its own refineries in order to offset the country's declining domestic production. Already, in June 1999, Romania's national oil company, SNP Petrom, signed a protocol with KazakhOil and KazTransoil to refine 140,000 bbl/d of Kazakh oil at Romanian refineries. Romania hopes to supply its own domestic market as well as transport refined products to Europe via barges on the Danube-Main-Rhine link. Romania also could use its own distribution network to transport refined products into other European lines.

Russian Natural Gas Transit

In addition to oil, southeastern Europe also represents an important transit site for Russian natural gas exports, mainly to Turkey. Russia's Gazexport, the export arm of Gazprom, transports natural gas from Russia via Ukraine and Moldova to Romania to Bulgaria and other Balkan countries. Russian natural gas is delivered via Bulgaria to Turkey, Greece, and Macedonia. In the past few years, the countries of southeastern Europe have sought to upgrade their pipeline links and increase their natural gas transit capacity in order to ensure that Russian natural gas continues to flow their way. Although Russia is looking to deliver natural gas directly to Turkey via the Blue Stream pipeline below the Black Sea, that will be in

addition to natural gas flowing to Turkey via southeastern Europe. With Russia seeking to increase its natural gas exports, the countries of southeastern Europe will remain important transit centers.

In 1996, Romania and Russia reached an agreement on the construction of a 120-mile long pipeline from the Romanian-Ukrainian border to the Romanian-Bulgarian border, part of a project to develop the natural gas transit corridor in southeastern Europe. However, a shortage of funds in Romania delayed the construction until 1999, when Russia's Gazprom offered credit (in the form of natural gas) to Romania to finance the pipeline's construction. The first 54-mile segment of the pipeline, from Issacea to Negru Voda in southeastern Romania, was commissioned in December 2000. When the remainder of the pipeline is completed (scheduled for the first half of 2002), it will give Romania the ability to transit approximately one Tcf of natural gas through its territory.

Bulgaria also is increasing its natural gas transit capacity, mainly by widening its existing network and building new compressor stations rather than by building new pipelines. In the last two years, Bulgargas, which owns and operates Bulgaria's 1,554-mile pipeline network (which includes over 400 miles of transit pipelines), has enlarged the country's natural gas transiting network to pump more Russian natural gas to its Balkan neighbors. From a transit capacity of 283 Bcf of natural gas per year before the enlargement program began, in 2000 Bulgaria transported to Greece, Macedonia, and Turkey some 423 Bcf of Russian natural gas, up 14% from 1999, according to Bulgargas chief executive director Kiril Gegov. Nearly 388 Bcf of that natural gas went to Turkey, the region's biggest energy consumer. Under a 1998 agreement with Gazprom, Bulgaria's only natural gas supplier, transit volumes to Greece, Macedonia, and Turkey should increase to 494 Bcf after 2002 and to 670 Bcf by 2010. Bulgargas said that it would spend $45 million in 2001 to continue enlarging the country's natural gas pipeline network.

Regional Electricity Exports

While Moldova remains a net electricity importer, both Bulgaria and Romania have become net electricity exporters in the past decade. Romania, which re-started electricity exports to Moldova in the wake of a violent snowstorm that devastated Moldova's northern power networks in November 2001, has sent its electricity supplies mainly to Moldova, while Bulgaria has supplied electricity to Turkey, Greece, Yugoslavia, and Macedonia in recent years.

Bulgaria is seeking to become the regional power hub in the Balkan Peninsula. In 2000, Bulgaria more than doubled its electricity exports, sending 5.6 billion kilowatt-hours (Bkwh) of electricity to its neighbors and earning more than $105 million in the process. Turkey, the region's largest power consumer, imported 3.4 Bkwh of power from Bulgaria in 2000, up from 2.2 Bkwh of Bulgarian electricity in 1999. In addition, Bulgaria exported power to Greece, Yugoslavia, and Macedonia in 2000, and in August 2001, Bulgaria began exporting power to Albania for the first time ever. Bulgaria is hoping to increase electricity exports by an additional 60% in 2001.

Bulgaria and Turkey have agreed to increase Bulgarian power supplies to Turkey to 4 Bkwh in 2001 and 5 Bkwh in 2002. In order to fulfill these planned increases in electricity exports, in May 2001 Bulgaria began construction of a 400-kilovolt electricity cable linking Bulgaria's power system with Turkey. The 42-mile long link, which is estimated at $35 million, will be the second such line between the two countries and will allow Bulgaria to maintain average exports of 3.4 Bkwh of power per year to Turkey under an agreement until 2008.

ROMANIA

Throughout the 1990s, Romania lagged behind most of its Eastern European neighbors in the pace of economic restructuring. The slow pace of reform has hindered the development of a truly market-based economy, leaving Romania with one of the lowest living standards in Europe and hampering the country's efforts to join the EU. In 1996, Romanians elected Emil Constantinescu as president, replacing Ion Iliescu and the former communists and stepping up reform efforts. Constantinescu's government embarked on a macroeconomic stabilization and market reform program, including further restructuring of energy-intensive industries and the energy and utility sectors.

However, the social impact of price liberalization, combined with an austere government spending program and a 3-year recession from 1997-1999, led to growing frustration among Romanians as living standards continued to decline. In November 2000 presidential elections, former President Ion Iliescu received 37% of the vote, while Corneliu Vadim Tudor, an outspoken nationalist, polled 28% of the vote. Iliescu's Party of Social Democracy finished first in the parliamentary election with 38%, followed by Tudor's Greater Romania Party with 21%. Iliescu proceeded to win a December 2000 runoff for the presidency, vowing to return hope for a better life to Romanians.

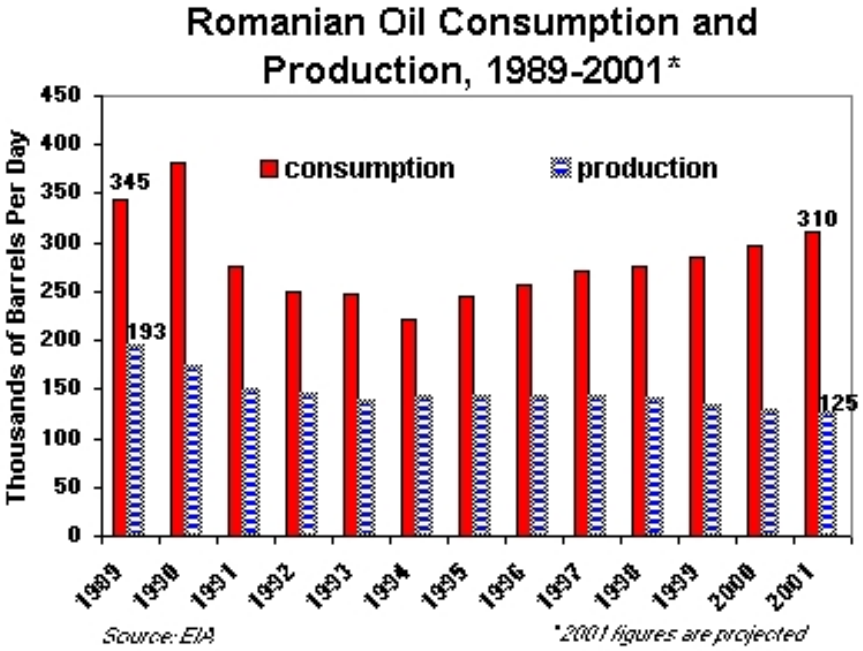
Oil

Romania has proven oil reserves of 1.4 billion barrels, and despite a steady decline in its crude oil production over the past 25 years, the country remains the largest oil producer in Central and Eastern Europe. From 294,000 bbl/d in 1976, Romania's oil production has decreased 57%, sliding to 127,400 bbl/d in 2000. With the country's oil production projected to dip to 125,000 bbl/d in 2001, Romania's oil demand now outstrips domestic production by a a ratio of more than two to one. Romania's oil consumption, which dropped from 345,000 bbl/d in 1989 to just 220,800 bbl/d in 1994, has been on the increase ever since, reaching 298,000 bbl/d in 2000 and expected to increase to 310,000 bbl/d for 2001.

The Romanian government has committed itself to increasing domestic production of oil and gas in order to reduce the country's reliance on imports. The removal of state price ceilings, plus relatively high world oil prices in 1999 and 2000, allowed SNP Petrom, the vertically integrated national oil company, to restart some of its idled wells, and the introduction of Western technology and production methods is expected to boost Romania's reserves and production in the next few years. In addition, SNP Petrom, which is 92% state-owned, is being restructured to streamline its operations and management. In July 2001, Romania's Industry Minister, Dan Popescu, said that partial privatization of SNP Petrom would be launched in 2002 after the completion of the restructuring plan.

Romania also is opening up its oil and natural gas sectors to outside investors, and numerous oil and natural gas blocks have been opened for exploration in the past 12 years. Both Shell and Amoco came up dry in exploring for oil in western Romania between 1992 and 1997, but several smaller oil companies currently are active in the region. In June 1999, U.S.-based Castle Energy exercised options to acquire a 50% interest in three oil and natural gas concessions in Romania for $385,000, while in September 2000, Sterling Resources (Canada) concluded a multi-million dollar deal to test for oil and natural gas in a 1.5-million acre block near Craiova in southwestern Romania. Sterling has committed to making at least $7 million in investments in Romania, while Castle Energy, whose concessions total 3.1 million acres, has plans to spend about $3 million on exploratory drilling. In addition, Forest Oil (U.S.) has two agreements in place with Romania and is awaiting approval of a third license in the Carpathian mountains.

Currently, around 10% of Romania's crude oil comes from offshore wells in the Romanian sector of the Black Sea, but Romania is seeking to increase that percentage. In 1998, French-Belgian oil company TotalFinaElf signed a 30-year exploration and drilling agreement with SNP Petrom. The companies agreed to explore an area of 4,000 square miles in the offshore Neptun oil block of the Black Sea, with TotalFinaElf paying $10 million upfront and the option to pay up to $500 million to develop the block if oil is discovered.



Ukraine's recent discovery of commercially exploitable oil and gas deposits in a disputed area of the Black Sea has led to Romanian protests. In July 2001, the Cernomorneftegaz Company, in

partnership with British-based JKX Oil & Gas, announced it had discovered approximately 73 million barrels of oil and 353 Bcf of natural gas near Zmiyinyy Island, object of a territorial dispute between Romania and Ukraine. Romania, which calls the island *Insula Serpilor* (Serpents' Island), says that Ukraine has no right to conduct economic activities in the region while negotiations are in progress, while Ukraine has argued that Cernomorneftegaz's work is just for exploration purposes, which is not prohibited by bilateral agreements currently in force. Romania already is exploiting an oil deposit to the west of the island and pumping the fuel through a pipeline to its port of Constanta.

Downstream/Refining

With 10 refineries and an overall refining capacity of approximately 522,000 bbl/d, Romania has the largest refining industry in the region. Romania's refining capacity far exceeds domestic demand for refined petroleum products, allowing the country to export a wide range of oil products and petrochemicals, such as lubricants, bitumen, and fertilizers, throughout the region. However, nearly all Romanian refineries are underutilized because of a lack of crude oil supplies, and the majority remain in the government's hands, running at 50% of capacity or less and needing repair. Years of low investment have left the country's refining industry in poor health, requiring massive amounts of capital to modernize and improve efficiency.

Several refineries have been privatized, injecting some much needed capital for maintenance and upgrades. In early 1998, Russia's Lukoil paid $300 million for a 51% stake in the Petrotel refinery in Ploiesti, and on November 1, 2000, the Romanian State Property Fund agreed to sell the Dutch-led Rompetrol Group BV a 70% stake in the Petromidia Navodari refinery, Romania's largest, for $50.5 million. The Dutch-Swiss company agreed to take over the refinery's $340-million debt and promised to invest $225 million over the next five years to modernize it, streamlining capacity at 54,000 bbl/d. In a cost-saving measure, Romanian authorities had shut down the Petromidia refinery in 1999, but under its new management, the refinery resumed operations in February 2001, processing an average of 5,600 bbl/d. In addition, SNP Petrom is planning to pump $236 million into upgrading its two refineries, Arpechim and Petrobrazi, over the next two years.

Natural Gas

Since 1983, when Romania's natural gas production peaked at 1.4 Tcf, the country's natural gas output has declined nearly 65%, dropping to 501.5 Bcf in 1999. In its difficult transition to a market economy, Romania's natural gas demand has decreased precipitously as well, with consumption decreasing 55% from 1989 to 1999, from 1.4 Tcf to 621.5 Bcf. Romania has proven natural gas reserves of 13.2 Tcf, but additional exploration has been discouraged by the country's economic woes and the poor investment climate. Also, the slow pace of reform has prevented potential investors from entering the Romanian natural gas market to help boost current levels of production.As a result, Romania is reliant on imports to meet its natural gas consumption needs.

Russia is Romania's main source of natural gas, but Romania has attempted to diversify its supply sources by concluding contracts with companies such as Germany's Ruhrgas and the Netherlands' Gasunie. Russia remains Romania's major supplier, and better connections with the Ukrainian pipeline system have allowed Romania to access additional Russian natural gas via Ukraine. In December 1999, a 12-mile pipeline link between the Ukrainian city of Khust and Satu Mare in northeastern Romania was completed, giving the country access to the *Soyuz* export pipeline and allowing Romania to import up to 13 Bcf per year of additional Russian natural gas. In the future, the Khust-Satu Mare pipeline may allow Romania to receive natural gas from as far away as Central Asia.

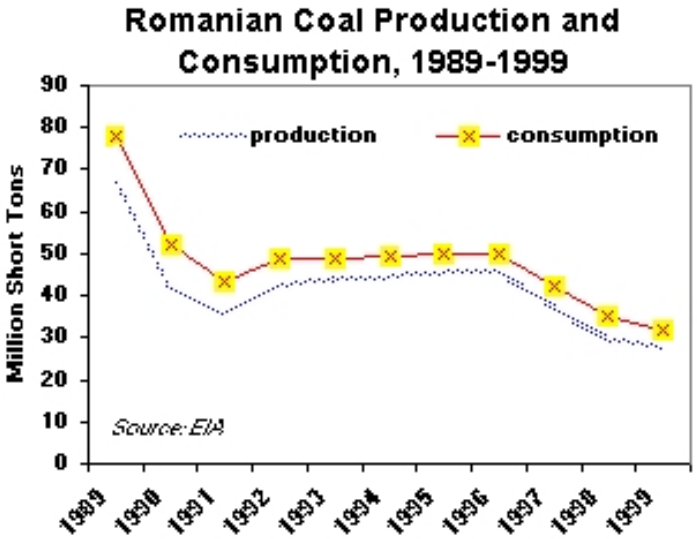
In addition, Romania has been developing contacts to import more Russian natural gas via Moldova to supply customers in Romania's northeast. In April 2001, Russian natural gas trader Itera, along with Romanian and Moldovan natural gas companies, confirmed its plans to build a 72-mile pipeline connecting the Moldovan cities of Dorchia and Ungheni with the Romanian town of Iasi. The $60-million pipeline, with an annual capacity of 141 billion cubic feet (Bcf) of natural gas per year, is expected to be completed in 2002.

In order for these potential imports to reach Romanian households, the country is restructuring Romgaz, the state-run natural gas utility, and starting to modernize its aging natural gas distribution system. In June 2000, the Romanian government approved the reorganization of Romgaz, restructuring it into four business units: Transgaz, for transport; Depogaz, for underground storage of natural gas; Exprogaz, to make and trade in oil products and carry out hydrocarbon exploration; and a distribution company with two subsidiaries. Romania also has begun to upgrade the country's 9,000-mile pipeline network, attempting to cut down on natural gas leakage and modernizing measuring stations to make gas consumption more efficient. Corroded steel pipelines are being replaced with polyethylene pipelines, and underground storage capacity is being increased from the present 39 Bcf to 162 Bcf by 2010. In addition, in July 2001 Germany's Ruhrgas became the first foreign company to invest in Romania's natural gas distribution network.

Coal

Romania's ailing coal industry is in dire need of major restructuring. Since the revolution of 1989, when Romanian coal production peaked at 66.4 million short tons (Mmst), the country's production has dropped nearly 60%. Romania's severe economic problems, combined with a parallel drop in coal demand and a lack of reform, have crippled the country's coal mining industry. After leveling off in the mid-1990s, the decline in Romania's coal production has accelerated in the past four years as pits began to be shut down and miners periodically have gone on strike to protest poor working conditions and to demand payment of wage arrears owed to them by the government.

Most of Romania's estimated 3,980 Mmst of coal reserves is lignite and sub-bituminous coal, and much of that is located in the Jiu Valley. The coal-rich region region, has been hit particularly badly by problems in the coal sector, with 18,000 miners losing their jobs in 1997 alone. Around 70,000 jobs in Romania's coal sector have been cut in the last four years, and World Bank officials have stated that Romania must shut 29 pits in the Jiu Valley, out of a total of 230 across the country, over the next three years. Starvation caused by the 1997-1998 job severance program led to bloody clashes, suicides and mass hunger strikes by Romanian miners, and in 1999, miners protesting the shutdowns and unhappy about wage arrears clashed with government forces as they marched to Bucharest to voice their concerns. Former Prime Minister Radu Vasile was forced to bargain with striking miners to negotiate a settlement to the confrontation before further violence erupted.



Miners' unions have warned of difficult conditions, including poor ventilation and obsolete equipment, in Romanian coal mines. On August 7, 2001, 14 miners were killed in an explosion in the Vulcan coal mine in the Jiu Valley, the latest in a pattern of deadly accidents in the region. A Romanian government investigation found that the explosion was caused by a violation of operation regulations while handling explosives, and as a result, eight officials held responsible for the blast were dismissed from their jobs.

Despite the industry's problems, Romania is making plans to increase coal production levels in the next decade. With reservoirs at the country's hydropower stations drained to less than 40% of capacity by a severe drought in the summer of 2000, Romania's plans to make up for reduced hydropower generation by boosting coal production is a major relief for domestic coal producers. In the first two months of 2001 alone, coal-mining productivity in Romania rose 15% year-on-year. However, Romania's attempts to revive its coal-mining industry by squeezing out as much coal as possible from existing mines as a cheaper alternative to other fossil fuel imports could slow the pace of restructuring. The government's strategy also could delay, if not cancel, plans by the World Bank to co-finance several coal projects in the country.

Electricity

Romania has installed electric-generating capacity of 22.2 gigawatts (GW), but in 1999 the country produced just 49 Bkwh of electricity, continuing a downward trend that has seen Romania's power generation drop 32% since 1989. Of the 49 Bkwh produced, 54% came from thermal-fired (oil, natural gas, and coal) power plants and 36% from the country's hydropower plants, with the remainder from Romania's sole nuclear power plant. Nevertheless, plummeting domestic electricity consumption, largely due to the Romania's economic woes and the collapse of industrial demand, has assured Romania's status as a net electricity exporter. In 1999, Romania consumed 44.8 Bkwh, a 40% decrease from the country's 1989 level of 74.7 Bkwh.

Approximately 60% of Romania's existing power capacity is more than 20 years old, and about 8 GW will need to be rehabilitated or replaced by 2010. According to the government's medium-term energy strategy, Romania is planning to rehabilitate 10 thermal power stations, with a combined capacity of 1.36 GW, between 2000 and 2005. Rehabilitation of these units will cost an estimated $460 million, while power-generating units with a total capacity of 5.9 GW are planned to be shut down. In addition, technical losses in Romania's inefficient power transmission and distribution system means that an estimated 13% of all electricity dispatched is lost before it reaches any customers.

Romania recently has begun to take steps to reform the country's power sector in order to bring in much needed investment for maintenance and upgrades. Romania removed price ceilings in 1997, but at less than 70% of the average prices in EU member states, the country's electricity prices are currently the lowest in Europe. In 2000, the Romanian government split up Conel, the state-owned electricity company that accounted for nearly 98% of all power produced in the countrya, and created independent companies to handle the country's power generation, transmission, and distribution. Electrica, the state-run electricity distributor, is undergoing further restructuring to divide the company into eight divisions prior to its planned privatization. The first of the eight distribution networks, Constanta and Timisoara, originally were planned to be sold off by the end of 2001, but Electrica General Manager Lucian Boghiu has stated that privatization is unlikely to happen this year.

In addition to restructuring efforts, Romania is opening its power market in line with the EU's electricity directive. In May 2001, Romania's Ministry of Industry and Resources announced that electricity prices will be marked up by 6.2%, the latest in a series of tariff increases. Earlier in 2001, Transelectrica, which was established to handle Romania's transmission system, received a $51.5-million loan from the European Bank for Reconstruction and Development (EBRD) to help upgrade its transmission system and to integrate the Romanian grid into the western European power network, the Union for the Coordination of Transmission of Electricity (UCTE). ANRE, Romania's power market regulator, has granted licenses to a number of large energy consumers, accounting for 15% of Romania's total power consumption, allowing them to select their own electricity suppliers. ANRE has licensed 11 independent electricity producers and is planning to open the energy market to 45% in the next few years.

With the government demonstrating its commitment to reform, investment in Romania's power sector is increasing, especially in the country's hydropower plants. In 1999, Switzerland's Sulzer Hydro won a $154-million contract from Hidroelectrica, Romania's hydropower producer, to refurbish six turbines at the Portile de Fier I (Iron Gates I) power plant on the Danube River. The Portile de Fier I plant has 12 Kaplan turbines, of which six are operated by Romania while the remaining six are operated by neighboring Serbia. Under the project, which is expected to be completed by 2005, the six Romanian turbines' total capacity is to be boosted to 1,290 MW from the present 1,070 MW. In addition, a joint venture between Hidroelectrica and Harza (U.S.) has been working on the Siriu-Surduc-Nehoiasu hydropower system on the Buzau river in eastern Romania. Hidroelectrica is seeking partners for 14 other hydropower projects (including completion of works, upgrading, and management) with a total capacity of 780 MW.

Nuclear

Romania has one nuclear power plant, at Cernavoda on the Danube River. Romania's former dictator, Nicolae Ceausescu, had planned to build five reactors at Cernavoda, but construction was halted after his overthrow in 1989. With the help of international investors, work resumed on the plant in the mid-1990s. The first reactor at Cernavoda, with a capacity of 750 MW, came online in December 1996 and now accounts for approximately 10% of the country's power generation.

In April 2001, Nuclearelectrica, which operates the Cernavoda plant, announced that it was close to concluding a $700-million deal with Italy's Ansaldo and Atomic Energy of Canada Limited (AECL) to finance completion of the 700-MW second reactor at Cernavoda. The two companies helped to build and commission the first reactor in 1996. Romania's share of the costs for the completion of the second reactor, which is approximately 40% complete, is estimated at $400 million. With construction to set to resume in 2002, Nuclearelectrica envisages completion and test operations at the reactor sometime around 2005. The remaining three reactors, whose construction is far behind, could become the object of international tenders to build and operate.

Environment

Romania is attempting to change its post-Cold War polluter image by paying greater attention to the environmental issues facing the country. While Romania is incorporating European Union environmental legislation in an attempt to join the EU, the country's environmental record suffered another blow in January 2000 when a devastating cyanide spill from a Romanian gold mine killed thousands of fish and wildlife in the Tisza River in Hungary.

Localized air pollution from leaded gas and industrial emissions represents a major threat to the environment in Romania. Although the country's energy consumption has decreased in the past 10 years as factories have cut back on production or closed down altogether, Romania's slow progress in restructuring its energy sector has provided a disincentive for energy saving in the long term. Thus, while the country's carbon emissions have dropped since 1990, Romania's energy and carbon intensity remain high, and the country's ability to maintain its reduction in carbon emissions and meet its Kyoto Protocol obligations in the 21st century is in question.

BULGARIA

Bulgaria has been slow to implement economic and political reform since the country's 1989 revolution removed Communist Party leader Todor Zhivkov. After a decade of stagnating economic growth and halting political reform, in June 2001, Bulgaria became the first country in post-communist eastern Europe to return a former monarch to power, as Bulgarians voted the National Movement for Simeon II into power in a general election. Simeon II, a successful businessman in Spain who was ousted from power by the Communists in a rigged election in 1946, returned to Bulgaria and formed his movement of radical young reformers and supporters of European integration only in April 2001 after the Constitutional Court banned him from running for president.

In July 2001, Simeon Saxe-Coburg was approved as the country's new prime minister, saying his priorities would be to bring Bulgaria into the European Union and NATO, to fight corruption, and to secure fast and stable economic growth. Saxe-Coburg's government, a coalition with includes a party of ethnic Turks, has pledged to improve people's lives in 800 days, speed up reforms, cut taxes, attract foreign investors, and boost the fledgling capital market. Bulgaria began EU membership talks in 2000 and hopes to join the union between 2004 and 2007.

Oil

Bulgaria has small indigenous oil reserves and produced only 1,000 bbl/d of oil in 2000. With the transition to a market economy and the end of favorable Eastern bloc prices for Soviet oil, Bulgarian oil consumption decreased by more than 50% from 1989, when Bulgaria consumed 235,200 bbl/d of oil, to 1997, when the country consumed just 106,800 bbl/d. Domestic demand has picked up in the past four years, with Bulgaria's consumption rising to 117,000 bbl/d in 2000 and projected consumption increasing to 121,000 bbl/d in 2001.

In October 1999, Russian oil major Lukoil bought a 58% stake in Bulgaria's largest refinery, the 134,000-bbl/d Neftochim refinery. Lukoil, which paid $101 million for the stake, pledged to invest $408.3 million by 2005 to upgrade the refinery to expand production lines and to meet environmental standards. Neftochim has an 85% share of the domestic market for refined products.

Natural Gas

Bulgaria has minimal natural gas reserves, forcing it to rely on imports for almost all of its natural gas consumption. Bulgaria's gas production increased from 0.4 Bcf in 1989 to 2.5 Bcf in 1993, but has since slipped to 0.7 Bcf in 1999. In May 2001, Bulgaria signed its first natural gas concession to a foreign firm, allowing British energy company Petreco to extract natural gas from Bulgaria's sector of the Black Sea. Under the 25-year contract, Petreco will be able to extract gas from the offshore Galata deposit, which has estimated reserves of 53 Bcf. Petreco has announced plans to extract 14 Bcf of gas per year, starting in 2002.

Bulgaria's natural gas consumption, meanwhile, has dropped from 222.8 Bcf in 1989 to a low of 119.0 Bcf in 1999, driven mainly by a decrease in demand from the industrial sector. State-owned Bulgargas is the country's only gas importer and the owner of the 1,380-mile pipeline network, and government officials have ruled out breaking up the monopoly in the near future. However, in June 2001, the Bulgarian government approved draft amendments to the country's energy act in a partial liberalization of the gas market. In line with an EU directive, as of January 2002, the government will allow large industrial gas consumers and gas distributors to negotiate imports of gas directly from external suppliers, circumventing Bulgargas.

Coal

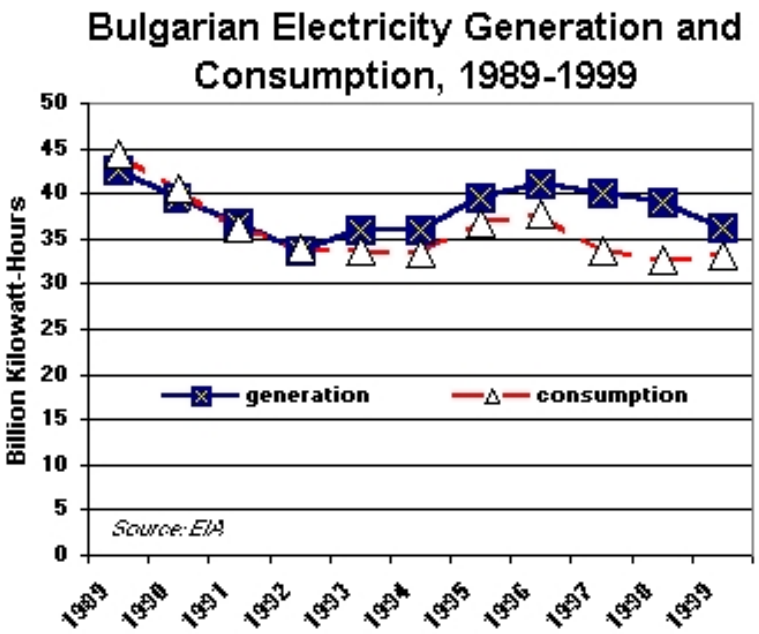
Coal is Bulgaria's most significant natural resource, with reserves estimated at 2.9 billion short tons, almost all of which is lignite or sub-bituminous coal. The country's biggest coal deposit, with estimated lignite reserves of 2 billion short tons, is the Maritsa Iztok coal basin, located in the southeast of the country. The Maritsa coal fields produce low-quality lignite coal with high ash and high sulfur content, but the adjacent Maritsa Iztok power plants are designed to work with this coal. Of the 27 Mmst of coal mined in Bulgaria in 2000, 22 Mmst was mined at Maritsa Iztok, while Bobov Dol, the second largest coalfield, produced approximately 2 Mmst.

In 1997, the Bulgarian government adopted an energy strategy that placed considerable emphasis on developing the country's coal sector, with total investment estimated at $362 million up to 2010. The strategy aims to increase output at the Maritsa Iztok mines to the pre-1989 level of 41 Mmst between 2005 and 2010 by developing the Troyanovo-1, Troyanovo-2, and Troyanovo-3 mines at the Maritsa Iztok basin. However, the mines have seen almost no investments over the past 10 years, and their ability to boost output will depend heavily on the rehabilitation of two of the adjacent power plants, as well as the construction of a new power plant to replace a third plant that is scheduled to be decommissioned.

Bulgaria slightly revised its coal sector strategy in 2000, calling for the closure of non-viable mines and the privatization of those that have attracted investor interest. In 2000, Bulgaria had 26 operating mines, 13 of which the government considered to be commercially viable. Privatization procedures have been started for 11 of the coal-mining companies.

Electricity

Bulgaria's installed electric capacity in 1999 was 12.5 GW, made up of 5.8 GW of thermal power (all coal), 3.8 GW of nuclear power, and 2.9 MW of hydropower. With domestic electricity consumption of 33.2 Bkwh in 1999, Bulgaria has significant spare capacity, even with nearly 2.6 MW of installed capacity currently inoperable. In 2000, Bulgaria produced 41 Bkwh of electricity, with coal-fired power plants generating 19.8 Bkwh, the Kozloduy nuclear plant accounting for 18 Bkwh, and hydropower supplying the remaining 3.2 Bkwh. The Maritsa Iztok complex, made up of three coal-fired power plants with combined capacity of 2,950 MW, accounted for nearly two-thirds of the power generated by coal-fired plants.



In 1998, the Bulgarian parliament began to liberalize the country's power sector by unbundling the generation, transmission, and distribution activities of the national electricity company, NEK. In the summer of 2000, the largest power plants and distribution networks, including the country's Kozloduy nuclear power plant, were separated from NEK, creating seven generation and seven distribution companies. Six of the seven independent power generators registered a profit in 2000, and some of them (but not Kozloduy) will be eligible for privatization.

NEK retains responsibility for central power trading (as the single buyer and seller of electricity), system operation, transmission network management, and system planning, as well as control over the the country's biggest hydropower plants. Introduction of open access is scheduled for 2002, and in September 2001, Milko Kovach, Bulgaria's new head of the State Agency on Energy and Energy Resources, announced that the country plans to start liberalizing its energy market in line with EU accession requirements and IMF recommendations next year.

Bulgaria is eager to attract investment to its aging power sector in order to make necessary upgrades and to maintain its status as the leading electricity exporter in the Balkans. With approximately 40% of Bulgaria's generating capacity scheduled to be retired by 2010, Bulgaria needs investment in the power sector, especially in the Maritsa Iztok coal-fired complex, which is the only Bulgarian facility fueled by local low-quality lignite fuel. Losing that capacity would force Bulgaria to become almost entirely dependent on higher-quality coal imports, most of which currently come from Russia.

In June 2001, Bulgaria sealed two investment deals for the Maritsa Iztok complex. Under a $470-million deal with Entergy (U.S.), four generation facilities at the Maritsa Iztok III power plant, which has a combined capacity of 840 MW, will be rehabilitated and retrofitted with equipment to treat sulfuric emissions. The project, which is expected to take approximately three and a half years to complete, will extend the operating life of the plant by up to 20 years. A $930-million deal with AES Corp. (U.S.) will build a new, 670-MW coal-fired plant at the Maritsa Iztok I plant, replacing an older unit. Construction of the new plant is expected to start by the end of 2001 or in early 2002. At a combined $1.4 billion, the deals represent the largest foreign investments in Bulgaria to date.

Rheinbraun (Germany) also is interested in investing in the 1,440-MW Maritsa Iztok II power station. However, Rheinbraun has stated that it is only interested in rehabilitating the four newest 210-MW units since it considers the four older 150-MW units to be inefficient. Although this would reduce the plant's capacity to 840 MW, the loss of output would not be noticeable since the four 150-MW units currently operate at an efficiency level of 22%. In addition, Bulgaria and Turkey have been attempting to re-launch the stalled $300-million, 170-MW Gorna Arda hydro project, which would rehabilitate the existing dams at the complex and build and operate a new water cascade of three hydropower stations. Bulgaria also is seeking investors for the $72-million Jadenitsa hydropower project and for the $50-million Tsankov Kamak hydropower station.

Nuclear
Bulgaria has one nuclear power plant, the 3,760-MW, Soviet-designed Kozloduy plant located 120 miles north of Sofia. The plant's six reactors include four 440-MW pressurized water reactors without safety encasement (similar to Chernobyl), which were installed between 1974 and 1982, and two more modern, 1,000-MW reactors that have safety enhancements. Although the Kozloduy plant generated 44% of the country's electricity in 2000, Bulgaria bowed to EU safety concerns in 1999 and agreed to close down two of the older 440-MW reactors (units 1 and 2) by 2003, earlier than Bulgaria had wanted. Liberalization of the country's energy market and rising electricity prices should allow Bulgaria to shut down the two reactors without hurting the country's power generation capacity.

The EU is pressing Bulgaria to close down the other two 440-MW reactors (units 3 and 4) as part of accession talks. The EU has called for closure by 2006, but Bulgaria has insisted that the reactors will be permanently closed only after 2008. The operational lifespan of the two units expires in 2010-2012. Bulgaria already has spent more than $100 million on upgrading work at Kozloduy, and in February 2001 the country signed a $76-million contract with Westinghouse to upgrade the two 1,000-MW units.

MOLDOVA
Moldova* became independent in 1991 with the collapse of the Soviet Union, but in the decade since then, the country has been beset by political and economic turmoil. The Trans-Dnistria region, home to the Russian Red Army 14th Division during the Soviet era, declared its independence from Moldova and proclaimed the Trans-Dnistrian Republic, leading to a brutal civil war in the mid 1990s. Fighting stalemated, leaving the region with de facto independence but there has been no formal resolution to the conflict.

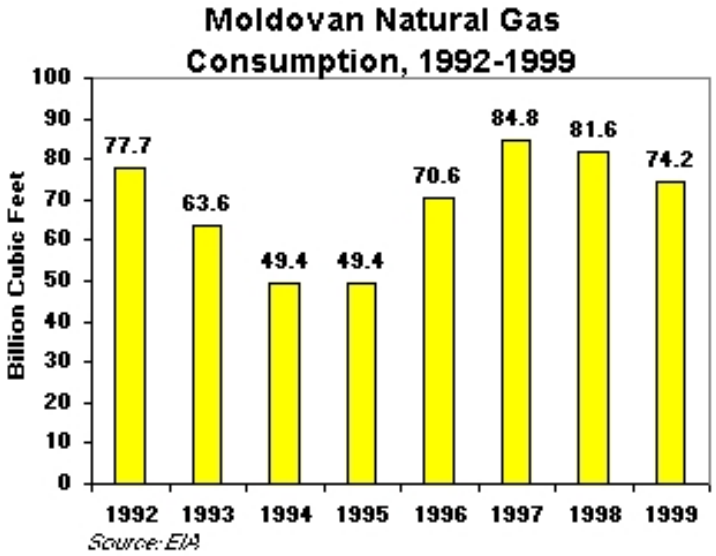
Moldova's economy has contracted severely during the last 10 years, and reform has been slow. The country's economic downturn has resulted in widespread disaffection, which the Communist Party capitalized on in winning an absolute majority in the February 2001 parliamentary elections. In the energy sphere, Moldova relies almost entirely on Russian and Romanian imports to meet domestic demand.

Oil
Moldova has minimal proven oil reserves, and the country currently does not produce any oil, although a plan to develop the Valenskoye field in the southern region of the country could yield up to 2,000 bbl/d. Since Moldova does not have any refineries, the country must rely on imported petroleum products to meet domestic demand. Following the breakup of the Soviet Union, Moldova's oil consumption plummeted by 71%, from 56,900 bbl/d in 1992 to just 16,700 bbl/d in 1996, as the country's economy contracted and fighting broke out in the separatist Trans-Dnistria region. Consumption has rebounded slightly and leveled off at around 20,000 bbl/d, with 2001 consumption projected to reach 21,000 bbl/d.

Just four years ago, Moldova imported the majority of its oil products from Russia, but currently Romania and Ukraine supply Moldova with nearly 99% of its oil demand. Oil products account for over 40% of Moldova's energy imports, which make up nearly one-third of the country's total imports.

Natural Gas

Moldova has estimated natural gas reserves of 882 Bcf, almost all of which are in the Viktorovskoye field. Moldova plans to develop this field in partnership with foreign investors, but production at the field--which would be around 0.1 Bcf per year--has not yet begun, leaving Moldova entirely dependent on Russia for its natural gas supplies. Since Moldova became independent in 1992, the country's natural gas consumption has been wildly inconsistent, with consumption falling to just 49.4 Bcf in 1994 and jumping to 84.8 Bcf in 1997 before dropping to 74.2 Bcf in 1999. This pattern reflects the economic contraction and rise in fighting between Moldova and the breakaway Trans-Dnistrian Republic in the mid-1990s, followed by the relative stability later in the decade as the fighting stalemated and gave way to negotiations.



Moldova's natural gas consumption has begun to decline again as Russian suppliers--including Gazprom and Itera--have reduced supplies to the country due to its increasing debts. According to Mihai Lesnic, chairman of the state natural gas distribution company Moldovagaz, Moldova has run up a gas debt of approximately $420 million to Russia, with the Trans-Dnistrian region, which consumes 40% of the gas imports, responsible for nearly $360 million of that debt. Currently, Moldova buys part of its gas supplies from from Gazprom for $80 per 1,000 cubic meters. Moldova also purchases natural gas from Itera for $65 per 1,000 cubic meters, but on tougher terms of payment.

Moldovan Prime Minister Vasile Tarlev has complained that $80 per 1,000 cubic meters of natural gas is an unbearable burden for most Moldovan businesses and individual consumers, resulting in non-payment and contributing to Moldova's mounting debt. In October 2001, Tarlev and Gazprom Chairman Alexei Miller initialed a preliminary agreement to reduce the burden, with natural gas supplies to be paid in cash at $60, and the remainder in the form of crops and other commodities from Moldova at $20. In addition, Russia and Moldova are attempting to negotiate a settlement to Moldova's natural gas debts, with one option allowing Russia to take part in the privatization of a number of Moldovan businesses. Russia restructured Moldova's natural gas debts in 2000, but the measure proved insignificant, forcing Moldova to ask for a further reduction of the debt.

Coal

Moldova has a small coal industry, with reserves estimated of approximately 10 Mmst and production of 35,000 short tons in 1999. This represented a sharp decline from the peak of around 290,000 tons produced in the late 1980s, when Moldovan coal enjoyed a higher level of demand in the combined markets of the Soviet Union. However, most Moldovan coal production is low-grade bituminous coal, used in construction rather than power generation. For energy purposes, Moldova imports approximately 620,000 tons of hard coal per year. Moldova's coal consumption, like its production, has dropped significantly in the past decade, from 2.96 Mmst in 1992 to just 64,000 short tons in 1999.

Electricity

Since receiving its independence in 1992, Moldova has gone from being a net power exporter to a net importer as power-generating capacity has been reduced due to under investment, warfare, and the country's economic contraction. Moldova's current 1-GW power-generating capacity is less than one-third of the country's 3.1-GW capacity in 1992. The country's power generation has been reduced from 10.6 Bkwh in 1992 to 4.2 Bkwh in 1999, while Moldova's domestic electricity consumption has dropped from 9.8 Bkwh in 1992 to 5.8 Bkwh in 1999.

As a result, Moldova is now dependent on imports for nearly 15% of its electricity consumption. Most of these supplies come from Romania and Ukraine. As of July 2001, Ukraine was exporting about 100 million kilowatt-hours of electricity per month to Moldova, with technical capacity to increase supplies to 250 million kilowatt-hours per month. Romania periodically has cut off supplies to the Moldovan grid due to non-payment of bills, and Moldova's debt for Ukrainian

electricity is approximately $30 million. Russia is eager to export its electricity to Moldova as well, and in August 2001, Russia and Ukraine re-connected their electricity grids and agreed on joint exports of electricity to Moldova.

Moldova's power sector continues to suffer from consumer non-payment of bills, leaving the countries' power-generating facilities short of cash for investment and leading to an energy crisis in northern Moldova earlier in 2001. In parts of northern Moldova served by the northern and north-western energy distribution grids, electricity was out for 12 or more hours per day. In April 2001, Moldova passed several urgent measures to resolve the crisis, including finally allowing electricity suppliers to cut off indebted customers. Itera and Spanish utilities company Union Fenosa have expressed interest in obtaining Moldova's northern and north-western electricity distribution networks, both of which are in bad financial condition.

In August 1999, Union Fenosa purchased three of Moldova's regional energy distribution networks, including the network supplying Chisinau. Under the $25-million sale agreement, Union Fenosa is committed to making further investments of $60 million over five years to upgrade and modernize energy infrastructure. In August 2001, Union Fenosa signed a $267-million, 10-Bkwh, 5-year power supply agreement with the Cuciurgan power station, which is controlled by the secessionist Trans-Dnistrian Republic. The agreement is expected to cover 70%-80% of the needs of the three power distribution grids.

In an effort to raise much needed capital, in November 2000, Moldova sought to sell 70% stakes in three gas-fired power plants with combined capacity of 318 MW. However, Moldova's offer to sell the CET1 and CET2 plants near Chisinau and the 240-MW Balti plant in the north failed to attract any bids. A second tender was launched in March 2001.

* *All Moldova figures include Moldova proper and the Trans-Dnistrian Republic.*

Table 1. Economic and Demographic Indicators for Southeastern Europe

Country	Gross Domestic Product (GDP), 2000E (Billions of U.S. $)	Real GDP Growth Rate, 2000 Estimate	Real GDP Growth Rate, 2001 Projection	Per Capita GDP, 2000E	Population 2000E (Millions)
Bulgaria	$12.0	5.8%	3.9%	$1,468	8.2
Moldova	$1.3	1.9%	3.5%	$300	4.3
Romania	$36.7	1.6%	5.2%	$1,647	22.3
Total/weighted average	$50.0	2.6%	4.8%	$1,438	34.8

Source: WEFA

Table 2. Energy Consumption and Carbon Dioxide Emissions in Southeastern Europe, 1999

Country	Total Energy Consumption (Quadrillion Btu)	Petroleum	Natural Gas	Coal	Nuclear	Hydroelectric	Other Electricity	Net Electricity Imports	Carbon Dioxide Emissions (Million metric tons of carbon)
Bulgaria	0.84	27.1%	14.0%	36.7%	19.1%	3.8%	0%	-0.6%	13.5
Moldova	0.15	22.7%	54.4%	7.3%	0%	1.9%	0%	13.7%	2.0
Romania	1.64	30.3%	37.8%	17.6%	3.5%	11.2%	0%	-0.5%	25.7
Total/weighted average	2.63	28.8%	31.1%	23.1%	8.3%	8.3%	0%	--	41.2

Source: Energy Information Administration
Note: percentages may not add up to 100% due to rounding.

Table 3. Energy Supply Indicators, Southeastern Europe

Country	Crude Oil Reserves, 1/1/01 (Million Barrels)	Natural Gas Reserves, 1/1/01 (Trillion Cubic Feet)	Coal Reserves, 1/1/01 (Million Short Tons)	Petroleum Production, 2000 (Thousand Barrels Per Day)	Natural Gas Production, 1999 (Billion Cubic Feet)	Coal Production, 1999 (Million Short Tons)	Electric Generating Capacity, 1999 (Gigawatts)	Crude Oil Refining Capacity, 1/1/01 (Thousand Barrels Per Day)
Bulgaria	1-15	0.2	2,988	1	0.7	28.7	12.4	134
Moldova	Minimal	Minimal	Minimal	0	0	0.04	1.0	0
Romania	1,200-1,400	4.0-13.2	3,980	127.4	501.5	27.6	22.2	522
Total	1,201-1,415	4.2-13.4	6,968	128.4	502.2	56.3	35.6	656

Source: Energy Information Administration

Sources for this report include: CIA World Factbook, U.S. Department of Commerce's Business Information Services for the Newly Independent States, the U.S. Energy Information Administration, PlanEcon, Radio Free Europe/Radio Liberty, U.S. Department of State, WEFA Eurasian Economic Outlook, as well as Eastern Bloc research and news reports.

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Radio Free Europe/Radio Liberty
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U.S. Department of Energy, Fossil Energy Overview of Romania
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November 2001

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Germany

Germany is one of the world's largest energy consumers. Because it has limited indigenous energy resources (except for coal), Germany imports most of its energy. Although the country is a major coal producer, it is a net coal importer.

The information contained in this report is the best available as of November 2001 and is subject to change.

GENERAL BACKGROUND

Germany is one of the world's largest economies, a founding member of the European Union (EU), a North Atlantic Treaty Alliance (NATO) member, and a member of the Group of Seven (G-7) industrialized nations. It joined the common European currency, the euro, on January 1, 1999, and Frankfurt is the seat of the European Central Bank. The German mark, which still exists as cash and coin will disappear in the first six months of 2002 as people trade in their marks for the new euro coins and currency.

The ruling Social Democrat (SPD) government, led by Chancellor Gerhard Schroeder, was voted into power on September 27, 1998. This election marked an important change in German politics, as Schroeder's predecessor, Helmut Kohl of the more conservative Christian Democrats (CDU), had held power for 16 years. The lower house of the German Parliament (Bundestag) gave Schroeder a vote of confidence on November 16, 2001, when he tied approval for military deployment to Afghanistan to a vote of confidence. The vote allows Germany to send 3,900 troops, including special forces, to support to the United States-led coalition against terrorism.

Germany experienced slower economic growth during 2001 as compared to 2000, and may be on the verge of a slight contraction, according to a report published in October 2001, by Germany's top six economic research

institutes. The events of September 11 had a negative effective on the entire world economy, and recent German government estimates are that growth in 2001 may be just 0.75%. In September, business confidence in Germany fell to its lowest level since 1993, and has continued to fall slightly since then. In addition, the growth generated by increasing exports because of the relatively weak euro and other factors up to August 2001, has been diminished as the global economy, and that of the United States in particular, looses momentum. Unemployment, a major issue in German politics in recent years, has decreased slightly since its high in 1998. However, the economic slowdown indicates that unemployment will likely not fall any further in the next 12 months.

Energy in Germany

German has very limited domestic energy sources and is heavily import-reliant to meet its energy needs. Coal accounted for 47% of domestic energy production in 1999, nuclear power 30%, natural gas 14%, renewable sources (including hydro) 6%, and oil 2%. However, oil accounted for 41% of consumption.

The SPD now rules in alliance with the Greens, the environmental party. The SPD-Green coalition government's energy policy has focussed on levying eco-taxes to reduce carbon emissions, ending the use of nuclear power, and supporting renewable energy. Schroeder's government came under harsh criticism and saw its popularity falter during September 2000 oil price demonstrations that swept across western Europe. Higher world oil prices and a weak euro caused Germany's oil import costs for the first half of 2000 to increase 140% over the same period in 1999, according to Germany's federal statistics office. Demonstrators, opposition CDU politicians, and others joined in demanding relief from eco-taxes (taxes now make up about 70% of the pump price for gasoline in Germany). Despite demonstrations resulting in the temporary paralysis of Berlin, Schroeder refused to roll back the taxes, instead offering some new tax rebates. Among these is a flat-rate travel-to-work benefit for all employees. However, in late October 2001, the

Chancellor's chief economic advisor indicated that these ecological taxes may be suspended for a year or two as a way to provide a stimulus to economy.

Energy policy in Germany is influenced heavily by EU regulations. The EU requires privatization and competition in member countries' energy markets, and Germany has been a leader in developing competitive energy markets.

Following reunification of the country in 1990, the major task of German energy policy was to merge successfully the radically different energy sectors of the East and West. West Germany had a diversified and mainly privately-owned system of energy supply with a high standard of energy efficiency and a commitment to environmental protection. In contrast, East Germany's energy sector was highly centralized, predominantly state-owned, and mainly dependent upon relatively "dirty" lignite (brown coal) as its primary fuel. To date, a great deal of progress has been made in conforming the former East Germany's energy sector to the standards of the West in the areas of privatization and environmental regulation.

OIL

Germany consumed about 2.8 million barrels per day (bbl/d) of oil in 2000, nearly all of which it imported, making Germany the third-largest oil importer in the world. German oil imports come primarily from (year 2000 percentages) Russia (29%), Norway (18%), United Kingdom (13%), and the Libya (11%). German imports from Russia have remained unchanged in recent years. However, OPEC's share of German imports has decreased, while the share of North Sea oil from Norway and the United Kingdom has increased. Despite the level of imports being about the same, import costs increased by about 85% in 2000. Imports from the North Sea fell 7%, made up by a 7% rise in imports from the countries that made up the former Soviet Union. OPEC's exports to Germany overall were essentially unchanged, with Libyan and Venezuelan imports declining and Nigerian and Algerian imports rising. Into the first six months of 2001, preliminary estimates show Russian crude oil maintaining the same level as 2000, but imports from OPEC declining from 26% to 22% of total imports into Germany.

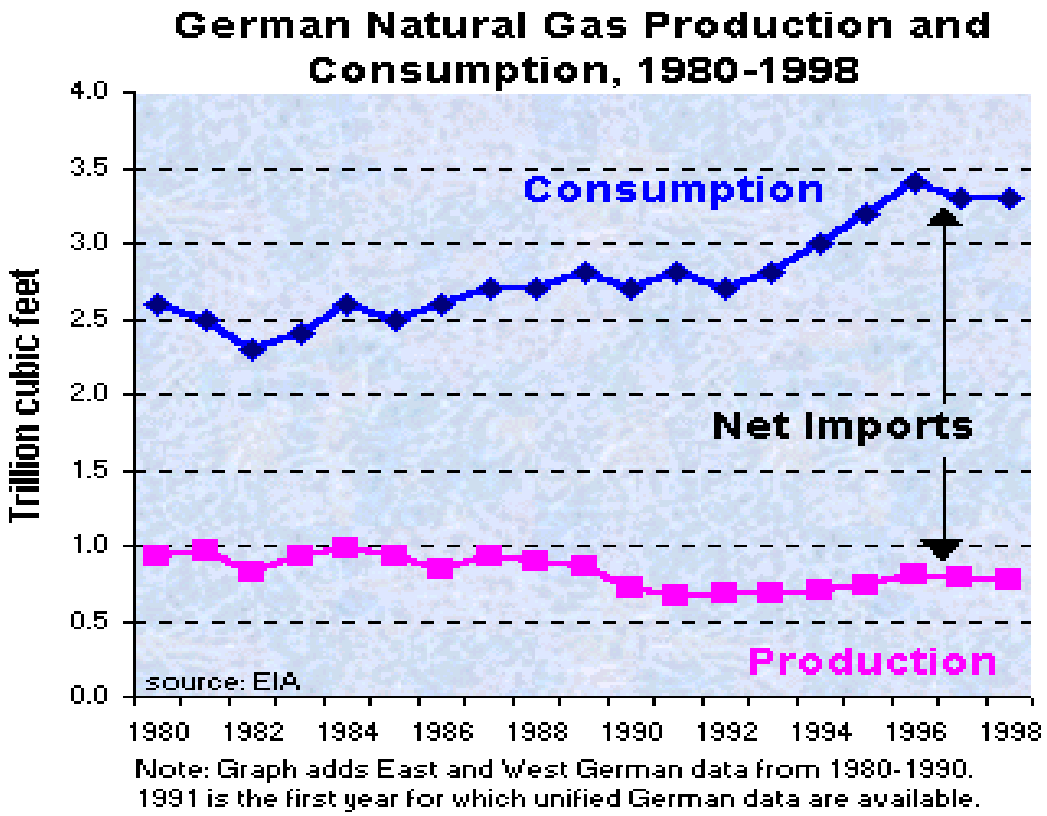
Germany produced around 139,000 bbl/d of oil in 2000, including 64,000 bbl/d of crude oil, 16,000 bbl/d of which came from the German North Sea. Higher world oil prices in 2000 spurred a small increase in domestic crude oil production.

Germany's oil consumption was essentially unchanged in 2000 as compared to 1999. With the aid of hefty federal taxes on gasoline consumption, Germany had decreased its oil consumption in recent years, with lower consumption in 1999 than any year since unification. Germans pay about four times more at the pump than Americans, despite having the most competative retail gasoline market in Europe. German refinery throughput increased 1% in 2000, and refinery capacity utilization was at 95%.

The German downstream sector is in the process of completing two large mergers. In April 2001, Royal Dutch Shell and one of Germany's largest energy companies, RWE, agreed to form a new 50:50 venture called Shell & Dea Oil. The new company is managed by Shell, and will

NATURAL GAS

Germany produces very little natural gas and satisfies most of its demand through imports. In 1998, the country produced 0.8 trillion cubic feet (Tcf) of natural gas from proven reserves of 12.0 Tcf, while consuming 3.3 Tcf. Almost one-third of Germany's gas imports come from Russia. The other main sources of imports are the Netherlands (about 24%) and Norway (about 20%). Gas consumption accounted for about 21% of total energy consumption in Germany in 1998. This share is expected to rise over the next decade, especially for electric power generation as nuclear power is phased out. Gas currently fuels about 10% of German electricity.



Ruhrgas remains Germany's dominant natural gas transmission company. Years of Ruhrgas's monopolistic control of Germany's gas market have left Germany with a highly developed gas infrastructure. Ruhrgas is currently involved in laying pipes to connect Poland to the German system in order to increase imports of Russian gas via Poland, a project that could be completed in late 2001. Ruhrgas has also bought stock in Russia's Gazprom, in an effort to facilitate closer relations between the two companies in anticipation of future increases in German demand for gas.

Competition in the market has developed slowly. Ruhrgas's main competitor, Wingas, was formed in 1993 by a joint venture between BASF's Wintershall and Russia's Gazprom. Now, with its own domestic pipelines and links to export supply lines, Wingas has gained market share, while Ruhrgas's share has decreased. Wingas is nearing completion on a pipeline construction project that will connect Russia's Yamal Peninsula to the German network, which is expected to increase further the Wingas market share.

Although Germany has one of the most liberalized energy sectors in the EU, full liberalization of German gas market has not emerged as expected. According to EU law, member countries' gas transmission systems had to be open to third party access as of August 2000. While a German law was in place confirming a legal right for third party access, in practicality, new

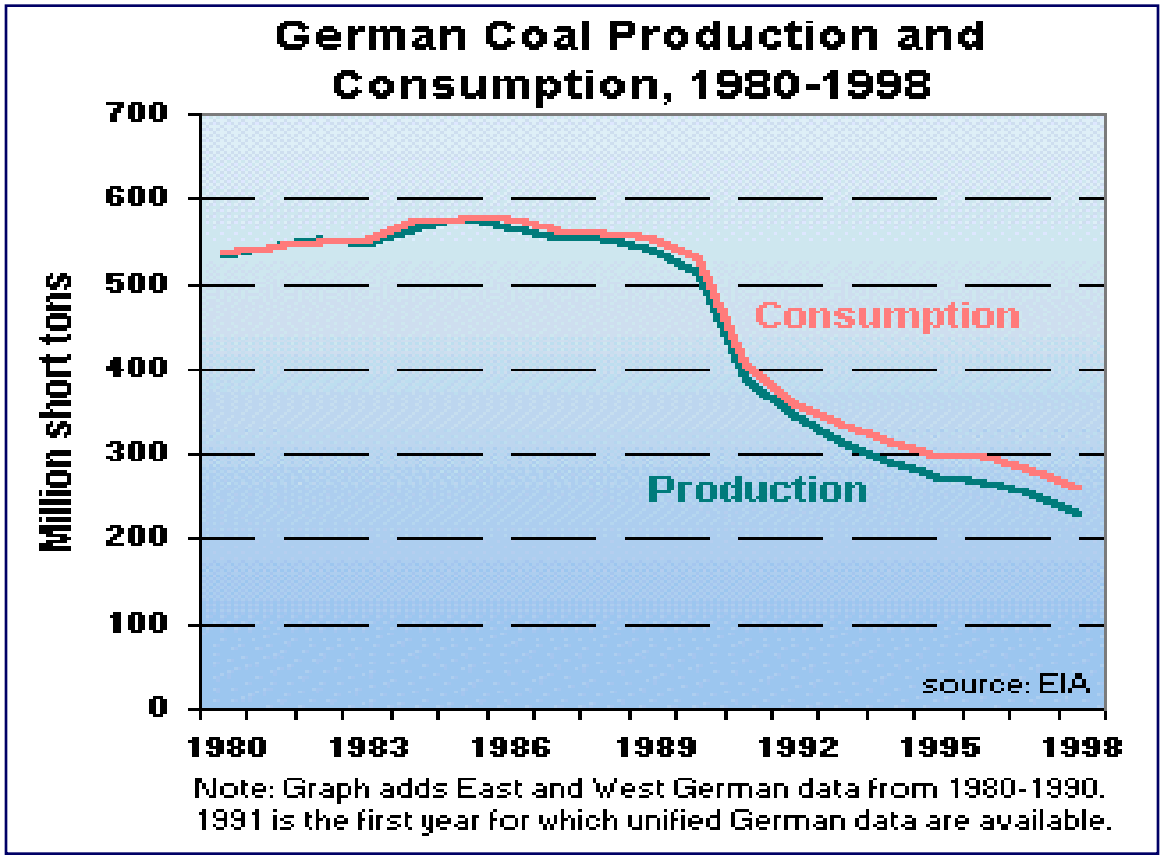
entrants have had difficulty gaining access. In response to a threat of legal action made by the European Commission (EC, the executive body of the EU), new legislation will be introduced to further promote open access.

In September 2000, the *Deutsches Nordseekonsortium* (German North Sea Consortium), which is made up of Wintershall (40%, operator), BEB Erdgas und Erdoel (40%), BASF (12%), and RWE-DEA (7%), began production. The first offshore natural gas project in the German North Sea, the field is located about 190 miles from the German coast. New pipelines will transmit the anticipated 3.3 million cubic meters (116.5 million cubic feet) per day of production. The field is expected to produce for 16 years.

COAL

Coal is Germany's only major domestic fuel source. Over 75% of German coal production is used for electricity generation, and coal accounts for over 50% of electricity generation. Hard coal production is expensive in Germany, relative to production costs in other major coal producers, because German coal is located deep underground. Hard coal production has remained a viable industry only through heavy subsidization, which now is coming to an end. Lignite, or "brown coal," production, however, is inexpensive in Germany. Germany is the world's largest lignite producer, with about one-fifth of global output.

In March 1997, the German government, the mining industry, and the unions reached an agreement on the future structure of subsidies to the German hard coal industry. Subsidies to the industry are to be reduced from over DM10 billion ($5.5 billion) in 1997 to DM5.5 billion ($3 billion) by 2005. The agreement called for closure of 7-8 of Germany's 19 hard coal mines, resulting in an estimated decline in employment from 76,000 miners in 1997 to 36,000 by 2005.



In October 2000, the EC energy commissioner demanded that Germany rework this subsidization scheme or risk legal action. According to the 1997 agreement, 2000 subsidies will total DM8.5 billion. The EC claims that too much of that amount will be spent on subsidizing continuing production, and not enough devoted to ending production. The EC is expected to take further steps, beginning with a formal letter to the German government, in early November 2000. The German Economy Minister stands by the subsidies as delineated in the 1997 agreement, despite impending legal action.

Decreasing coal production has brought about changes in the industry's organization. Two major producers, Saarbergen and Ruhrkohle Bergbau, merged to form Deutsche Steinkohle (DSK), which accounts for 96% of German production. DSK is part of the larger RAG group, which intends to diversify its holdings and focus less on coal as the sector shrinks in coming years.

As domestic production declines, Germany is emerging as a significant coal importer. Germany imported 10% of its coal consumption in 1997, and 12% in 1998. The largest supplier is Poland, followed by Australia, South Africa, and Colombia. The Federation of German Coal Importers expects German coal imports to double over the next 20 years, as nuclear power is phased out

and domestic production declines.

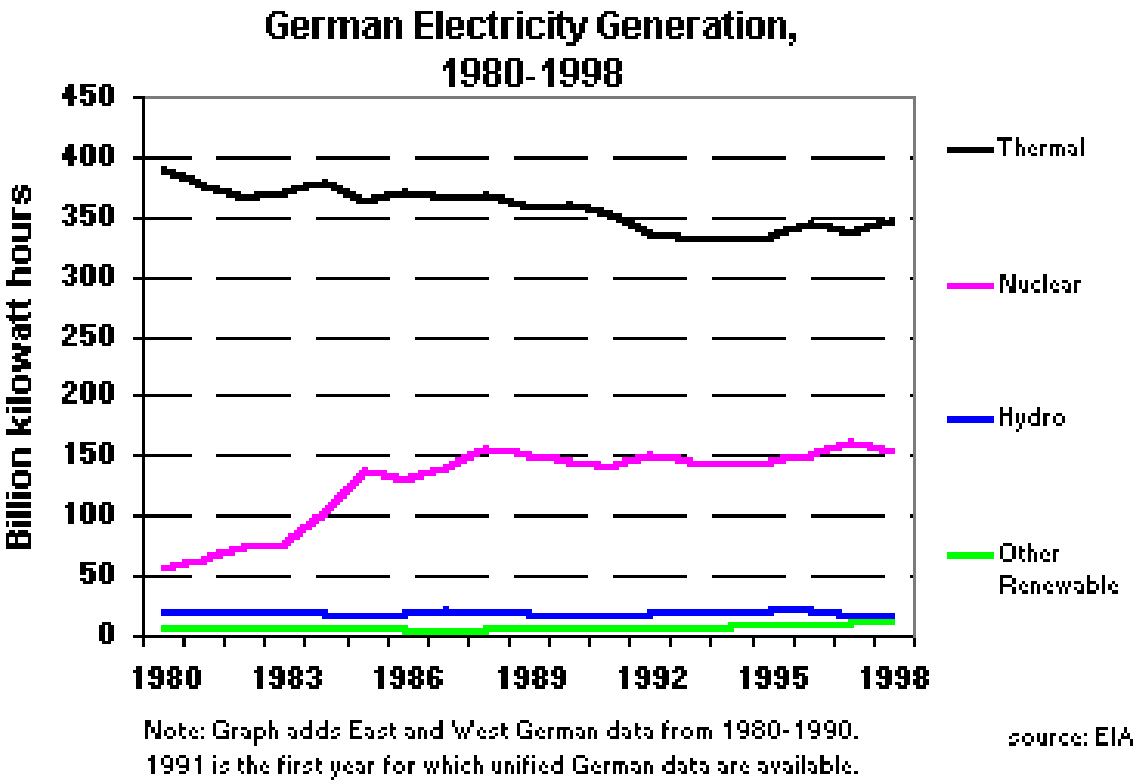
Germany's lignite production is separate from hard coal production. Lignite was the most important fuel in the former East Germany, and East Germany had been producing about three times as much lignite as West Germany in the years prior to unification. Since reunification, wasteful and environmentally damaging mining methods practiced during Communist rule have been reformed. The industry also has been privatized. Lignite production in Germany fell from 308 Mmst in 1991 to 183 Mmst in 1998. Rheinbraun, a subsidiary of RWE, is responsible for most of German lignite production, and most of its lignite is used to produce electricity in RWE's power generation plants.

ELECTRICITY

Germany has Europe's largest electricity market. In 1998, Germany generated 525.4 billion kilowatt hours (bkwh) of electricity, two-thirds of which came from fossil fuels (mostly coal), with the other other third coming mostly from nuclear power along with small amounts of hydropower and other renewable sources. The country was a net electricity exporter, consuming only 488.0 bkwh. Germany has about 2,800 power plants and considerable excess generation capacity. The International Energy Agency predicts slow demand growth in coming years. Major electricity companies recently have announced intentions to decrease generation capacity and output, and new power plant construction is at record lows.

The industry is undergoing dramatic changes in fuel mix and in organization. Efforts continue to phase out nuclear power and to increase reliance on renewable energy sources, most notably wind power. The German power market was liberalized in April 1998, and the ramifications of this change are still developing.

Sector Organization



In step with EU legislation, the German power market has become one of the most competitive in Europe. Liberalization of the electricity sector has progressed via agreements among major participants in the market and is not overseen by any regulatory body (like the natural gas sector). Liberalization has resulted in lower consumer prices, decreased employment in the industry, and is now sparking a wave of consolidation.

Six major electricity generation companies have dominated the German market in recent years, accounting for about 80% of generation. Major mergers are re-shaping the industry, potentially reducing the number of major players from six to three in the near future. RWE, the largest energy company in Germany, has acquired VEW, the country's six-largest electricity producer. Veba, Germany's second-largest power company, merged in June 2000 with Viag, the third-largest, to create Eon. The newly merged companies will be Europe's third- (RWE) and fourth-largest (Eon) electricity companies, behind the French state company EdF and Italy's ENEL.

In efforts to meet antitrust regulation, the four merging companies will sell their combined 81% share of Veag, which had been the fifth-largest electric company. U.S.-based NRG Energy, which mines lignite in Germany, and Germany's former fourth-largest company, EnBW, will bid jointly for control

of Veag. The closing dates for bids is November 15, 2000. The merger activity also cleared the way for EdF to acquire a 25.01% stake in EnBW. The EU is not expected to issue a decision regarding approval of the sale to EdF until early 2001.

The utility market is highly fragmented in Germany, with about 70 regional utilities and 900 municipal utilities, which together account for about 20% of power generation and about two-thirds of distribution. Merger and acquisition activity also is re-shaping these utilities, with a reported 15 mergers among 40 companies in 1999. Foreign company involvement in the sector became controversial in 2000, with a German court blocking the sale of Bewag of Berlin to HEW, a Hamburg utility owned by Sweden's Vattenfall. Sempra Energy of the United States was the main rival for the sale. Vattenfall and HEW had been hoping to complete the purchase of Bewag in time to launch a joint bid with U.S.-based Southern company for Veag.

Despite the overall success of liberalization, third party access to transmission networks remains a contentious issue. The *Verbandervereinbarung* that determines access to the grid system was first agreed in May 1998 and left transmission control mostly in the hands of the six major companies. After much criticism, a new Verbandervereinbarung was agreed in December 1999. This agreement has encountered even more criticism than its predecessor, and EU competition authorities have expressed concern. The most criticized aspects of the agreement include a lack of price transparency and the division of the German market into two distinct trading zones.

The German government has been critical of member EU governments that have not taken steps to open their power sectors in accordance with EU law. Currently, German electricity companies do have the right to block electricity imports from countries that deny access to foreign companies. The Minister of Economics, Werner Mueller, has proposed that German energy law be amended to extend the right to invoke bans, known as "reciprocity clauses", to the government.

Nuclear Power

Currently, Germany ranks fourth worldwide in installed nuclear capacity, behind the United States, France, and Japan. Germany's nuclear plants comprise about 30% of Germany's electric generation capacity, and about 29% of actual generation. Eon, RWE, and EnBW own nuclear generation capacity, with Eon holding stakes in 11 of Germany's 19 nuclear power reactors.

Nuclear power has become controversial since the September 1998 elections. The Greens, the environmental party that is part of the ruling alliance, are staunchly opposed to the continued use of nuclear power. Chancellor Schroeder had decided to close all 19 nuclear reactors in 2005, but he has since rescinded his position. The government agreed with utility companies in June 2000 to gradually phase out nuclear power. Each nuclear plant is allowed to produce a finite amount of electricity, and plants will have a life span of 32 years. The deal could see the total elimination of nuclear power by 2021, as the newest nuclear plant opened in 1989. Generation volumes are transferable; if an older plant closes before reaching its production ceiling, its remaining allowable production can be transferred to a new plant.

There are few economically viable alternatives to quickly replace such a significant portion of the fuel mix, especially in the wake of the liberalization of the industry. As European markets become more liberalized and more price-sensitive, replacing the mostly amortized plants will prove difficult. Over the longer term, however, high costs (high fixed costs, long depreciation periods and long annual operating times) associated with nuclear generation could work to decrease nuclear generation's role in Germany's power sector. Nuclear installations currently are initiating programs to reduce production costs and waste disposal costs in order to become more price-competitive. In October 2000, Eon and RWE announced intentions to close a number of their less competitive (in terms of price) nuclear power plants.

ENVIRONMENT

Germany has a strong commitment to protecting its environment. It has actively promoted the use of renewable energy, both under the Kohl government with the Electricity Feed Law, and now under Schroeder's government with eco-taxes. In Germany's eco-tax regime, energy tax (energy taxes are slated to increase 10% over the next three years) revenue is used to fund renewable projects.

In 1998, Germany emitted 227.5 million metric tons of carbon from the consumption of fossil fuels. Germany ranks third in total carbon emissions within the G-7, after the United States and Japan. Germany signed the Framework Convention on Climate Change in Rio de Janeiro in June 1992 and ratified it on December 9, 1993. Signers of the agreement pledged to stabilize per capita CO_2 emissions in the year 2000 and beyond at 1990 levels. Under the Kyoto Protocol of December, 1997, Germany would have to go even further by reducing carbon emissions 8% by 2008-2012. This will be made more achievable given the sharp drop in total German carbon emissions since 1990, due mainly to decreased consumption of energy overall (and in particular lignite) in the former East Germany.

Sources for this report include: CIA World Factbook; Dow Jones; Economist Intelligence Unit ViewsWire; Petroleum Intelligence Weekly; Financial Times; Economist; Petroleum Economist; U.S. Energy Information Administration; WEFA World Economic Outlook.

COUNTRY OVERVIEW

President: Johannes Rau (elected May 1999)
Chancellor: Gerhard Schroeder (elected September 1998)
Independence: January 18, 1871 (reunification of West and East Germany took place on October 3, 1990)
Population (2001E): 83 million
Location/Size: Central Europe, bordering the Baltic Sea and the North Sea, between the Netherlands and Poland, south of Denmark/137,821 square miles (slightly smaller than Montana)

Major Cities: Berlin (national capital since 10/3/90), Hamburg, Munich, Cologne, Frankfurt, Essen, Dortmund, Stuttgart
Language: German
Ethnic Groups: German 91.5%, Turkish 2.4%, other 6.1% (made up largely of Serbo-Croatian, Italian, Russian, Greek, Polish, Spanish)
Religions: Protestant 38%, Roman Catholic 34%, Muslim 1.7%, unaffiliated or other 26.3%
Defense (8/98): Army, 230,600; Navy, 26,700; Air Force, 76,200 (including conscripts)

ECONOMIC OVERVIEW

Finance Minister: Hans Eichel
Currency: Deutsch Mark (DM)
Exchange Rate (11/09/00): 1 US Dollar = 2.2861 DM
Gross Domestic Product (GDP, nominal, 2000E): $1.87 trillion **(2001E):**
Real GDP Growth Rate (2000E): 3.0% **(2001E):** 1.1%
Inflation Rate (consumer prices, 2000E): 1.9% **(2001E):** 2.7%
Unemployment Rate (2000E): 9.6% **(2001E):** 9.5%
Exports of Goods (2000E): $549 billion
Imports of Goods (2000E): $492 billion
Major Trading Partners (2000): France, U.S., U.K., Italy, Netherlands
Major Export Products (2000): Machinery and transport equipment, manufactured goods, chemicals
Major Import Products (2000): Machinery and transport equipment, manufactured goods, other finished goods, fuels

ENERGY OVERVIEW

Minister of Economics: Werner Mueller
Proven Oil Reserves (1/1/01): 380 million barrels
Oil Production (2000E): 139,000 barrels per day (bbl/d), of which 64,000 bbl/d was crude oil
Oil Consumption (2000E): 2.76 million bbl/d
Net Oil Imports (1999E): 2.7 million bbl/d
Natural Gas Reserves (1/1/01): 11.5 trillion cubic feet (Tcf)

Natural Gas Production (1999E): 0.82 Tcf
Natural Gas Consumption (1999E): 3.0 Tcf
Coal Reserves (12/31/96E): 73.9 billion short tons
Coal Production (1999E): 226 million short tons (Mmst)
Coal Consumption (1999E): 258 Mmst
Net Coal Imports: 32 Mmst
Electric Generation Capacity (1/1/99): 108 gigawatts
Electricity Production (1999E): 531.4 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Minister for Environment: Juergen Trittin
Total Energy Consumption (1999E): 13.9 quadrillion Btu* (3.6% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 229.9 million metric tons of carbon (3.7% of world total carbon emissions)
Per Capita Energy Consumption (1999E): 170.4 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.8 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 7,280 Btu/ $1990 (vs U.S. value of 12,638 Btu/ $1990)**
Carbon Intensity (1999E): 0.12 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (41.9%), Residential (24.2%), Transportation (21.5%), Commercial (12.3%)
Sectoral Share of Carbon Emissions (1998E): Industrial (37.4%), Transportation (25.6%), Residential (24.5%), Commercial (12.5%)
Fuel Share of Energy Consumption (1999E): Oil (41.4%), Coal (23.2%), Natural Gas (21.2%)
Fuel Share of Carbon Emissions (1999E): Oil (45.1%), Coal (36.3%), Natural Gas (18.6%)
Renewable Energy Consumption (1998E): 395 trillion Btu* (5% increase from 1997)

Number of People per Motor Vehicle (1998): 1.9 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 9th, 1993). Under the negotiated Kyoto Protocol (signed on April 29th, 1998, but not yet ratified), Germany, as a member of the European Union, has agreed to reduce greenhouse gases 8% below 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: Emissions from coal-burning utilities and industries and lead emissions from vehicle exhausts (the result of continued use of leaded fuels) contribute to air pollution; acid rain, resulting from sulfur dioxide emissions, is damaging forests; heavy pollution in the Baltic Sea from raw sewage and industrial effluents from rivers in eastern Germany; hazardous waste disposal.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling . Has signed, but not ratified, Air Pollution-Persistent Organic Pollutants.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

ENERGY INDUSTRIES

Major Energy Companies: *Oil:* Deutsche Shell, Esso, Ruhr Oel; *Natural*

Gas: Ruhrgas, Wintershall/Wingas; *Coal:* DSK, RAG; *Electricity:* RWE, Viag, Veba
Major Refineries (crude capacity, bbl/d): Karlsruhe (285,800), Bayernoil (258,000), Schwedt (230,000), Gelsenkirchen (227,000), Leuna (214,000), Wilhelmshaven (225,000), Godorf (170,000), Wesseling (140,000), Esso Ingolstadt (105,000)

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April 2002

Russia

Russia is important to world energy markets because it holds the world's largest natural gas reserves, the second largest coal reserves, and the eighth largest oil reserves. Russia is also the world's largest exporter of natural gas, one of the largest oil exporters, and the third largest energy consumer.

Note: Information contained in this report is the best available as of April 2002 and is subject to change.

GENERAL BACKGROUND
After a banner year in 2000, when Russia's real gross domestic product (GDP) grew by 8.3%, Russia's economic growth slowed in 2001. Nevertheless, Russia's economy grew by a healthy 5.1%, and the country's economy is in the best shape it has been in since the breakup of the Soviet Union in 1991. Russia's rate of inflation slowed from 20.2% in 2000 to 18.5% in 2001, and Russia's currency, the ruble, continued to strengthen in 2001, prolonging its remarkable rebound from the country's August 1998 financial crisis and devaluation.

Since energy accounts for approximately 40% of Russia's exports and 13% of the country's real GDP, Russia's economy is extremely sensitive to global energy price fluctuations. As a result, the decline in world oil prices in 2001 put the brakes on Russia's economic recovery, which was fueled by high world oil prices in 1999-2000 and the increased competitiveness of Russian exports in the aftermath of the 1998 financial crisis. Although the windfall in oil export revenues in 1999-2000 stimulated increases in other industrial sectors and helped the Russian government pay down some of its $154 billion foreign debt, structural reforms slowed in the euphoria of the oil revenues.

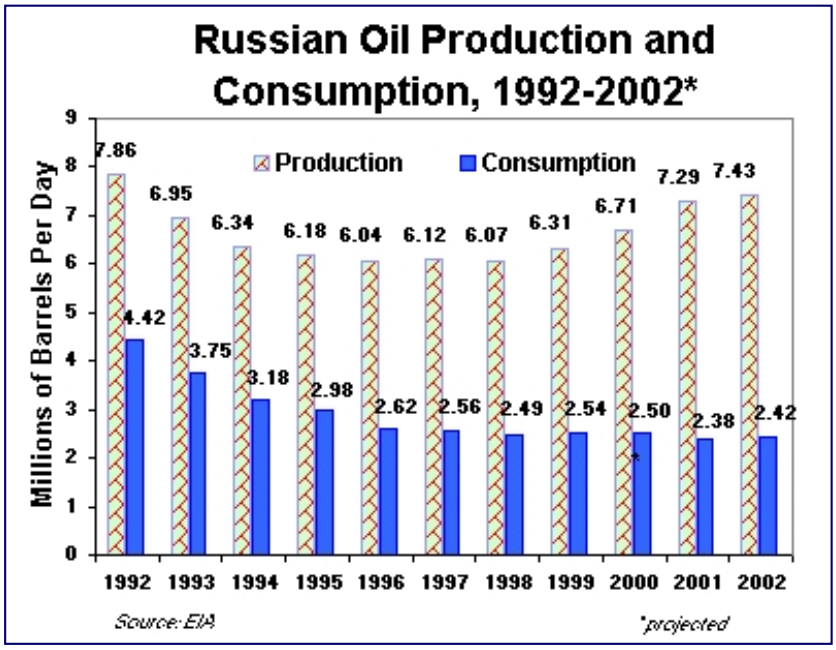
The drop in world oil prices after September 11, 2001, resulted in members of the Organization of Petroleum Exporting Countries (OPEC) requesting Russia and other non-OPEC members to cut their oil exports in order to boost prices. Russia agreed with OPEC in December 2001 to cut its oil exports by 150,000 bbl/d during the first quarter of 2002. Despite heavy lobbying by Russian oil companies to end the cut and to increase exports, Russia, whose state budget for 2002 is based on an average oil price of $23 per barrel and a minimum price of $18 per barrel, decided in March 2002 to continue its self-imposed cuts by 150,000 bbl/d through June 2002.

Although reforms have been slow in coming, restructuring and liberalizing the energy sector and making the Russian economy less dependent on oil and natural gas exports is a stated priority for Russian President

Vladimir Putin and the Russian government. Plans to break up the monopoly positions of both Gazprom and Unified Energy Systems, the Russian natural gas and electricity monopolies, have been approved. Similarly, the Russian government has pledged to improve the investment climate in Russia, but Russia's unstable tax and legal codes have kept many foreign energy companies from investing in Russia's energy sector. Russia has plans for a number of new oil and natural gas pipelines, and massive infrastructure investments will be needed to develop several planned international oil and gas projects.

OIL

After several years of production declines following the collapse of the Soviet Union, Russia's oil industry has bounced back over the past few years, posting strong profits and healthy increases in production. Russia is one of the world's biggest oil producers, but from 1992 to 1998, the country's oil production plummeted 23% due to decreased domestic industrial demand and a decline in drilling and capital investment.



Buoyed by high world oil prices in 1999-2000, Russian oil companies reinvested much of their generous profits into ramping up crude production. Since 1998, when production bottomed out at 6.07 million bbl/d, Russia's oil production, including condensates, has increased 20%, with overall production of 7.29 million bbl/d in 2001.

Despite Russia's pledge to OPEC to shave 150,000 bbl/d off its oil exports in the first half of 2002, Russian oil production is still forecast to post a 1.9% year-on-year increase--reaching 7.43 million bbl/d--in 2002. Russian oil production actually increased in the first few months of 2002, with average oil production of 7.49 million bbl/d in February 2002. Although Russian government officials have attempted to limit the country's oil exports, new export channels, such as the Baltic Pipeline System, have provided a powerful disincentive to Russian oil producers to reduce their output. As a result of Saudi Arabia's OPEC-mandated production cut (and that country's better compliance with its pledged cuts), Russia's oil production surpassed Saudi Arabia's in February 2002 for the first time since the Soviet era, making Russia the world's leading oil producer, if only temporarily.

Russia has proven oil reserves of 48.6 billion barrels, but aging equipment and poorly developed fields are making it difficult to develop these reserves. In addition, Russia's rate of oil production is exceeding its rate of discovery of new reserves by a significant margin. The Russian oil industry faces the depletion of existing oilfields, deterioration in transport infrastructure, and an acute shortage of investment due to the confusing tax and legal environment. In order to sustain and to increase Russia's oil production from current levels, large amounts of capital will be needed to develop new fields and to extend the life of existing oilfields with exhausted and low-yield reserves.

However, the sharp rise in oil prices during 1999-2000 provided Russian oil companies with a windfall in revenues, and many have begun to upgrade decaying oil infrastructure and to undertake new exploratory drilling. In addition to further development of the West Siberia region, where most of Russia's oil comes from currently, Russian oil producers are conducting more exploration in the Russian sector of the Caspian Sea, and teaming up with foreign oil producers to develop oil projects in the Arctic region, Eastern Siberia, and Sakhalin Island in Russia's Far East. Russia's future level of oil production will be defined by the

ability of oil companies to develop these new deposits, which will require a massive amount of infrastructure investment (including new export pipelines) in order to deliver this oil to customers.

Oil Sector Reform

Russia reorganized its state-run oil industry into a number of vertically-integrated oil companies in the early 1990s, and the state has divested itself of large stakes in most of these companies. Nonetheless, foreign investment in the industry has been minimal due to economic and political instability, a poor record of corporate governance, and the unstable legislative framework.

In order to create a more stable investment climate, potential investors have called upon the Russian government to undertake further reform, including the establishment of cohesive production-sharing agreement (PSA) framework legislation. Although the political and economic situation has stabilized since the August 1998 financial crisis, and high world oil prices in 1999-2000 enticed some investors into Russia, others are still awaiting the passage of a new Russian PSA regime and tax code.

Oil Exports

Despite problems surrounding the transition to a market economy and the lack of foreign investment in its oil sector, Russia remains one of the world's top oil exporters. After Russian oil exports slumped in the mid-1990s, exports rebounded after the ruble devaluation of August 1998 reduced production costs sharply for Russian oil producers, and the climb in world oil prices in 1999-2000 made exports even more profitable for Russian oil companies. With domestic consumption of 2.38 million bbl/d in 2001, Russia's increased its net oil exports in 2001 to 4.91 million bbl/d, making Russia the world's second largest oil exporter, behind only Saudi Arabia.

Russia is not a member of OPEC, but in recent years it has frequently attempted to coordinate its export strategy with OPEC. Although Russia agreed to reduce its oil exports by 150,000 bbl/d in the first quarter of 2002, Russian oil companies' compliance with these export cuts has been questionable at best, with preliminary data showing that Russian crude oil exports actually increased during the first quarter of 2002. Russian government officials levied higher export tariffs and set crude oil export quotas in order to limit the country's oil exports, but Russian oil companies increased their oil product exports instead. For 2002 as a whole, Russia's net oil exports are projected to increase to 5.01 million bb/d.

Oil Pipelines

Russia's oil exports could be even higher if they were not restricted by a lack of spare capacity in existing export pipelines. Despite Russia's pledged export cuts, the country's main export pipeline, the 1.2-million-bbl/d-capacity Druzhba pipeline, still is operating close to its highest capacity in years. In addition, many of the country's oil pipelines are in a state of disrepair, and Russian Energy Ministry figures indicate that almost 5% of crude oil produced in Russia is lost through illegal tapping of Russia's pipelines.

With a windfall in oil export tariffs in the past several years, Transneft, the state oil transport monopoly, has taken steps to upgrade the country's pipeline system, with an emphasis on building new export pipelines to increase and diversify export routes for oil exporters. In addition to constructing the Baltic Pipeline System and a possible pipeline to China, Transneft is seeking to lure additional transit oil from Azerbaijan, Kazakhstan, and Turkmenistan.

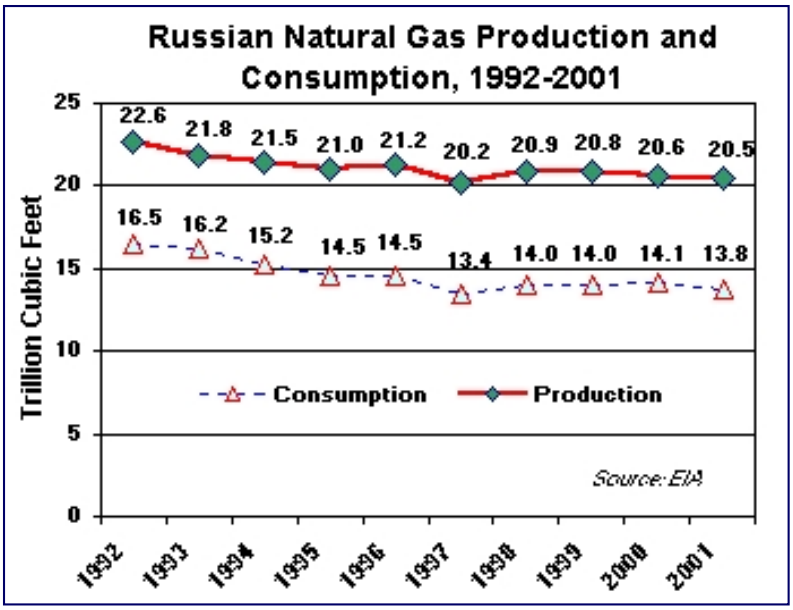
Downstream/Refining

Russia has 42 oil refineries--many of which are inefficient, aging, and in need of modernization--with a total processing capacity of 6.9 million bbl/d. With Russian domestic demand of 2.38 million bbl/d in 2001, refining capacity far outstrips demand for refined products. In addition, because a barrel of crude oil on the Russian market typically sells for just over half the world crude oil price, many Russian oil companies prefer to export their crude oil rather than to refine it in Russia. When Russian oil producers do not export their crude oil--often because of the constraints of Russia's pipeline system or the government's limits on each company's exports--many choose to supply their own refineries rather than sell the oil on the open market.

Russia's decision to go along with OPEC oil supply cuts in the winter of 2001-2002 has led to a glut of oil on the Russian market. As a result, Russian oil companies have channeled more oil into domestic refineries, and with refineries awash in crude, the domestic crude price collapsed, falling from about $13.70 per barrel at the wellhead in November 2001 to just $4.48 per barrel in January 2002. With many Russian refineries undergoing renovations or efficiency upgrades, Russia's refineries have not been able to handle so much crude oil at once. Preliminary data indicates that Russia's exports of refined products increased in the first quarter of 2002, and surplus refined products such as fuel oil, gasoline, and kerosene went into storage.

NATURAL GAS

Russia contains over 1,700 trillion cubic feet (Tcf) in proven reserves of natural gas, the world's largest. Gazprom, the state-run natural gas monopoly, produces nearly 94% of Russia's natural gas, operates the country's 90,000-mile natural gas pipeline grid and 43 compressor stations, and holds nearly one-third of the world's natural gas reserves while employing approximately 38,000 people. Often referred to as a "state within a state," Gazprom also is Russia's largest earner of hard currency, and the company's tax payments account for around 25% of federal government tax revenues.



Russia's natural gas production also is the largest in the world. Natural gas also accounts for over 54% of Russia's energy consumption, but the country still has plenty of natural gas available for export. According to Russia's State Statistics Committee, in 2001 Russia consumed 13.8 Tcf of natural gas while it produced 20.5 Tcf. With 6.7 Tcf in net natural gas exports, Russia is the world's largest natural gas exporter. In 2002, Russia is planning to increase natural gas production to 21.2 Tcf, while the country projects domestic natural gas consumption to increase to 14.6 Tcf.

In addition to its main producing areas in the Yamal-Nenets region of northern West Siberia at the Urengoy and Yamburg fields, Gazprom is responsible for future development of giant Bovanenkovskoye field on the Yamal Peninsula and other fields in the Yamal-Nenets region, including the the giant Pestsovoye and Zapolyarnoye fields to the north in the Ob-Taz Gulf area. Through its subsidiary Rosshelf, Gazprom also is responsible for development of the Shtokmanskoye field in the Barents Sea and other fields in the North Caucasus, Precaspian, Timan-Pechora, and the Volga-Urals.

Many analysts doubt Russia's ability to raise its natural gas production in the face of Gazprom's declining budget and the low levels of investment to the sector in recent years. Although Russia's natural gas sector has not been as hard hit as other sectors of the energy industry during the transition to a market economy (production is down just 9% since 1992), low investment in the sector has raised concerns about future production levels. Production in the Urengoy and Yamburg natural gas fields is declining, while the planned development of new fields continues to be delayed as a result of lack of investment resources. In February 2002, Gazprom scaled back its 2002 investment program for field exploration to $453 million from the $499 million invested in 2001.

Sectoral Problems

According to the Russian Gas Law of 1999, Gazprom must supply the Russian natural gas market, regardless of profitability, at regulated prices. Thus, the company is forced by the Russian government to

sell natural gas to domestic users for approximately $16 per 1,000 cubic meters (35,300 cubic feet)--less than it costs the company to produce, and only about one-tenth of the export price of $140-$150 per 1,000 cubic meters.

In addition, Gazprom continues to be hurt by chronic non-payments by consumers (although this situation has improved recently). In 1999, Russian consumers paid only 39% of their bills for natural gas in cash, but by 2001, Gazprom was paid in cash for 83% of the natural gas it sold domestically. Still, only 29 of Russia's 89 regions are up to date with their natural gas payments, and the multi-billion dollar debt of domestic natural gas consumers has hindered Gazprom's ability to invest adequately in new fields, many of which need major infrastructure investments.

The only investment in new natural gas production that Gazprom has made recently is the development of Zapolyarnoye, which was brought onstream in October 2001 to offset the decline in the company's production. Although Gazprom has enough undeveloped natural gas reserves in its portfolio to ensure future supplies, Zapolyarnoye is the last of the so-called "easy-to-develop" giant fields. Development of future fields, most of which are located in the more remote regions that lack infrastructure to deliver the natural gas to consumers, will require much higher levels of investment. Developments like Prirazlomnoye and Shtokmanskoye are provisionally budgeted to cost $1 billion and $15 billion to $20 billion, respectively.

Restructuring the Natural Gas Sector

While Gazprom is looking to establish partnerships with foreign investors to develop several natural gas production projects, restrictions on foreign investment in the company, along with allegations of asset stripping by senior managers of Gazprom, has limited Russia's investments in new natural gas developments. In addition, Gazprom's control over Russia's natural gas trunk-line system, forcing other producers to sell their natural gas to Gazprom on its terms, has proven a disincentive to increased natural gas production. The lack of access to Russia's natural gas pipelines has meant that Russian oil companies prefer to flare their associated natural gas instead of treating it and selling it to Gazprom.

In an attempt to spur increased investment in the industry and to raise production levels, President Putin is taking steps to end Gazprom's monopoly position and to restructure the natural gas sector. On November 9, 2000, the government ordered Gazprom to give other companies the right to use up to 15% of its pipeline capacity, and in May 2001, Gazprom's Board of Directors ousted long-time chief Rem Vyakhirev and replaced him with Aleksei Miller, an ally of Putin.

A restructuring plan currently under consideration would break Gazprom's upstream operations into separate producing companies in order to foster competition on the Russian domestic market, while the government would take control of Gazprom's transmission pipelines, offering equal access to all natural gas producers, thereby giving incentive to Russia's oil companies to treat the associated natural gas they develop. In addition, the Russian government is paying heed to Gazprom's minority shareholders, curtailing Gazprom's mysterious relationship with natural gas trader Itera and attempting to loosen restrictions on the purchasing of Gazprom shares by foreign investors.

Natural Gas Exports

The Russian government's determination to keep domestic natural gas prices artificially low means that the country's natural gas industry is heavily dependent on exports to finance its production. In 2001, Russia totaled 6.7 Tcf of net natural gas exports, the majority of which were piped to customers outside the Commonwealth of Independent States (CIS). Gazprom supplies Europe with 25% of its natural gas, and with several new export pipelines planned or already under construction, Russia hopes to increase this percentage in the next decade.

In order to offset its own declining production and maintain its export level, Gazprom, via natural gas trader Itera, contracted to buy 353 billion cubic feet (Bcf) of gas from Turkmenistan in 2002. As

Kazakhstan, Turkmenistan, and Uzbekistan continue to develop their natural gas industries and increase their production, senior Russian officials--including President Putin--have called for a Eurasian alliance to offset the impact of European natural gas market liberalization. According to Putin, the so-called "Gas OPEC," uniting Russia with the three big natural gas-producing countries in Central Asia, would "bring an element of stability into the transportation of natural gas on a long-term basis." Analysts have criticized the alliance proposal as a Russian attempt to exercise control over Central Asian natural gas exports.

Natural Gas Export Pipelines

In an effort to diversify its export routes and reach new markets, Russia is planning to build several new natural gas export pipelines. The Blue Stream pipeline to Turkey is the centerpiece of Russia's export diversification strategy. The pipeline, which will supply Turkey with 565 Bcf of natural gas via twin pipelines laid on the bottom of the Black Sea, is nearing completion, and should be operational by the fall of 2002. The December 2001 resolution of the dispute between Russia and Ukraine over Ukraine's unsanctioned removal of natural gas has caused Gazprom to drop plans to build a "Ukraine bypass" pipeline, but plans for the second branch of the Yamal-Europe pipeline--to Europe via Belarus--are in development. In addition, Russia is looking eastwards, with several potential natural gas pipelines to China currently under consideration.

COAL

With 173 billion short tons in proven coal reserves, Russia holds the world's second largest coal reserves, behind only the United States. However, years of poor management during the Soviet era, combined with a sharp decline in demand for coal during the early 1990s, significantly undermined the Russian coal sector's viability in the early 1990s. By 1993, Russian government subsidies to the coal sector became unsustainably high, exceeding 1% of the country's GDP, according to the World Bank. As production began to slump, Russia initiated a comprehensive restructuring of the coal sector in the mid-1990s.

As a result of the restructuring, the state coal company, RosUgol, has been phased out, production subsidies have ended, and mines with no economic future are being closed. With over $1.3 billion in financial assistance provided by the World Bank, the restructuring efforts are paying off, and the transition of Russia's coal sector from a massively-subsidized industry into a streamlined, profitable operation is almost complete. After years of decline, which saw Russian coal production decrease by 41%--from 406 million short tons (Mmst) in 1992 to 241 Mmst in 1998--in 1999, the reformed coal sector increased its production to 259 Mmst. EIA preliminary data for 2000 shows that Russia's coal production increased to 281 Mmst, and Russia's State Statistics Committee reports that the country's coal production rose again in 2001. Russia's Ministry of Energy has projected a 0.3% coal production increase in 2002.

Many of Russia's major coal basins are in West Siberia, and in 2001, the region's coal mines accounted for 48% of Russia's overall coal production. Kuzbassrazrezugol and Krasnoyarskugol, both located in West Siberia, were Russia's largest coal producers in 2001, with output of 36.3 Mmst and 35.3 Mmst, respectively. In addition, through the first seven months of 2001, Russia's State Statistics Committee reported that Russia's coal exports increased during the same time period by 30% year-on-year, including a 41.5% increase in exports to countries outside the CIS and Baltics.

With Russia's determination to increase its oil and natural gas exports, Russia's coal consumption is slated to rise. Although coal accounted for just 16% of Russia's domestic energy consumption in 1999, the government is committed to increase that percentage to as high as 28%. Russia consumed 298 Mmst of coal in 2000, but the country's energy strategy calls for coal production to climb to 335 Mmst in 2010, and then to 430 Mmst in 2020.

Nevertheless, the Russian Trade Union of Coal Miners complained in March 2002 of a lack of demand for Russian coal. Despite the sector's increased productivity, the Union's chairman, Ivan Mokhnachuk, said that coal deliveries to power-generation facilities fell by 4.4 Mmst in 2001, while coal stocks in depots increased by 33% over the previous year. At the same time, he noted, Russia imported 28.4 Mmst of coal

from Kazakhstan. The Russian Trade Union of Coal Miners has accused both Kazakhstan and China of dumping coal on the Russian market, reducing demand for Russian-produced coal.

ELECTRICITY

Russia's mammoth power sector, which includes over 440 thermal and hydropower plants, plus 29 nuclear reactors, has a total electric generation capacity of 203 gigawatts (GW). With 139 GW of production capacity, thermal power (oil-, gas-, and coal-fired plants) accounts for 68% of the country's power generation capacity, while hydropower plants account for an additional 44 GW (21.5% of total installed power capacity). Russia's electricity sector is dominated by Unified Energy Systems (UES), which is 52%-owned by the Russian government. UES, headed by former privatization minister Anatoly Chubais, controls approximately 70% of the country's distribution system and oversees Russia's 72 regional electricity companies, called *energos*.

Russia shut down several nuclear reactors during the 1990s, leading to a drop in the country's power-generating capacity during the last decade from 213 GW in 1992. Nonetheless, Russia still has sufficient power production potential to supply domestic consumers, as well as export power to other countries. In 1999, Russia's total electricity generation broke a decade-long downward trend by inching up from 788 billion kilowatt-hours (Bkwh) produced in 1998 to 801 Bkwh, followed by a jump to 836 Bkwh of electricity produced in 2000.

Similarly, the economic recovery after the August 1998 financial crisis resulted in an increase in the country's total electricity consumption, from 715 Bkwh in 1998 to 767 Bkwh in 2000. Increased industrial demand for electricity also has forced power stations to operate at higher capacity, straining power companies' ability to procure fuel supplies at a time when Gazprom is continuing to reduce natural gas supplies to UES. A lack of fuel supplies at power stations has already led to periodic power outages.

Electricity Sector Restructuring

Russia's aging power sector is in serious need of investment and reform. Much of the sector is obsolete by Western standards, and Russia lacks the money to pay for necessary maintenance. UES estimates that between $20 billion and $35 billion in investment will be needed over the next 10 years for maintenance and modernization efforts, but the company currently only has about $1 billion per year to invest. Analysts have estimated that if rates of investment stay at present levels, 32% of the current stock of electricity generating equipment will be out of commission by 2005, prompting a crisis in electricity production that may lead to widespread regional power shortages.

In an effort to entice foreign electricity companies to invest in Russia's power sector, numerous reform plans have been debated over the past decade, to no avail. However, the severe power outages in Russia's Far East during the winter of 2000-2001 made power sector restructuring a high priority, and in May 2001, the Russian government approved a blueprint for electricity sector restructuring. The restructuring plan will break the UES monopoly into separate generation and distribution units, then split up the generation assets further. Russian government officials hope this will pave the way for privatization of independent power-generating companies and thereby attract much needed investment to the sector.

Electricity Exports

UES has begun to focus on electricity exports in order to increase its cash flow to allow it to procure fuel supplies, as well as to invest in maintenance and modernization projects. In October 2000, UES began to supply electricity to Europe as part of an international project to create an "East-West energy bridge." UES is participating in the Baltrel program to create an energy ring with power companies in the Baltic states, and it has also signed contracts to export power to Turkey via Georgia. In addition, in August 2001 the Ukrainian and Russian electricity grids were re-connected, allowing Russia to export electricity via Ukraine to Moldova, as well as to access the Romanian, Bulgarian, and Balkan markets.

In March 2002, during a joint meeting of the CIS Electric Power Council and the Union of the Electric Industry (Eurelectric) in Warsaw, UES Chairman Anatoly Chubais appealed to European colleagues to

"destroy the iron curtain" between the energy systems of the East and the West. The first steps towards synchronization of energy systems have already been taken, as the Union for the Coordination of Transmission of Electricity (UCTE), of which 20 European countries are members, has entered into discussions with its eastern colleagues over the technological and operational aspects of amalgamating their systems.

Nuclear

With the opening of the 1,000-megawatt (MW) Rostov-1 reactor in March 2001, Russia now operates 30 nuclear reactors at 10 locations, all west of the Ural Mountains. The country has a total installed nuclear capacity of 22 GW, and in 1999 Russia's nuclear plants generated 111 Bkwh of power, accounting for 14% of the country's total electricity generation. However, Russia's nuclear power plants are aging, and the nuclear power industry has been hard hit by Russia's transition to a market economy. Russia already has shut down four reactors that were over 30 years old (the maximum prescribed service life for a reactor), but 15 of the country's 29 operating units are over 20 years old, and by 2005, seven of those reactors will have been in service for 30 years.

With Russia's plans to export additional natural gas to the West, the country's energy strategy is to increase its use of nuclear power over the next 20 years to meet domestic electricity needs. In order to do so, additional capacity will be needed, but the nuclear industry's lack of money has forced Minatom, the government agency responsible for overseeing the country's nuclear power plants, to focus on extending the service life of existing units instead of building new ones. Safety issues are an ongoing concern, especially with regard to the 16 relatively old reactors of the RBMK design used at Chernobyl. Older RBMK units at Kursk and St. Petersburg are scheduled to be overhauled and equipped with stopgap safety improvements to prolong their lives for another three decades.

Minatom is hoping to complete construction on five nuclear reactors that have been under construction since the 1980s, as well as to build 25 new reactors during the next 20 years. In February 2001, Russia's Deputy Minister of Atomic Energy, Bulat Nigmatulin, said the ministry would finance most of the $1.5 billion necessary to complete the construction of the five reactors by 2005. Although the Rostov-1 reactor is now operational, both the 1,000-MW Kalinin-3 reactor and the 1,000-MW Kursk-5 reactor are still under construction. In addition, Western nuclear experts have expressed serious doubts that Russia can finance the construction of 25 additional reactors on its own.

To increase its ability to finance domestic nuclear projects, in October 2000 Russia announced plans to market nuclear power plants to countries in Asia and Africa. The first of such plants, a $1.2-billion project for two 1,000-MW reactors, was sold to India, to be installed near Chennai by 2008. Russia also negotiated a similar deal with Iran to build the Bushehr nuclear power plant, and in November 2001, Russia delivered the first reactor body to Iran. According to the International Atomic Energy Agency, Russian-designed reactors would not be licensable in Western countries because they do not have all of the mandatory safety features, such as a containment dome.

ENVIRONMENT

After years of neglect under the Soviet Union, the environment has become a pertinent issue in today's Russia. Soviet policies that encouraged rapid industrialization and development left a legacy of air pollution and nuclear waste with which Russia now is struggling to contend. Although environmental awareness in Russia is rising, the cost of remediating the country's environmental hot spots is high, and the newly created Ministry of Natural Resources has a limited budget. As a result, cleanup has been slow, and environmental protection has not been a top priority for the Russian government.

The economic contraction in the aftermath of the Soviet Union's collapse caused a drop in industrial production, resulting in less energy consumption and a drop in Russia's carbon emissions. However, energy and carbon intensities in Russia remain high, and although per capita carbon emissions have fallen over the past 12 years, Russia will need to pursue more sustainable environmental policies in order to maintain this trend, especially with the rebound in industrial production since the August 1998 financial crisis. Russia

has abundant fossil fuel resources, but the country will need to pursue more renewable energy options and cleaner environmental technologies in order to preserve its natural wonders and protect its environment for future generations.

COUNTRY OVERVIEW
President: Vladimir Vladimirovich Putin (acting president since December 31, 1999; president since May 7, 2000)
Prime Minister: Mikhail Mikhaylovich Kasyanov (since May 7, 2000)
Independence: August 24, 1991 (from Soviet Union). National holiday: Independence Day, June 12, 1990
Population (7/01E): 145.5 million
Location: Eurasia
Size: 6,592,850 sq. mi., slightly more than 1.8 times the size of the United States
Major Cities: Moscow, St. Petersburg, Yekaterinburg, Irkutsk, Murmansk, Yakutsk, Vladivostok
Languages: Russian, others
Ethnic Groups: Russian 81.5%, Tatar 3.8%, Ukrainian 3%, Chuvash 1.2%, Bashkir 0.9%, Belorussian 0.8%, Moldovan 0.7%, other 8.1%
Religions: Russian Orthodox, Muslim, other

ECONOMIC OVERVIEW
Minister of Economic Development and Trade: German Oskarovich Gref
Minister of Finance: Aleksey Leonidovich Kudrin
Currency: Ruble
Market Exchange Rate (4/25/02): $1 = 31.19 rubles
Nominal Gross Domestic Product (GDP) (2001E): $301.5 billion; **(2002E):** $327 billion
Real GDP Growth Rate (2001E): 5.1%; **(2002E):** 3.2%
Inflation Rate (Change in Consumer Prices, Dec. 2000-Dec. 2001E): 18.5%; **(2002E):** 12.8%
Official Unemployment Rate (2001E): 8.8%; **(2002E):** 8.6%
Current Account Balance (2001E): $34.3 billion; **(2002E):** $27.1 billion
Major Trading Partners (1999): Germany, Ukraine, U.S., Belarus, Italy, Netherlands, Kazakhstan
Merchandise Exports (2001E): $102.7 billion; **(2002E):** $103.7 billion
Merchandise Imports (2001E): $53.1 billion; **(2002E):** $60.0 billion
Merchandise Trade Balance (2001E): $49.6 billion; **(2002E):** $43.7 billion
Major Exports: Petroleum and petroleum products, natural gas, wood and wood products, metals, chemicals, and a wide variety of civilian and military manufactures
Major Imports: Machinery and equipment, consumer goods, medicines, meat, grain, sugar, semifinished metal products
External Debt (2001E): $154 billion

ENERGY OVERVIEW
Deputy Prime Minister (for Energy Issues): Viktor Borisovich Khristenko
Minister of Energy: Igor Khanukovich Yusufov
Minster of Atomic Energy: Aleksandr Yuryevich Rumyantsev
Proven Oil Reserves (1/1/02E): 48.6 billion barrels
Oil Production (2001E): 7.29 million bb/d (of which 7.05 million bbl/d was crude); **(2002E):** 7.43 million bbl/d
Oil Consumption (2001E): 2.38 million bbl/d; **(2002E):** 2.42 million bbl/d
Net Oil Exports (2001E): 4.91 million bbl/d; (**2002E):** 5.01 million bbl/d
Major Oil Customers: Europe, Commonwealth of Independent States
Crude Refining Capacity (1/1/02E): 6.6 million bbl/d
Proven Natural Gas Reserves (1/1/02E): 1,700 trillion cubic feet (Tcf)
Natural Gas Production (2001E): 20.5 Tcf
Natural Gas Consumption (2001E): 13.8 Tcf
Net Natural Gas Exports (2001E): 6.7 Tcf
Coal Reserves (1/1/01E): 173 billion short tons
Coal Production (2000E): 281 million short tons (Mmst)

Coal Consumption (2000E): 298 Mmst
Electric Installed Capacity (2000E): 203 gigawatts (68% thermal, 21.5% hydro, 10.5% nuclear)
Electricity Generation (2000E): 836 billion kilowatt-hours (Bkwh)
Electricity Consumption (2000E): 767 Bkwh
Net Electricity Exports (2000E): 69 Bkwh

ENVIRONMENTAL OVERVIEW
Minister of Natural Resources: Vitaliy Grigoryevich Artyukhov
Total Energy Consumption (1999E): 26.0 quadrillion Btu* (6.8%) of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 400.1 million metric tons of carbon (6.5% of world carbon emissions)
Per Capita Energy Consumption (1999E): 176.7 million Btu (vs. U.S. value of 355.9 million Btu)
Per Capita Carbon Emissions (1999E): 2.7 metric tons of carbon (vs. U.S. value of 5.6 metric tons of carbon)
Energy Intensity (1999E): 72,133 Btu/$1990 (vs U.S. value of 12,638 Btu/$1990)**
Carbon Intensity (1999E): 1.1 metric tons of carbon/thousand $1990 (vs U.S. value of 0.20 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1997E): Industrial (64.3%), Residential (17.9%), Transportation (17.1%), Commercial (0.7%)
Sectoral Share of Carbon Emissions (1997E): Industrial (64.8%), Transportation (17.8%), Residential (17.4%)
Fuel Share of Energy Consumption (1999E): Natural Gas (54.3%), Oil (19.3%), Coal (16.0%)
Fuel Share of Carbon Emissions (1998E): Natural Gas (50.8%), Coal (26.2%), Oil (22.9%)
Renewable Energy Consumption (1997E): 2,482 trillion Btu* (1% increase from 1996)
Number of People per Motor Vehicle (1997): 6.5 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 28th, 1994). Under the negotiated Kyoto Protocol (signed on March 11th, 1999, but not yet ratified), Russia has agreed to stabilize greenhouse gases at 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: air pollution from heavy industry, emissions of coal-fired electric plants, and transportation in major cities; industrial, municipal, and agricultural pollution of inland waterways and sea coasts; deforestation; soil erosion; soil contamination from improper application of agricultural chemicals; scattered areas of sometimes intense radioactive contamination; ground water contamination from toxic waste.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Wetlands and Whaling. **Has signed, but not ratified:** Climate Change, Air Pollution-Sulphur 94.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar and wind electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP based on EIA International Energy Annual 1999

ENERGY INDUSTRY
Organization: Russia's energy sector is overseen by the Ministry of Energy, except for nuclear power, which is administered by the Ministry of Atomic Energy (Minatom).

Russia's Oil Sector is dominated by large joint-stock companies, although smaller independent producers also produce oil. The major vertically integrated companies include Lukoil, Yukos, Surgutneftegaz, Tyumen Oil (TNK), Tatneft, Sibneft, Slavneft, and Rosneft. Transneft has a monopoly over crude oil

transport, while Transnefteprodukt transports petroleum products.

Russia's Natural Gas Sector is dominated by the joint-stock company Gazprom, which is 38% owned by the Russian government. Gazprom produces over 90% of the country's natural gas and also controls Russia's pipeline network. Itera has gained a foothold in the natural gas sector as Russia's second-largest natural gas exporter.

Russia's Coal Sector, formerly operated by RosUgol, a government-owned holding company that was organized along regional lines, has been restructured, with many unprofitable mines closed down, RosUgol eliminated, and the remaining efficient mines privatized. Kuzbassrazrezugol and Krasnoyarskugol were Russia's biggest coal producers in 2001.

Russia's Electricity Sector is operated by the joint-stock company Unified Energy Systems (UES), which is majority state-owned. UES controls approximately 70% of the country's distribution system, 21 thermal power plants, 8 nuclear power plants, and oversees the country's 72 regional electricity companies, known as *energos*.

Major Producing Oil Fields: Samotlor, Romashkino, Mamontov, Fedorov, Lyantor, Arlan, Krasnolenin, Vatyegan, Sutormin

Major Oil Terminals: Novorossiisk (Black Sea), Tuapse (Black Sea), Primorsk (Baltic Sea); Russia also uses ports at Ventspils (Latvia), Odesa (Ukraine), Klaipeda (Lithuania), and Butinge (Lithuania)

Major Oil Export Pipelines outside the Commonwealth of Independent States: Friendship (Druzhba) (1.2 million bbl/d nominal capacity)

Major Oil Refineries (1/1/02E) (Capacity in bbl/d): Omsk (566,000), Angarsk (441,000), Nizhniy Novgorod (438,000), Grozny (390,000), Kirishi (388,000), Novo-Ufa (380,000), Ryazan (361,000), Novo-Kuibishev (309,000), Yaroslavl (290,000), Perm (279,000), Ufaneftekhim (251,000), Salavatnefteorgsintez (247,000), Moscow (243,000), Ufa (235,000), Syzran (211,000), Volgograd (200,000), Saratov (177,000), Orsk (159,000), Samara-Kuibishev (154,000), Achinsk (147,000), Ukhta (127,000), Nizhnekamsk (120,000), Komsomolsk (108,000)

Major Foreign Oil Company Involvement: Agip, BP, British Gas, ChevronTexaco, Statoil, Conoco, ExxonMobil, Neste Oy, Norsk Hydro, McDermott, Mitsubishi, Mitsui, Royal Dutch/Shell, and TotalFina Elf.

Major Producing Natural Gas Fields: Urengoy, Yamburg, Medvezh, Orenburg, Severo Urengoy, Vyngapurov

Major Natural Gas Export Pipelines outside the Commonwealth of Independent States (Capacity): Brotherhood (*Bratrstvo*), Progress, and Union (*Soyuz*) (to Europe, via Ukraine) (1 Tcf each); Northern Lights (0.8 Tcf) (to Europe, via Belarus and Ukraine), Volga/Urals-Vyborg (to Finland) (0.1 Tcf); Yamal (to Europe, via Belarus) (1.0 Tcf); Blue Stream (0.56 Tcf) (to Turkey, under construction)

Major Coal Producing Basins: Chelyabinsk, Kansk-Achinsk, Kuznetsk, Lena, Moscow, Pechora, Raychikhinsk, South Yakutia, Taymyr, Zyryanka

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Sources for this report include: Agence France Presse, Asia Pulse, Associated Press, BBC Monitoring International Reports, Central Asia & Caucasus Business Report, Caspian News Agency, Caspian Business Report, CIA World Factbook, Current Digest of the Post-Soviet Press, DRI/WEFA Eurasian Economic Outlook, DRI/PlanEcon, The Economist, Energy Day, The Financial Times, FSU Energy, FSU Oil and Gas Monitor, Gas Connections, Hart's European Fuel News, Interfax News Agency, The International Herald

Tribune, International Petroleum Finance, ITAR-TASS News Agency, Mining & Metals Report, The Moscow Times, Oil and Gas Journal, Petroleum Economist, Petroleum Report, Platt's International Coal Report, Platt's Oilgram News, Polish News Bulletin, PR Newswire, Project Finance, Radio Free Europe/Radio Liberty, Reuters, RosBusinessConsulting Database, Russian Economic News, The Russian Oil & Gas Report, Turkish Daily News, Ukraine Business Report, U.S. Department of Energy, U.S. Energy Information Administration, U.S. Department of State, Warsaw Business Journal, World Gas Intelligence, and World Markets Online.

Links

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January 2002

Spain

Spain is one of the fastest growing European economies but has very limited domestic energy resources. As a result, Spain is expected to become an increasingly important energy importer.

Note: The information contained in this report is the best available as of January 2002 and is subject to change.

BACKGROUND

Spain's period of rapid (4% annual growth) economic expansion is slowing. Still, Spain's forecast growth rate of 2.4% in 2002 is still well above the average "eurozone" growth rate forecast of 1.4%. The unemployment rate has decreased significantly (although projected at 12-13% for 2002), and government finances have improved over the past year. Inflation is expected to ease from 3.7% in 2001 to 2.4% in 2002 as unions have recently given priority to job creation over wage increases. Prime Minister Jose Maria Aznar's center-right Popular Party was re-elected with an absolute majority in March 2000. Aznar is continuing his liberalization of Spanish industry. Legislation aimed at getting rid of monopolies (state-held or private) in the energy, telecommunications, and services industries passed in June 2000. Oil, natural gas, and electricity markets are key targets in Aznar's liberalization program.

The recent economic and political turmoil experienced by Argentina has adversely affected Spanish companies, which invested EUR 45 billion there over the last decade. Five large Spanish companies, including oil company Repsol-YPF and power company ENDESA, that alone account for about three-

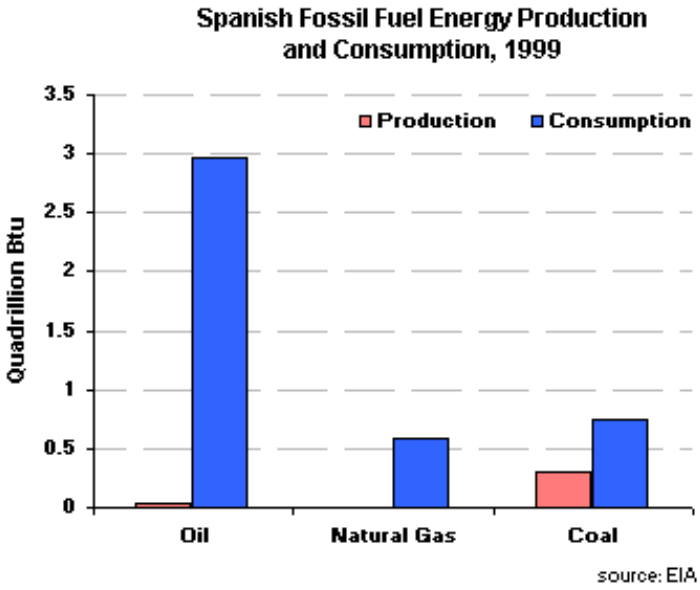
quarters of the trading volume on the Madrid stock exchange, are expected to lose billions of euros because of the default on Argentine government debt and the devaluation of the Argentine peso.

Spain's economic growth and accelerated industrialization associated with European Union (EU) membership have fueled energy demand, up 75% since the mid-1970s. Electricity demand is growing at a particularly rapid rate of 6% per year, reflecting a need for greater investment. Spain is highly dependent on imported oil, leaving the country economically vulnerable to world oil price fluctuations. Further energy demand increases are expected to be met largely with natural gas imports. The increasing use of natural gas has created a new dependency on Algeria, from which Spain obtains 60% of its natural gas imports. With an extensive gas network now in place, Spain's demand for natural gas is expected to increase dramatically during the next few years.

Spain assumed the six-month European Union (EU) presidency in January 2002, and Spanish Finance Minister Rodrigo Rato has announced that Spain will seek to establish a link between progress on the liberalization of energy markets and energy tax harmonization during its term. In December 2001, government energy regulator CNE recommended a EUR 4 billion investment in Spain's natural gas and electricity sectors in order to guarantee supply, to be financed mostly by Red Electrica and Gas Natural's Enagas.

OIL

Oil plays a major (albeit decreasing) role in the Spanish energy sector. In the 1970s, oil accounted for 73% of Spain's primary energy consumption. That percentage has now fallen to less than 60% and is expected to fall further as natural gas becomes an increasingly important fuel source. In 2001, Spain consumed about 1.5 million barrels per day (bbl/d) of oil, 99% of which was imported.



Spain has very limited domestic oil reserves and production. The largest producing area is in the Mediterranean Sea, with the Casablanca complex producing about 4,000 bbl/d. In October 2001, Spain authorized Conoco's UK subsidiary to explore for hydrocarbons off the coast of the southern Mediterranean province of Malaga. The permit for exclusive exploration rights is for six years.

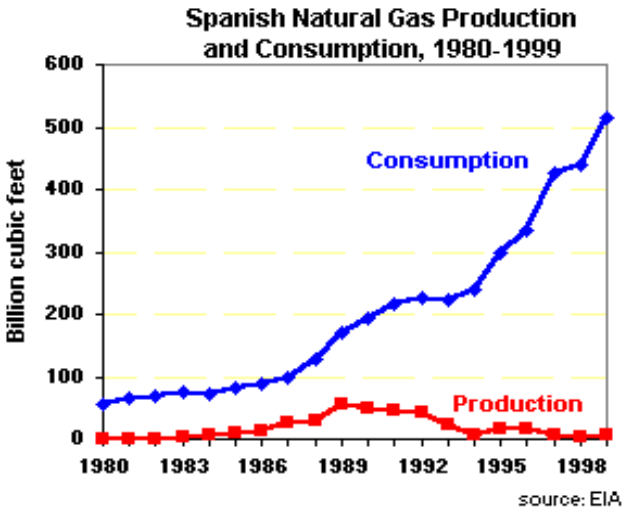
Until 1993, the Spanish oil industry was state-controlled. Today, formerly state-held (now private) Repsol still dominates the Spanish oil sector (and also the Spanish natural gas sector, through a controlling share in the Gas Natural Group). The company acquired the top Argentine oil company, YPF, in 1999, changing the company name to Repsol-YPF. Repsol-YPF is responsible for over 50% of Spain's oil production. Worldwide, the company has reserves of 4.8 billion barrels of oil equivalent and and a daily production of about 1 million barrels of oil equivalent per day. The company owns the majority of Spain's refineries, its distribution network (through Compania Logistica de Hidrocarburos, CLH, in which it holds a majority stake), and its gasoline stations (through its trademarks Repsol, Campsa, and Petronor). Divestments in the wake of the merger are working to lessen Repsol-YPF's control in the industry. June 2000 economic liberalization plans also work toward this end; the company's share in CLH must be reduced from 62% to 25%. Repsol-YPF's profits will be much lower for 2001 than the record $2.10-billion profit achieved in 2000 because of the Argentine economic situation. Repsol-YPF derives 45% of its operating income from Argentina's oil and natural gas fields, and is negotiating a "contribution" to Argentina's government expected to be between $300 million and $500 million.

Compania Espanola de Petroleos (Cepsa), established in 1929, is Spain's oldest private oil and gas company. The company has exploration and production activities in Colombia and Algeria. It is the second largest oil group in Spain, with a 25% retail market share. BP Oil is also active in Spain. Repsol, Cepsa, and BP Oil account for almost all of the activity in the Spanish oil sector.

Refining

Spain has nine major refineries. Four are owned by Repsol, and another is owned by a Repsol subsidiary, Petronor, in which Repsol has an 88% stake. Cepsa owns three, and one is owned by BP. Because of state regulation of the industry, Spain has avoided developing the excess refining capacity that characterizes some other countries in southern Europe. Spain's total crude oil refining capacity stands at 1.3 million bbl/d.

NATURAL GAS



Natural gas is expected to account for a much larger share of Spain's total energy consumption in coming years, especially as new pipelines and natural gas-fired power plants come on line. Natural gas consumption has grown from 2% of total energy consumption in the 1970s to more than 11% in 1999. Preliminary estimates of consumption for 2000 are about 611 billion cubic feet (Bcf). Some estimates predict natural gas consumption growing at a 15% annual rate in this decade. Spanish energy company Endesa predicts demand for natural gas rising to about 883 Bcf by 2005. Almost all of this consumption will be satisfied with imports, as Spain has extremely limited natural gas reserves. The country's largest natural gas field went out of production in 1995, and only a very small number of smaller fields remain in production.

The Gas Natural Group (GN) is the leading natural gas conglomerate in Spain, dominating Spain's gas sector with 90%-95% of the market. However, in the market for industrial customers, which was partially opened in 2000, GN's market share was down to 79% by the first half of 2001. Repsol-YPF controls the Group, with 47% of its shares and majority board representation. GN is comprised of Gas Natural SDG, the main natural gas distributor in Spain; Enagás, a transport company; Gas Natural Aprovisionamientos (supplies); Gas Natural Comercializadora (commercialization); Gas Natural Servicios, the services company of the Group; Gas Natural Overseas Trading Company; 14 natural gas distribution companies in Spain; and Gas Natural Internacional, which brings together in a single business unit the interests of GN in Gas Natural BAN (Argentina), Gas Natural ESP (Colombia), Companhia Distribuidora de Gas do Rio de Janeiro-CEG, CEG RIO and Gas Natural SPS (Brazil), in addition to Gas Natural México. Also, GN has minority holdings in three natural gas distribution companies in the region of Aragon and in the Basque Country.

According to liberalization legislation passed in June 2000, no single operator may command over 70% of the Spanish natural gas market by 2004. Since June 2000, large industrial consumers have been able to choose suppliers, and all consumers should be able to choose suppliers by 2003. Several additional regulatory measures were taken in 2001: In July, Spain's Economy Ministry published the terms under which GN must auction off one-third of its 580 Bcf per year Algerian pipeline natural gas imports. In September, Spain's Economy Ministry detailed new natural gas sector regulations that include a revised system for calculating pipeline tariffs and procedures for accessing the national grid. Finally, in October, the government ended GN's monopoly of natural gas imports when a contract for Algerian gas imports equivalent to about 25% of Spain's total annual consumption was awarded to Spain's four largest electricity companies (Endesa, Iberdrola, Union Fenosa, and Hidrocantabrico), BP, and Royal Dutch/Shell. This is part of a strategy being pursued by Spanish electricity companies to enter into the natural gas market. As Algeria supplies about 75% of Spain's imports, these companies now control about 19% of the market. These

companies have until 2004 to sell the natural gas to their industrial clients. The planned sale of 65% of GN subsidiary Enagas cannot be valued until the publication of new natural gas tariffs by the government, expected sometime in 2002.

The Group's Enagás transports natural gas imports to the Iberian Peninsula via gas pipelines connected to international networks (or via methane carriers for liquefied natural gas, discussed below). There are two international gas pipelines in Spain: Lacq-Calahorra in the north and the Pedro Duran Farell pipeline (formerly the Mahgreb-Europe line) in the south. The Lacq-Calahorra gas pipeline is the main Spanish connection to the European network, linking to Norway's North Sea gas sources. The Pedro Duran Farell pipeline, which crosses through Algeria and Morocco and travels under the Strait of Gibraltar, is about 870 miles (1,400 kilometers) long and connects the Algerian deposits with the Spanish gas pipeline network in Córdoba. This pipeline made its first Spanish delivery in 1996. Work is underway to expand the Pedro Duran Farell pipeline's annual capacity from 282.5 Bcf to 388.5 Bcf by adding a compressor station. Completion is expected in late 2003.

There are two new projects underway as well. Spain will have an additional connection with France via Irun in the Basque Country as a new transfrontier connector is being built with completion expected by the end of 2003. A further extension of the pipeline network coming to and from Irun is planned to be ready between 2005 and 2008. It will have 111 miles in Spain and 93 miles in France, and possess an annual capacity of 144.8 Bcf. In July 2001, Cepsa and Sonantrach of Algeria signed an agreement for the construction of the new Medgaz undersea natural gas pipeline between Algeria and Almeria, Spain, which received political backing in August. A feasibility study is scheduled to be completed in early 2003. The pipeline would have a length of 137 miles and have a capacity of between 282.5 Bcf and 353 Bcf. Natural gas would be alloted in proportion to each shareholder's equity ownership. At present, Sonatrach and Cepsa each hold 20%, while BP, Endesa, Eni, Gaz de France, and TotalFinaElf each hold 12%. Some natural gas from this pipeline may transit through Spain onto other European destinations.

Liquefied Natural Gas

Spain is Europe's second-largest liquefied natural gas (LNG) importer, behind France. Spain has three regasification terminals (Barcelona, Cartagena, and Huelva), the most of any country in Europe. All three are owned and operated by GN. Algeria is Spain's largest LNG supplier. Spain also is involved in long-haul LNG transit, importing LNG from the United Arab Emirates and Qatar. In 1999, Spain began receiving shipments from Trinidad and Tobago and Nigeria. In October 2000, shipments began from Oman, with 17 received through the end of January 2002. In June 2001, GN and Enel of Italy signed an agreement to develop joint marketing and sales negotiations for LNG internationally.

The GN plans to expand its three regasification terminals and its tanker fleet in order to handle increased LNG imports for rising domestic consumption. Spanish electricity generator Union Fenosa signed a firm contract with the Egyptian General Petroleum Corporation in July 2000 for the purchase of LNG from a new liquefaction terminal under construction at Damietta, Egypt. Union Fenosa and Iberdrola, which are constructing the new receiving gasification plant together, had disagreed on the location, but in November 2001 they settled on Fenosa's proposal at the Sagunto port in Valencia. The plant, to be completed in winter 2004, will be able to process 282.5 Bcf per year and will be linked to new combined cycle gas turbine plants being constructed by Fenosa nearby and Iberdrola in Castellon. Some of the natural gas will also transit to other locations.

A new regasification plant is planned for northern Spain. The Bahia de Bizkaia Gas group, a consortium led by BP and including Repsol-YPF, Iberdrola, and EVE (the Basque Energy Authority), will build the new import facility in conjunction with a new power station. The regasification facility is expected to begin operations in 2003.

Seven Spanish companies and Algeria's Sonatrach, forming the Reganosa group, will begin building in 2002 another new LNG import facility. Algerian LNG will supply the new Ferrol terminal in Galicia in northwest Spain for ten years following the terminal's projected 2004 commissioning. In conjunction with the terminal, which will have an initial capacity of 88 Bcf per year, a new pipeline will be constructed to

connect the terminal to power plants located about 60 miles away.

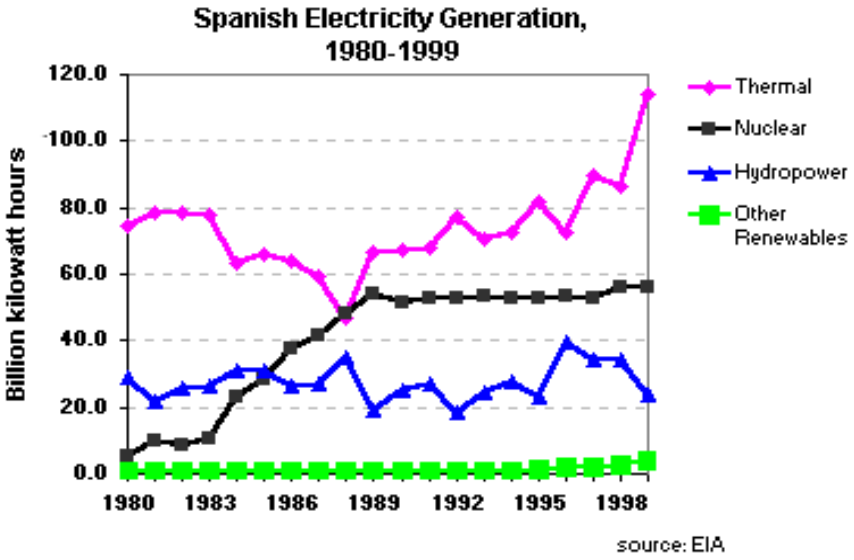
COAL

Coal is Spain's most plentiful indigenous energy source. Production has fallen in recent years, and the decline is expected to continue as Spain works to meet environmental standards. Currently, 95% of coal is used to generate electricity. All of the major coal companies are state-owned.

Spanish coal is too expensive to be competitive in a free energy market, with about 80% of the coal costing at least twice international prices to produce, so the Spanish government subsidizes coal production. According to new EU regulations that will take effect in July 2002, Spain must lower its coal production by 65% over the next ten years. Also, coal mines that do not improve their economic viability will only be able to receive production subsidies until 2008. Spain is one of three EU countries that will be permitted to continue coal production for reasons of economic security, and hence will continue to receive subsidies for more competitive mines. There is increased pressure on coal, however, as the electricity market privatizes, and as electricity generation will no longer be a captive market for domestic coal. Imports of foreign coal already are on the rise, and electricity generators are looking more to natural gas.

The sector now employs only half the number of people as a decade ago. However, most of those employed are in the Asturias region, where the jobs are badly needed. It would be difficult to completely phase out coal mining because of this region's dependence on the industry for employment.

ELECTRICITY



Spain has the fifth largest electricity market in Europe (behind Germany, France, the United Kingdom, and Italy), and it is growing quickly. Electricity demand is estimated to have grown by 5.4% in 2001 to about 205 billion kilowatthours (bkwh). Red Electrica de España (REE), Spain's network operator, invested heavily in the network in 2001, with EUR 78.4 million invested in expanding the electricity network and REE announced plans in October 2001 to invest between EUR 60.2 million and EUR 72.2 million to improve the electricity connection with France. Spain's three largest electricity groups - Endesa, Iberdrola, and Union Fenosa - have announced massive investments planned from August 2001 to 2005 of EUR 34 billion, with much of that in Latin America and other European countries, but nevertheless including EUR 8 billion for new generating plants in Spain.

Endesa announced in July 2001, that it will build a natural-gas-fired, 400-megawatt (MW), combined-cycle generating turbine (CCGT) plant in Huelva by June 2004, in addition to three other gas-fired 400-MW CCGTs the company already has under construction in Spain near Cadiz, Barcelona, and Tarragona. Union Fenosa plans to add 5,000 MW of new capacity by 2005, mostly in Spain, of which 2,800 MW would be natural-gas-fired. Piemsa, an affiliate of Petronor, is planning to construct an 800-MW integrated gasification combined-cycle (IGCC) complex at a refinery near Bilbao that will make use of heavy refinery stocks. The plant will be one of the largest and most advanced of its kind in the world.

Spain's electricity market is privatizing ahead of the schedule mandated by the EU. A 1996 EU directive required that at least 26.48% of electricity sales in member countries be open to competition, beginning in February 1999. This requirement increased to about 28% in February 2000 and will grow to 33% in 2003.

Spain already has surpassed the 2003 requirement.

The Spanish electricity sector is in the midst of restructuring. There are five major utility companies in Spain, in descending order of size: the formerly state-held Endesa, Iberdrola, Union Fenosa, Hidrocantabrico, and the newly independent Viesgo. Viesgo's acquisition by Enel of Italy from Endesa was completed in January 2002, and Viesgo has a 5% market share. This is part of Enel's strategy of regaining market share abroad after selling its Elettrogen utility at home to Endesa in 2001.

Hidrocantabrico was sold in October 2001 to Electricite de France (EdF) and Eletricidade de Portugal (EdP), after the Spanish government decided to lift the veto on EdF's and EdP's voting rights. Some 60% of Hidrocantabrico will actually be owned by Energie Baden-Wurttemberg (EnBW) of Germany, which is controlled by EdF. The agreement is subject to commitments by the French and Portuguese governments to open up their electricity markets to Spain and subject to France increasing its interconnection with Spain from 1,000 MW to 4,000 MW between 2006 and 2011. This includes a new 1,200 MW line to run along side the planned high-speed rail line between Perpignan and Figueras in Catalonia.

In August 2001, Spain and Portugal signed an agreement to form a single electricity market by completely unifying their electricity networks. The unification is to be completed by sometime in 2003. There are still several unresolved obstacles to this. One obstacle is that there is minimal separation between transport and distribution activities, which remain monopolies, and production and marketing activities, which are open to competition. Another problem is that in Portugal production is sold to the state-held REN, which transports the electricity, whereas in Spain producers compete to sell electricity, but receive compensation payments for market liberalization called CTCs. The Spanish government in March 2001 reiterated its support for CTCs, but these payments are under investigation by the EU. The opposition PSOE party has called for their end. However, electricity companies have called for an end to tariff privileges enjoyed by several large industrial companies that they believe have made these companies uncompetitive internationally. In addition, electricity companies would like to raise their rates, arguing that prices have fallen 17% in the past five years, while inflation for the period has been 14%. In December 2001, a 1% rate increase was authorized for industrial customers. The Economy Ministry began investigating several electricity companies for alleged restrictive practices in order to raise prices in November 2001, though it has not revealed which companies are under investigation.

As electricity demand has increased rapidly in Spain in the past year combined with flat or low hydroelectric capacity, domestic supply has not been sufficient, and Spain began to import electricity from Morocco for the first time in December 2001 when cold temperatures created a surge in demand. Union Fenosa and Endesa have signed agreements with Moroccan power company ONE. Spain granted ONE the status of an "external operator" in 1998, giving the company the right to deal directly with Spanish electricity companies or on the Spanish spot market. The power exchange between ONE and Spanish companies is through the Spain-Morocco grid interconnection, which became operational in 1998. Two power connections between Algeria and Spain are also planned, one of which will run along side the Medgaz pipeline.

Spanish utilities are becoming increasingly involved in foreign power markets, especially in Latin America. Endesa owns a controlling stake in Chile's largest power provider, Union Fenosa is involved in Guatemala and Panama, and Hidrocantabrico has interests in Mexico. In neighboring France, Endesa acquired a 30% stake in SNET, which owns five coal-fired power plants, and hopes to control the company completely in a few years.

Nuclear Power

Spain is about 27% reliant on nuclear power for its electricity generation. Spain currently has nine nuclear reactors. In 2001 Spain's nuclear plants produced a record 63.6 bkwh, an increase of 2.3% compared to 2000. The Popular Party supports nuclear power, but the PSOE has indicated that it supports a gradual shut-down of Spain's nuclear plants. Currently, the construction of new nuclear plants is not illegal, but companies are unlikely to invest in such plants because of high costs and little government incentive.

COUNTRY OVERVIEW

Head of State: King Juan Carlos (since November 1975)
Prime Minister: Jose Maria **Aznar** (since May 1996)
Independence: 1492 (expulsion of the Moors and unification)
Capital City: Madrid
Population (July 2001E): 40 million
Location/Size: Southwestern Europe, bordering the Bay of Biscay, Mediterranean Sea, North Atlantic Ocean, and Pyrenees Mountains, southwest of France/504,750 sq km (slightly more than twice the size of Oregon)
Language: Castilian Spanish 74%, Catalan 17%, Galician 7%, Basque 2%
Religion: Roman Catholic 99%, other 1%

ECONOMIC OVERVIEW

Finance Minister: Cristobal Montoro
Currency: Euro (EUR)
Exchange Rate (1/29/2002): 1 US Dollar = 1.156 EUR Spanish Peseta
Gross Domestic Product (GDP, nominal, 2001E): $579 billion
Real GDP Growth Rate (2001E): 2.6% **(2002F):** 2.4%
Inflation Rate (consumer prices, 2001E): 3.7% **(2002F):** 2.4%
Unemployment Rate (2001E): 13.4% **(2002F):** 13.0%
Merchandise Exports (2000E): $115.1 billion
Merchandise Imports (2000E): $147.8 billion
Merchandise Trade Deficit (2000E): $32.7 billion
Major Trade Partners: France, Germany, Italy, United Kingdom, United States, Portugal
Major Export Products: Automobiles, tourism, power generation equipment, electrical machinery, petroleum and chemical products, foodstuffs
Major Import Products: Crude petroleum, vehicle and automobile parts, capital goods, and food

ENERGY OVERVIEW

Proven Oil Reserves (1/1/02E): 21 million barrels
Oil Production (2001E): 21,000 barrels per day (bbl/d), of which 7,000 bbl/d was crude oil
Oil Consumption (2001E): 1.48 million bbl/d
Net Oil Imports (2001E): 1.46 million bbl/d
Crude Oil Refining Capacity (1/1/02E): 1.3 million bbl/d
Natural Gas Reserves (1/1/02E): 18 billion cubic feet (Bcf)
Natural Gas Production (1999E): 5.1 Bcf
Natural Gas Consumption (1999E): 513.8 Bcf
Net Natural Gas Imports (1999E): 508.7 Bcf
Coal Reserves (12/31/96): 728 million short tons (Mmst)
Coal Production (1999E): 27 Mmst
Coal Consumption (1999E): 49 Mmst
Electric Generation Capacity (1999E): 44.9 million kilowatts
Electricity Generation (1999E): 197.7 billion kilowatthours (bkwh)
Electricity Consumption (1999E): 189.6 bkwh

ENVIRONMENTAL OVERVIEW

Minister of Environment: Jaume Matas
Total Energy Consumption (1999E): 5.2 quadrillion Btu* (1.4% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 81.5 million metric tons of carbon (1.3% of world carbon emissions)
Per Capita Energy Consumption (1999E): 132.6 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.1 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 8,707 Btu/$1990 (vs U.S. value of 12,638 Btu/$1990)**

Carbon Intensity (1999E): 0.14 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (43.1%), Transportation (31.6%), Residential (15.0%), Commercial (10.3%)
Sectoral Share of Carbon Emissions (1998E): Industrial (39.3%), Transportation (38.9%), Residential (13.1%), Commercial (8.7%)
Fuel Share of Energy Consumption (1999E): Oil (57.0%), Coal (14.3%), Natural Gas (11.2%)
Fuel Share of Carbon Emissions (1999E): Oil (66.6%), Coal (23.1%), Natural Gas (10.3%)
Renewable Energy Consumption (1998E): 521.4 trillion Btu* (1% increase from 1997)
Number of People per Motor Vehicle (1998): 2.1 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 21st, 1993). Signatory to the Kyoto Protocol (signed April 29th, 1998 - not yet ratified).
Major Environmental Issues: Pollution of the Mediterranean Sea from raw sewage and effluents from the offshore production of oil and gas; water quality and quantity nationwide; air pollution; deforestation and desertification.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants, Desertification.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

Sources for this report include: CIA World Factbook; DRI/WEFA; Economist; Economist Intelligence Unit; European Union; Financial Times; Gas Natural; Petroleum Economist; Repsol; U.S. Energy Information Administration; World Markets Online.

Links

For more information from EIA on Spain, please see:
Spain Country Data

Links to other U.S. Government Sites:
CIA World Factbook - Spain
U.S. State Department Consular Information Sheet - Spain
U.S. State Department Country Commercial Guide - Spain
U.S. State Department Background Notes - Spain
U.S. Embassy in Spain

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Energy Information Administration

April 2002

Russia: Oil and Natural Gas Export Pipelines

OIL PIPELINES

Russia has an extensive domestic oil pipeline system, with links to nearly all of the former Soviet republics. Transneft, the state-owned transport monopoly, manages, services, and is responsible for developing Russia's pipeline system. Russia's main export pipeline to Europe is the 1.2-million-bbl/d-capacity *Druzhba* (Friendship) pipeline that traverses Belarus before splitting into northern and southern routes and delivering oil supplies to customers throughout Europe. The northern Druzhba line runs from Russia via Belarus to Poland and on to eastern Germany, while the southern Druzhba line cuts across northern Ukraine and on to Hungary, Slovakia, and the Czech Republic.

However, aside from the Druzhba pipeline and the Novorossiisk export terminal on the Black Sea, Russia's ability to export its oil to world markets is limited. With the breakup of the Soviet Union, Russia 's main export terminals for crude oil and oil products--in Ventspils (Latvia), Klaipeda (Lithuania), Tallinn (Estonia), and Odessa (Ukraine)--were located outside Russia's borders, forcing the country to pay transit fees to its neighbors in order to export its oil.

Since oil exports are a major source of revenue for Russia's budget, the country is seeking to increase its domestic export capacity and reduce the fees it pays to transit countries. Thus, Russia is building a number of new pipelines and export terminals, such as the Baltic Pipeline System, as well as increasing capacity at several existing terminals and pursuing plans to construct additional pipelines, including a potentially major oil export pipeline to China.

Baltic Pipeline System

Outside of the Caspian Sea region, the 284-mile Baltic Pipeline System (BPS) is Russia's largest new pipeline export scheme. This system involves the laying of a new main pipeline from Kharyaga (Nenets Autonomous District, Arkhangelsk region) to Usa (Komi Republic), the reconstruction of the Usa-Ukhta, Ukhta-Yaroslavl, and Yaroslavl-Kirishi pipeline segments, and the construction of a new pipeline from Kirishi to Primorsk and an oil terminal in Primorsk on the Gulf of Finland. The first stage of the BPS, with an export capacity of 240,000 bbl/d, was put into operation in December 2001 when the first tanker was loaded at Primorsk. The cost of the first stage of the BPS has been estimated at $460 million.

The BPS, which will export most of the oil from the Timan-Pechora and West Siberian oil provinces, as well as some oil from Kazakhstan, gives Russia a direct outlet to northern European markets, allowing the country to reduce its dependence on transit routes through Estonia, Latvia, and Lithuania. Use of the BPS, which is fully owned and operated by Transneft, the Russian pipeline monopoly, should bring the Russian government $100 million per year in fees, as well as allow Russia to save up to $1.5 billion each year in transit tariffs. In addition, Russian officials argue that the oil-loading terminal in Primorsk also allows Transneft to maneuver between southern and northern export routes, giving exporters greater flexibility and attracting more oil from the Caspian Sea region to transit Russia.

Transneft President Semyon Vainshtok announced in November 2001 that construction of the second stage of the BPS will begin in June 2002. The second stage of the BPS, which will take a year and a half to complete, will involve construction of three pump stations and eight storage tanks, as well as upgrades to the Yaroslavl-Kirishi pipeline. The cost of the second stage of construction, which will increase the capacity of the BPS to 360,000 bbl/d, is estimated at around $350 million to $400 million.

However, the BPS has already run into problems. In January 2002, Transneft pumped an average of 236,000 bbl/d through the BPS, nearing its capacity, but in February 2002, Finnish energy company Fortum, which purchased nearly one-third of the BPS exports in January, cut its orders by 85%. After ordering an average of 72,300 bbl/d for the month in January 2002, Fortum reduced its purchases from the BPS to an average of just 10,845 bbl/d in February, citing high levels of sulfur that entered the BPS in the Udmurtia and Bashkortostan republics, making it more expensive to process on delivery in Finland. Most of the oil that was pumped through the BPS in January 2002 came from came from Sibneft, Lukoil and Surgutneftegaz.

China Oil Pipeline

In order to supply China's increasing oil demand and boost its own export potential, Russia has been negotiating with China to build an oil pipeline linking the two countries. In July 2000, Russian President Vladimir Putin and Chinese President Jiang Zemin signed a memorandum of understanding on a feasibility study for a potential oil pipeline between Russia and China, and in September 2001, Russian and Chinese officials signed a general agreement to prepare a feasibility study for the construction of a Russia-China oil pipeline.

Originally, Transneft and Russia's second largest oil producer, Yukos, were working together on the idea of building the proposed $2.5-billion pipeline, which would bring East Siberian oil to northeastern China. Under a 25-year deal, the pipeline would supply China with 400,000 bbl/d starting in 2005--the equivalent of 26% of China's projected net imports then. Spur lines would eventually link the Talakanskoye, Verkhne-Chonskoye, and Yurubchenskoye fields to the main pipeline, boosting capacity to 600,000 bbl/d by 2010 and helping to alleviate localized fuel shortages in Russia that have been aggravated by high rail tariffs.

The preliminary proposal signed by Chinese and Russian sides called for the line to stretch 1,400 miles from Angarsk, across Mongolia, then into Beijing. Russia wants to cut the pipeline's distance by

traversing Mongolia, but China would like to circumvent Mongolia for security reasons. In addition, Yukos and Transneft have differed in their preferences for the pipeline route, with Yukos, which previously favored a pipeline route from its fields in the Tomsk region straight to China, now favoring a route that would terminate in Nakhodka on Russia's Pacific Ocean coast. Yukos argues that shipping crude via Nakhodka would give producers a bigger choice of buyers, while Transneft has said that both routes could eventually be built. Discussions on a final route for the pipeline are continuing.

Sakhalin Pipelines

Sakhalin Energy (Sakhalin-2), a consortium led by Royal Dutch/Shell (Netherlands/U.K.), has plans to build oil export pipelines to Japan, South Korea, and Taiwan by constructing nearly 480 miles each of oil and natural gas pipelines down the length of Sakhalin Island to the ice-free port of Prigorodnoye. The Sakhalin-2 energy project currently produces oil in the six months of the year when the bitterly cold seas off the island's eastern shores are free of ice. Sakhalin Energy's plan is expensive, but will allow year-round oil and natural gas exports.

The rival Sakhalin-1 group favors a shorter, 150-mile underwater pipeline. Sakhalin-1 partners propose to export their oil across the Tatar Straits to DeKastri, on the Russian mainland, where an existing tanker terminal could be expanded to handle exports to Asia. It will be much cheaper to build, but off-takers will have to contend with ice for several months a year. Capacity of both the terminal and pipeline is planned at 240,000-300,00 b/d. Sakhalin-1 says its export route will be cheaper than that of Sakhalin-2, and although Sakhalin-1 is attempting to speed up its timetable to start production in 2003 instead of 2005 as originally scheduled, Sakhalin-1 acknowledges that exports will not begin before 2005.

CPC Pipeline

In March 2001, the Caspian Pipeline Consortium's (CPC) Tengiz-Novorossiisk pipeline was commissioned. The CPC pipeline, which is run by an international consortium rather than Transneft, has an initial capacity of 564,000 bbl/d, with throughput eventually increasing to 1.34-million bbl/d in 2015. Oil from the Tengiz field in Kazakhstan began to flow via the 990-mile pipeline to Russia's Black Sea port of Novorossiisk, but flows were suspended several times because the CPC did not have an agreement with Russia's State Customs Committee to transit Russian territory. After Russia and Kazakhstan negotiated an oil transportation agreement and an "oil quality bank", the first tankers were loaded at Novorossiisk in October 2001.

With a 24% stake, the Russian government is the largest shareholder in the Caspian Pipeline Consortium, but the lack of a pipeline linking the CPC pipeline with Russia's Transneft pipeline system currently prevents Russian oil from flowing through the CPC pipeline. As a result, the ChevronTexaco-led Tengizchevroil consortium looks set to be the only bidder for pipeline space in 2002. Future inclusion of Russian crude will require Transneft to link its system to the CPC pipeline, as well as additional regulations or changes to the existing oil transit agreement and quality bank.

Druzhba-Adria Pipeline Integration

In October 2000, Yukos announced plans to integrate the Druzhba southern pipeline with the Adria

pipeline, which runs from the Adriatic port of Omisalj in Croatia to Hungary. Yukos signed a $20-million agreement with Croatian oil transport company Jadranski Naftovod to modernize the Adria pipeline to help integrate the two pipelines. By reversing the flows of the 110-mile pipeline between Omisalj and Sisak, the integration of the Druzhba and Adria pipelines will allow direct exports of Russian oil to the coast of the Adriatic Sea.

According to Yukos, Russian Urals blend crude oil should be flowing the 1,987-mile route to the deepwater Omisalj port by the end of 2002. In December 2001, the Ukrainian parliament ratified an agreement to reduce its tariff for Russian oil crossing its territory en route to Omisalj, a step that Russian oil companies had seen as the last major obstacle for the integration project to move forward. Ukraine's agreement to cut its transit tariff brought it in line with Belarus, Slovakia, Hungary, and Croatia, the other countries through which the route passes.

With the line reversed to Omisalj, Russian oil exporters will have direct access to the Mediterranean Sea, allowing them to bypass the Black Sea and the increasingly crowded Bosporus Straits. The entire Druzhba-Adria pipeline route would handle 100,000 bbl/d in 2003, the first full year of operation. Transneft and Jadranski Naftovod have said that exports via the pipeline would rise to 200,000 bbl/d after five years, and to 300,000 bbl/d after 10 years.

Sukhodolnaya-Rodionovskaya Pipeline

In September 2001, Transneft completed a 162-mile pipeline from Sukhodolny to Rodionovsky in the southern Rostov region, allowing oil headed south for the Russian Black Sea port of Novorossiisk to avoid transiting Ukraine. The 320,000-bbl/d line removes the need for Russian oil exporters to use a 60-mile stretch of pipeline in Ukraine. The original, Soviet-era pipeline sidetracked west into Ukraine to serve the Lisichansk refinery, but after the collapse of the Soviet Union, Ukraine began charging Transneft high transit fees to use the pipeline. Transneft decided it was worth the $240-million cost to construct a bypass pipeline in order to avoid Ukraine's high transit fees.

NATURAL GAS PIPELINES

Russia has a comprehensive domestic natural gas distribution system run by the state natural gas monopoly Gazprom, as well as a series of natural gas pipelines linking Russia to the former Soviet republics. Russia's main natural gas export pipelines to Europe run from West Siberia, across the Volga-Urals and Timan-Pechora, and through Ukraine and Belarus to Europe. The Brotherhood, Progress, and Soyuz gas pipelines, with capacities of 1 trillion cubic feet (Tcf) each, transit Ukraine, while the 1.0-Tcf Yamal-Europe pipeline crosses Belarus, and the 0.8-Tcf Northern Lights gas pipeline transits both Belarus and Ukraine.

With world natural gas demand increasing, Russia is attempting to increase its capacity to export its natural gas. In addition, with so many natural gas pipelines crossing Ukraine, Russia is seeking to build new pipelines to diversify its natural gas export routes. In order to reach lucrative markets in Western Europe and Asia, Russia is proceeding with the construction of a number of international natural gas pipeline projects, including the Blue Stream pipeline to Turkey, and possible pipelines from Russia's

Sakhalin Island to Asian markets.

"Blue Stream" Pipeline

In 1997, Russia and Turkey signed an intergovernmental agreement for the sale of 565 billion cubic feet (Bcf) per year of natural gas, beginning in 2001. To implement this agreement, the "Blue Stream Pipeline Company" was formed, and the countries agreed to build a pipeline directly from Russia to Turkey, via the Black Sea.

Construction on the 565-Bcf-per-year-capacity Blue Stream pipeline officially began in February 2000. The pipeline includes a 222-mile section in Russia, from Izobilnoye to Dzhugba on the Black Sea Coast, a 235-mile section on the bottom of the Black Sea that will connect Dzhugba to Samsun on the Turkish coast, and a further 300-mile link from Samsum to Turkey's capital at Ankara. The estimated cost of the pipeline, which is Russia's largest investment project, is between $3 billion and $3.3 billion. The seabed stretch of the pipeline, which will be laid at depths deeper than any other pipeline in the world, is estimated to cost $2 billion alone. ENI (Italy) and Gazprom each have a 50% stake in the Blue Stream project.

In the spring of 2001, investigations into allegations of corruption in Turkey in the tendering for the Blue Stream pipeline set the project back several months. Turkey's Energy Minister, Cumhur Ersumer, was forced to resign after being named in a court indictment of 15 ministry officials charged with corruption. Aside from setting back the timetable for completion of the project, the Blue Stream pipeline itself was unaffected, and in August 2001, the Saipem 7000, an Italian technological innovation that is the only ship in the world capable of laying pipelines at such depths, began laying the pipeline at the bottom of the Black Sea at a depth of nearly 7,000 feet.

In February 2002, the Saipem 7000 completed laying the first of two branches of the subsea section of the pipeline, with work on the second branch to be completed in May 2002. Construction of the Turkish onshore section of the pipeline is already complete, while the 222-mile Russian section of the pipeline, which includes compressor stations and underground storage facilities, is scheduled to be finished by September 2002.

Natural gas supplies through the Blue Stream pipeline are slated to being in the third quarter of 2002, with Russia scheduled to deliver 70.6 Bcf of natural gas to Turkey via the pipeline this year. From 2003 to 2009, Russia will increase deliveries via Blue Stream by 70.6 Bcf per year each year, with the pipeline reaching peak capacity of 565 Bcf per year in 2009. Over the course of the 25-year agreement, Russia will pipe 14.1 Tcf of natural gas to Turkey.

Ukraine Bypass and Yamal-Europe Pipelines

Gazprom currently supplies around 25% of European natural gas demand, and the company is eager to increase its penetration in the region. Approximately 90% of Russia's total natural gas exports to Europe are routed through Ukraine, which receives natural gas supplies as in-kind payment for allowing Russia's natural gas to transit its territory en route to European consumers (Ukraine purchases additional natural

gas from Russia to meet its domestic demand). The Yamal-Europe pipeline, which is routed through Belarus and Poland to Germany, is Russia's only natural gas export pipeline to Europe that is not routed through Ukraine.

Russia has questioned Ukraine's reliability as a transit country, noting Ukraine's $2-billion debt for natural gas supplies. Several times in the past few years, Russia has accused Ukraine of illegally taking more natural gas from than the amount for which it had contracted. With Russia's long-term energy supply agreement with the European Union, Russian officials have said that they need additional export routes to be able to meet Russia's increased supply obligations. As a result of the strained relations between Ukraine and Russia over natural gas transit, in October 2000 Gazprom officials proposed a new pipeline that would bypass Ukraine. However, Ukraine pledged to stop siphoning natural gas from the transit pipelines, and in October 2001, the two countries agreed on a 12-year debt restructuring deal for Ukraine's natural gas debts.

Gazprom has sent conflicting signals on its intentions with the second leg of the Yamal pipeline (stipulated in a 1993 Russia-Poland intergovernmental agreement) and the related question of a possible bypass route around Ukraine. In February 2002, Gazprom board member Boris Fyodorov told investors that the company's board of directors had decided to increase the capacity of the Yamal-Europe pipeline and drop the project to build the natural gas pipeline through Poland, bypassing Ukraine. Gazprom officials, however, denied reports that the company has scrapped plans for a north-south pipeline from Belarus to Slovakia via Poland, avoiding Ukraine.

Although there has been confusion as to what Gazprom's position is, what is clear is that the company is still interested in boosting Russia's natural gas export capacity to Europe by diversifying its export routes. Currently, the Yamal-Europe pipeline annually carries about 600 Bcf of Russian natural gas, which is sold to the Russian-German trading company Weih, and the pipeline is expected to handle about 1.17 Tcf of natural gas per year by 2003 after new compressor stations have been built in Poland. Gazprom's plans for a second stretch of the Yamal-Europe pipeline through Poland would increase capacity to 2.1 Tcf of natural gas per year, but Russia and Poland have differed on the route for the second leg, and Russia's shorter route would still cost an estimated $2 billion to construct. As a result, Yamal-Europe II appears to be on hold.

China Natural Gas Pipelines

Russia also is looking to eastern markets to export its natural gas to Asian countries. On September 29, 2000, Russia announced that it would expedite the development of eastern Siberia natural gas fields, as well as conduct a feasibility study for laying a natural gas pipeline to China in a bid to supply natural gas to China. Several international projects are seeking to deliver Russian natural gas to China, although China has narrowed it down to two major options: a BP (U.K.)-led consortium that is developing the Kovykta natural gas field, and the the Sakha consortium developing the Chayandinovskoye field. Analysts believe that only one pipeline will be needed.

The Chayandinovskoye option would cost approximately $6 billion-$10 billion and would entail a 1,700-

mile pipeline link from the Chayandinskoye field to Xinjiang region northern China. In March 2001, Russia's Sakhaneftegaz and China's National Oil & Gas Development Corp. signed a preliminary agreement to develop the Chayandinovskoye field, which is estimated to contain 43 Tcf of natural gas, and build a dedicated pipeline with capacity of between 423 Bcf and 706 Bcf per year. Gazprom may act as the operator for the pipeline.

The second option for China to receive Russian natural gas is via a pipeline linking Russia's Kovykta field in Irkutsk with northeastern China. The Kovykta field, which is being developed by Russia Petroleum, a BP-led consortium, has estimated natural gas reserves of 49 Tcf. The pipeline would terminate in South Korea via a sub-sea pipeline across the East China Sea. The most direct route for the proposed Irkutsk pipeline--which Russia Petroleum strongly prefers--would be to lay the pipeline through Mongolia into northern China and then down to South Korea.

However, China is urging that the pipeline bypass Mongolia and instead go around the eastern edge of that country and follow a route on to Manzhouli in northeastern China, then cross into North Korea before terminating in South Korea. China feels that a route across Mongolia would be geopolitically risky and argues that Mongolian natural gas demand does not justify having the pipeline cross its territory.

If China insists that the pipeline not traverse Mongolia, an extra 700 miles will be added to the 2,000-mile pipeline route. In addition to the political issues related to the pipeline crossing North Korea, the added cost (from the extra length) of the pipeline may make the extension to South Korea unfeasible. Thus far, Russia Petroleum has failed to agree on the price China will pay for the natural gas.

North TransGas Pipeline

In late April 2001, Gazprom signed an agreement with Finnish and German customers for a feasibility study on a pipeline that would carry Russian natural gas across the Baltic Sea to serve Scandinavia and Germany. The North TransGas pipeline, if it is built, will be well located to export natural gas production from the far north of European Russia and the Barents Sea, and also will allow Gazprom to avoid negotiating fees for transit countries. Gazprom's partners in the North TransGas pipeline project are Finland's Fortum and Germany's Wintershall and Ruhrgas. However, until Gazprom is restructured and attracts more foreign investment, it appears that only one of the proposed northern natural gas pipelines--Yamal-Europe II or the North TransGas pipeline--is possible due to Gazprom's financial woes.

Sakhalin-1 Natural Gas Pipeline to Japan

The Sakhalin-1 consortium, made up of ExxonMobil (U.S.), Rosneft, ONGC Videsh (India), and a consortium of Japanese firms, is developing the Odoptu, Chayvo and Arkutun-Dagi oil and natural gas fields on Sakhalin Island off Russia's Pacific Coast. The consortium is proposing to deliver natural gas from Sakhalin to Japan via a 120-mile pipeline linking its fields with Sapporo, on Japan's northernmost island of Hokkaido. A feasibility study for the pipeline, which could be extended to Tokyo, is scheduled to be completed in April 2002.

ExxonMobil, the project's operator, previously has stated that it believes the pipeline will be economically viable. ExxonMobil has already given the green light to increase investment at the fields, and the company has announced that Sakhalin-1 is planning to produce 335 Bcf of natural gas per year in 2003. Sakhalin-1 hopes to start piping natural gas to Japan in 2008, with exports reaching 360 Bcf per year.

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December 2001

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Baltic Sea Region

The Baltic countries--including Estonia, Latvia, and Lithuania--occupy a strategic location as transit centers for Russian oil exports. In addition, Belarus is becoming a major transit center for Russian natural gas exports to Europe.

Note: Information contained in this report is the best available as of December 2001 and is subject to change.

GENERAL BACKGROUND

Estonia, Latvia, and Lithuania--together often known as the Baltic states--have moved rapidly towards European integration since they won their freedom from the Soviet Union in 1991. Alone among the former Soviet republics, the Baltic states were quick to adopt market economies and to implement democratic reforms. As a result, they largely have avoided the economic and political crises that have beset other regions in transition from a centrally planned economy, including the Balkan region and Southeastern Europe.

Due to their small sizes, the Baltic countries have joined forces in a number of political and economic arenas in order to give themselves more clout on the international stage. In addition, the countries have agreed to cooperate in the military sphere in order to bolster their individual security. Each country has applied to join the North Atlantic Treaty Organization (NATO), and each has made membership in the European Union (EU) a stated foreign policy goal. The Baltics have agreed to coordinate their energy markets and to harmonize their national energy programs in a unified bid to meet the the EU's membership requirements.

Belarus, on the other hand, has been reluctant to implement political and economic reforms since the collapse of the Soviet Union. Rather than attempting to integrate with the West, Belarussian President

Alyaksandr Lukashenko has isolated Belarus from the West by refusing to implement political reforms and instead returning the country to a form of market socialism. Although Belarus is just as dependent on Russian oil and natural gas as are the Baltic states, Belarus has not made any serious attempts to diversify its energy sources. Unlike the Baltics, Belarus has maintained a close relationship with Russia, and as such it has benefited by receiving cheaper energy supplies from its eastern neighbor.

REGIONAL ENERGY ISSUES

Although not important energy consumers or producers, together the Baltic states occupy a key location for Russian oil exports. Other regional energy issues in the Baltics include Russian natural gas transit and alternative natural gas supplies, energy sector privatization and energy market liberalization, electric grid unification, and integration with the EU.

Russian Oil Export

Latvia's Ventspils port is Russia's primary crude oil export terminal in the north, and both Estonia and Lithuania have important ports for Russian crude oil and petroleum products for export. Transit fees for these oil and petroleum products that are destined for export are an important source of revenue in the Baltic states.

However, Russia is keen to avoid these transit fees by constructing its own oil export terminal at Primorsk, part of Russia's new Baltic Pipeline System (BPS). The Primorsk terminal, with an initial capacity of 240,000 barrels per day (bbl/d), is scheduled to load its first tanker in December 2001. According to various estimates, ports in the Baltic states could lose between 10% and 50% of their current Russian oil export volumes. Nevertheless, projected increases in Russian oil exports, along with increased oil exports from the Caspian Sea region, especially Kazakhstan, appear to ensure that the ports in Estonia, Latvia, and Lithuania will remain important oil export terminals in the future.

Estonian Ports

In recent years, Estonia's ports at Tallinn and nearby Muuga have become major terminals for the export of Russian petroleum products. By the end of 1999, these terminals were exporting over 300,000 barrels per day (bbl/d) of products, rivaling Ventspils as the largest transshipment center in the Baltics. Estonia's ports, which only export petroleum products such as heavy fuel oil, are not reliant on pipelines to deliver supplies. Instead, Estonian transit companies, such as Eurodek Tallinn and Pakterminal, use trains to transport oil products from Russia to Estonian sea ports.

In 2000, Pakterminal handled 8.5 million tons (171,000 bbl/d) of oil products, around 500,000 tons (10,000 bbl/d) more than in 1999, despite a plunge in imports from Russia in the third quarter that forced the company to transit other oil products. In the first nine months of 2001, the company reported handling an average of 182,000 bbl/d of oil products, an increase over the record volumes in 2000. Thus, Pakterminal, Estonia's largest oil transit company, is confident that Russia's Baltic Pipeline System and new port at Primorsk will not substantially cut into its business.

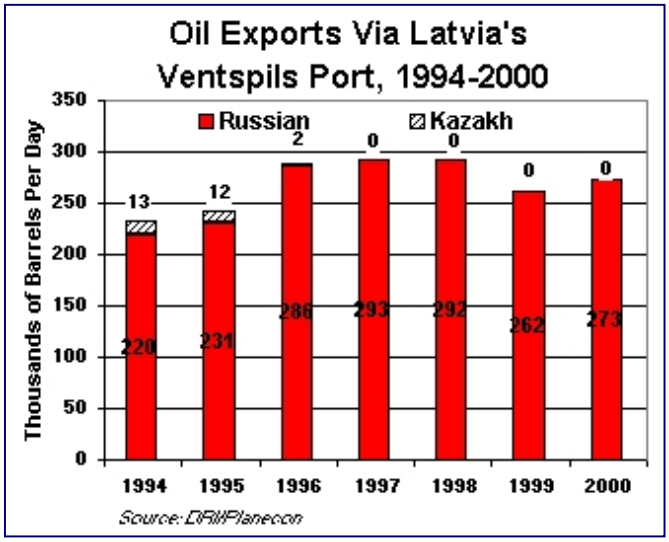
Eurodek Tallinn also is increasing its export volumes after handling 6.2 million tons (124,500 bbl/d) of oil products in 2000. In the first half of 2001, the company handled 3.6 million tons (144,500 bbl/d), and in August 2001, Eurodek opened a new $50-million terminal in the port of Muuga. The 60,000-bbl/d-capacity terminal will allow the company to boost its export capacity. A smaller 16,000-bbl/d-capacity terminal is also being constructed by Alexela Oil in Padiski, with work due to be completed by August 2002.

Overall, a total of 1.8 million tons of oil products passed through the Port of Tallinn during September 2001, and 16.1 million tons (431,000 bbl/d) during the January 2001-September 2001 period.

Latvian Ports

Latvia's Ventspils port is the largest oil export terminal in the Baltics, and both Riga and Liepaja also have ports for exporting oil and oil products. The Ventspils oil terminal can handle about 500,000 bbl/d of crude, and Latvian officials have stated that its throughput capacity could be increased to 1.8 million bbl/d (although this would require about $30 million in investment). Actual exports from Ventspils have been far below capacity, however, due to a bottleneck in Polotsk, Belarus that has limited pipeline flows.

To reduce the bottleneck at Polotsk, the Western Pipeline System joint-stock company was formed in 1998 to help build a second pipeline from Polotsk to Ventspils. The project calls for an additional 360,000 bbl/d capacity by 2005, with backing sought from Russian, Latvian, Belarussian, and Western companies, and additional backing to come from the European Bank for Reconstruction and Development (EBRD).



According to PlanEcon, Ventspils handled 273,000 bbl/d of crude oil in 2000, all of which was Russian crude oil. In the past, Kazakhstan also has exported small amounts of oil via Ventspils, with as much as 13,000 bbl/d of Kazakh crude flowing through the terminal in 1994. Increasing Russian oil exports have limited Kazakhstan's ability to export via Latvia, and Latvia's efforts to reach an agreement with Kazakhstan to export up 100,000 bbl/d via Latvian ports have been hindered by the need to reach an agreement with Russian on rail tariffs and the use of its pipelines.

Although in 2000 Ventspils retained its status as the Baltic port with the largest share of Russian oil exports, competition from other Baltic ports is increasing and eroding Ventspils' market share. In an effort to attract more Russian oil exports, Ventspils Nafta, the company that runs the terminal, has cut its reloading tariffs several times in the past few years. Nonetheless, it is still one of the highest-cost routes for Russian crude oil, and recent reductions in exports could force it to reduce loading charges again in order to stay competitive. Russian companies now pay Latvia in excess of $100 million annually for transit services.

Russia's new Baltic Pipeline System is the biggest threat to Ventspils, since the BPS would allow Russian oil companies to save large amounts of money on transit services and transshipment. Semyon Vainshtok, president of Transneft, the Russian pipeline monopoly, has assured Latvian government officials that the opening of the BPS in December 2001 will not affect the amount of oil loaded at Ventspils, since increases in Russian exports will necessitate the use of both Ventspils and the BPS. Latvia is looking to sell its 43% stake in Ventspils Nafta, hoping that the privatized company will make the port more competitive. Latvia also may offer Transneft a larger stake in LatRosTrans, the Latvian-Russian joint venture that operates the oil and oil product pipelines between Polotsk and Ventspils, in exchange for an increase in the amount of oil shipped to Ventspils.

Lithuanian Ports

Lithuania is positioning itself as a transit center for oil exports from Russia. Lithuania's port of Klaipeda

once had been one of the former Soviet Union's primary export outlets for refined products, but its importance has declined in recent years, and Lithuania now ranks behinds both Latvia and Estonia as a petroleum transshipment center.

Lithuania has moved forward with its plan for a $120 million upgrade of the port at Klaipeda, and the country recently built a new $267 million export port at Butinge near the Latvian border. The Klaipeda oil terminal is expanding its product export capability from 90,000 bbl/d to 160,000 bbl/d. The Butinge terminal, which was launched in July 1999, will have a final capacity of 160,000 bbl/d of crude oil for import or export, and 50,000 bbl/d of products.

The Butinge terminal has been beset by problems since it was launched. Since privatizing Mazeikiu Nafta, the company that operates the Butinge terminal, in 1999, Lithuania has been unable to secure enough oil supplies to load at the terminal. Russia's Lukoil, the coordinator of Russian oil exports in the country's northwest, reduced oil supplies to Lithuania after being left out of the Mazeikiu Nafta privatization. As a result, the Butinge terminal exported just 60,000 bbl/d of crude oil and petroleum products in 2000.

Kazakhstan has been ready for a number of years to supply oil to Lithuania, but an agreement between Kazakh oil companies and the Russian side regarding transportation of oil to Lithuania has not been reached. In July 2000, Kazakhstan's Karazhbasmunai and Mazeikiu Nafta signed a three-year oil supply under which Kazakhstan was to supply up to 60,000 bbl/d to Lithuania, but deliveries have not yet begun due to the lack of an agreement with Russia on transportation tariffs.

In addition, an oil spill at Butinge in March 2001 caused tensions between Latvia and Lithuania as winds blew the spill into Latvian waters. Reportedly, a tanker was being filled with crude oil when a cable snapped, resulting in pipes being disconnected and a small amount of oil was spilled into the Black Sea, where it later sunk to the seabed in Latvian territorial waters. Mazeikiu Nafta and the Latvian Maritime Environment Board have argued over the amount of oil spilled and the damage it caused, as well as Mazeikiu Nafta's compensation to Latvia. The Butinge terminal has experienced several additional accidents since the March 2001 oil spill.

In the summer of 2001, Mazeikiu Nafta did sign a five-year agreement with Russian oil major Yukos to export 80,000 bbld/d of crude via its Butinge terminal, and deliveries began in July 2001. From January 2001 to September 2001, the Butinge terminal handled an average of 112,000 bbl/d, up from an average of 75,000 bbl/d during the same time period in 2000.

Electric System Unification

The power systems of Estonia, Latvia, and Lithuania originally were built to be part of the Soviet Union's northwestern unified energy system. After achieving their independence, the Baltic states disconnected from the grid, forming their own national grids. However, the independent national grids continued to run in parallel mode, allowing Latvia, whose power-generating capacity is mainly seasonal hydropower, to import electricity supplies from Estonia and Lithuania when necessary. In 1999, Russia, Belarus, Estonia, Latvia, and Lithuania agreed to re-connect their electricity grids in order to ensure reliable power suppliers for consumers in the five countries. Lithuania, which remained connected to Belarus, Latvia, and Estonia, withdrew from the five-party agreement at the last minute due to political reasons.

The Baltic states' power grids are not connected to the Western European energy grid. As a result, both Lithuania and Estonia, which have excess power-generating capacity, have been limited in their ability to

export power. In addition to exporting power to Latvia, Lithuania has exported power to Belarus periodically, but Belarus has been delinquent in its payments for electricity supplies. Belarus owes Lithuania around $50 million for electricity in 1998 and 1999, but after a one-year break, Lithuania agreed to begin power exports to Belarus again in July 2000 after concluding a unique three-way arrangement with Russian and Belarus. Under the agreement, Russia agreed to purchase 2.2 billion kilowatt-hours (Bkwh) of power from Lithuania's Ignalina nuclear power plant for subsequent delivery to Belarus. In exchange, Russia supplied the Ignalina plant with nuclear fuel, while Belarus paid Russia in commodities rather than cash.

In October 2000, Lietuvos Energija, Lithuania's power utility, halted exports to Belarus due to a lack of payment guarantees. Lithuania announced that it is unwilling to export power to Belarus directly without firm payment guarantees. Thus, in February 2001, representatives of Lithuania, Estonia, Latvia, Russia, and Belarus signed a multi-lateral agreement on the parallel work of their energy grids, bringing Lithuania on board to the earlier agreement. The agreement gives Lithuania, which also is looking to link directly with Poland, the ability to transit its electricity via Belarus to other markets such as Slovakia, with which Lithuania recently signed an export contract. In addition, in the spring of 2001, Lithuania and Russia signed a deal on the export of 7 Bkwh of Lithuanian electricity in 2001, 2 Bkwh of which was to be sent to the Kaliningrad Region of Russia and 5 Bkwh to be sent to Belarus.

Estonia, for its part, has been pushing to link its grid to the Western European grid. BALTREL, the Baltic countries' power cooperation organization, also has proposed supplying Sweden and Finland with power generated in the Baltic states. To begin with, this would mean linking the 51-mile stretch of sea between Tallinn and Helsinki via an underwater cable. A consortium of electric companies agreed in September 1998 to build the electricity transmission cable, and ABB (Sweden) has been chosen to lay the 315-MW-capacity cable, beginning in the spring of 2002. The project, dubbed "Estlink," is estimated to cost $100 million and should be ready by the end of 2003. Electricity transmission via the cable could be underway by mid-2004.

Regional Natural Gas Supplies

Russia is the main source of natural gas supplies for each of the Baltic states, and the proposed North TransGas project by Russia's Gazprom could bring additional Russian natural gas exports to the Baltics. The project, which would be carried out by Gazprom in conjunction with Finland's Fortum and Germany's Wintershall, would pump natural gas to Scandinavian and German customers via a pipeline beneath the Baltic Sea.

Three options for the pipeline route have been identified: Russia-Finland-Gulf of Bothnia-Sweden-Baltic Sea-Germany; Finland-Baltic Sea-Gotland-Germany; or St. Petersburg-Germany via a pipeline on the bottom of the Baltic Sea. Although none of these options call for the pipeline to transit any of the Baltic states, a pipeline extension to Estonia may be possible and, according to Estonian officials, it may even be desirable for the project's participants, since it could cut down on the costs of part of the subsea pipeline. In addition, Latvia's huge natural gas storage facilities could play an important role in the project, and an extension from the Baltic Sea to Latvia is another possibility.

The Baltics also are looking to diversify their natural gas supplies, and the recent natural gas deal between Norway and Poland may provide the Baltic states with an alternative supply of natural gas. In September 2001, PGNiG, the Polish natural gas distributor, and the leading natural gas companies from the Norwegian market (including Statoil, Norsk Hydro, TotalFinaElf, ExxonMobil, and Shell) signed a 16-year, $11-billion deal to supply Poland with a total of 2.6 trillion cubic feet (Tcf) of natural gas. A dedicated pipeline will be

built to supply Poland, with annual supplies of 88 billion cubic feet (Bcf) to begin in 2008 and rise to 177 Bcf in 2011, lasting until 2024.

Although the deal appears to threaten Poland with oversupply, since Poland does not consume as much natural gas as the deal calls for, the possible re-export of Norwegian natural gas from Poland to the Baltic states would take care of the excess natural gas on the Polish market. Lithuanian and Estonian officials have expressed their interest in receiving natural gas from Poland, which would require the Baltic supply network to be linked to Poland. Approximately 120 miles of pipeline would have to be laid from Poland to Lithuania in order to connect the networks. Estonia wants Lithuania, the new presiding head of the Baltic Council of Ministers, to take vigorous action in issues concerning the establishment of a common natural gas pipeline and natural gas supply.

ESTONIA

Since regaining its independence from the soviet Union in 1991, Estonia has moved rapidly to reorient itself to the West, adopting market reforms and luring foreign direct investment, especially from Finland. The country has made substantial progress integrating with the West, gaining membership in the World Trade Organization (WTO), and applying for membership in the EU and NATO. As a result of the rapidity with which Estonia adopted political and economic reforms, the country was invited to begin EU accession negotiations in the first wave of new members, putting Estonia on the fast track to become an EU member.

Russia remains the major power in the region, and because Estonia has a sizable ethnic Russian population in the northeastern part of the country, Estonia's political and economic activities necessarily take into context the country's huge neighbor to the east. In addition, because of its lack of indigenous energy resources aside from oil shale, Estonia still is dependent on Russia for the majority of its energy supplies. After falling into recession in 1999, when the effects of Russia's 1998 financial crisis reverberated through the Estonian economy, Estonia rebounded to post 6.9% economic growth in 2000. Foreign direct investment, which was equal to 7% of the country's real GDP in 2000, has slowed in 2001. Nevertheless, Estonia's economy still is projected to grow by 4.8% for 2001.

Oil

Estonia has no proven crude oil reserves, but *polevkivi* (oil shale) is abundant in the northeastern part of the country. Oil shale provides over 75% of Estonia's total energy supply, making Estonia the only country in the world where oil shale is the primary source of energy. Oil shale is produced by majority state-owned Eesti Polevkivi (Estonian Oil Shale) near Kohtla-Jarve. Oil shale is consumed for power generation by the Eesti Energia and Kohtla-Jarve Soojus electric companies and for shale-to-oil processing by Kiviter AS, which processes the oil shale to produce about 4,400 bbl/d of distillate liquid fuels. Estonia's indigenous oil shale production, however, is not sufficient to meet the country's demand for oil, which stood at 23,000 bbl/d in 2000 and is projected to remain relatively constant in 2001.

Eesti Polevkivi's is projecting its oil shale production in 2001 to remain stable at approximately 12 million

tons a year despite the consolidation and restructuring of several of its quarries. The Narva and Sirgala quarries have been unified into one firm (Narva Quarry), while the Kohtla mine and Aidu quarry are being consolidated into one company as well. Eesti Polevkivi also is planning to close the Ahtme mine and to stop oil shale extraction there in 2002. Nevertheless, oil shale mining continues at the Viru and Estonia mines, and Eesti Polevkivi plans to produce around 12 million tons of oil shale per year until 2006.

The impending closure of another mine follows on the 1999 closure of the Tammiku mine and foreshadows the industry's downturn. After 2006, Eesti Polevki is forecasting its production target will shift downward, to 10.5 million tons per year, as Estonia tries to curb pollution from the oil shale industry in an effort to meet EU environmental regulations. Eesti Polevkivi has indicated that it expects the oil shale industry to continue for another 40 years, but no new mines are scheduled to be built, and Estonia is coming under heavy pressure from the EU to cut back significantly on oil shale production. Estonian politicians have announced they will ask the EU to accord special treatment to oil shale, approaching it the same way that the EU does coal, since the problems of the two natural resources are similar.

In February 2001, Narva Elektrijaamad (Narva Power Plants) and Eesti Polevkivi signed a $73-million supply contract for 2001 under which Eesti Polevkivi will sell Narva Power Plants 9.4 million tons of oil shale this year. In 1999, Narva Power Plants used 85% of the total output of Eesti Polevkivi. According to the terms of NRG Energy's (USA) purchase of 49% of Narva Power Plants from Eesti Energia (Estonian Energy, the country's electric utility), Eesti Polevkivi is now a subsidiary of Narva Power Plants. On top of the cost for the power plants, NRG Energy paid $27.6 million for a 51% controlling share in Eesti Polevkivi, and the U.S. energy firm has committed up to $80 million in investment in the oil shale company, including modernizing the technology used at Eesti Polevkivi and renovating its infrastructure.

Downstream/Refining

Estonia has no refineries, so it must import all petroleum products, either by rail or by pipeline.

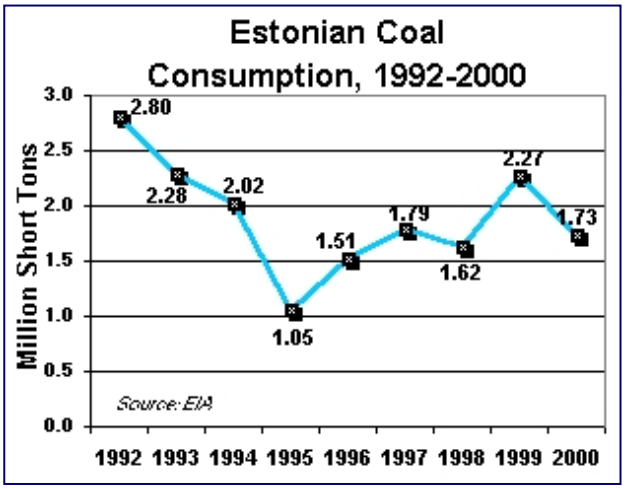
Natural Gas

Estonia has no natural gas reserves and therefore must import all of its natural gas for domestic consumption. Currently, Estonia imports all of its supplies via the country's 250-mile pipeline network from Russia, but Estonia is keen to diversify, and Norway is a potential supplier. Estonia's natural gas consumption collapsed from 53 Bcf in 1992 to just 21 Bcf in 1993 as Estonia attempted to reorient its economy to the West, but the country's consumption of Russian natural gas has crept slowly upwards in ensuing years. In 2000, Estonia consumed 39.6 Bcf of natural gas.

Eesti Gaas (Estonian Gas), the former state-owned gas company that was fully privatized in 1997, is the largest natural gas supplier in Estonia. In November 1999, Eesti Gaas, which is owned by Ruhrgas (Germany, 32%), Gazprom (Russia, 31%), Fortum (Finland, 10%), and Itera (9.5%), signed a long-term agreement with Gazprom to supply Estonia with natural gas from 2000-2005. Over 90% of Estonian district heating stations use natural gas, and natural gas is the primary fuel of the Viru Power Station, which produces both heat and power.

Coal

Estonia does not have any coal reserves or coal production, but the country does import a small amount of lignite, mainly for district heating. Throughout much of the 1990s, Estonia's coal consumption was on the decline, with consumption falling from 2.08 million short tons (Mmst) in 1992 to 1.62 Mmst in 1998.



However, with the rise in oil and oil shale prices that began in March 1999, Estonia turned to coal for more of its energy needs, and consumption shot up to 2.27 Mmst in 1999. In 2000, Estonia's coal consumption was back down, to 1.73 Mmst, and over time, the country's coal consumption is forecast to fall even further as Estonia brings its energy balance in line with EU environmental regulations.

Electricity

With 3.4 GW of electric-generating capacity, Estonia produces ample power to meet its own consumption requirements. The lion's share of this generating capacity comes from Estonia's two oil-shale-fired power plants in the northeast of the country, the 1,610-MW Eesti Elektrijaam and the 1,390-MW Balti Elektrijaam. The two power stations, which together make up the Narva Power Plants, currently supply approximately 95% of Estonia's electricity. Although Estonia has a small amount of hydropower and other renewable energy capacity, the power produced at these facilities costs twice as much as the electricity generated at the oil-shale-fired power plants.

In 2000, Estonia generated 7.1 Bkwh of electricity, which was more than enough to cover the country's overall consumption of 5.4 Bkwh of power. Estonia exports its excess power to Latvia and to northwestern Russia. As Estonia strives to liberalize its energy market in line with EU directives, the country wants the EU to recognize the importance of oil-shale-fired power generation to its economy. If the local power market is opened to imported electricity immediately upon the country's entry into the EU (in keeping with the union's competition policy), Estonian officials are worried that it would lead to a steep drop or even a cessation of oil shale-fueled power generation, creating a social and economic crisis in northeastern Estonia. As a result, Estonia wants the EU to recognize and to accept that the majority of the country's electricity will come from oil shale-fueled power plants until at least 2015.

Prior to 1995, all of Estonia's electricity had been produced entirely by Eesti Energia, the state-owned electric company, but in 1996, the first steps towards privatization were taken with the establishment of the joint-stock company Kohtla-Jarve Soojus comprising Estonia's two smaller oil shale-fired power plants, the Ahtme and Kohtla-Jarve Power Stations. Then, on August 25, 2000, after more than four years of negotiations, the Estonian government finalized a controversial $70.5 million deal to sell a 49% stake in the Narva Power Plants to NRG Energy. As part of the deal, NRG Energy also was to receive a 51% share of Eesti Polevkivi, the state oil shale firm. In June 2001, in an effort to appease domestic critics of the deal, including former Estonian President Lennart Meri, NRG agreed to pay an additional $27.6 million for the stake in Eesti Polevkivi, completing the final sale details.

Under the terms of purchase, NRG committed to investing approximately $361 million in reconstructing and refurbishing the Soviet-era Narva Power Plants and making environmental improvements. In September 2001, Eesti Energia and NRG Energy signed a contract with three international banks for a 14-year, $280-

million loan to begin renovation of the Narva Power Plants. Two energy blocks at the Eesti and Balti power plants will be renovated by Finland's Foster Wheeler Energia, with renovation starting with the Eesti power block. In addition, a portion of the loan money will be spent on reconstruction of Eesti Polevkivi oil shale mines.

As a condition of the privatization terms of Narva Power Plants, the Estonian government stipulated that NRG Energy must ensure that the Estonian energy market becomes part of the European energy market. Estonia's power grid is configured to the old Soviet power grid, and as Estonia reorients itself to the West and moves towards EU integration, one of the country's security-political priorities is to create an energy connection to the West European electricity grids. In the meantime, in February 2001, Estonia, Latvia, Lithuania, Belarus, and Russia signed an agreement formalizing their already existing arrangement to cooperate in the power sector by connecting their energy grids and by sharing power supplies.

LATVIA

In the decade since Latvia declared its independence from the Soviet Union, the country has moved rapidly towards integration with Europe. Latvia has applied for membership in both the EU and NATO, and in February 1999, Latvia became the first Baltic state to join the World Trade Organization. In addition, in December 1999, Latvia was invited to begin accession talks with the EU in the so-called "second wave" of EU aspirants, and membership in the organization is a top foreign policy priority.

Relations with Russia still color many of Latvia's activities. In addition to ongoing citizenship questions surrounding Latvia's large ethnic Russian minority, the Latvian economy is tied to Russia's since Latvia is dependent on Russian oil and natural gas exports for its domestic consumption. Nevertheless, Latvia weathered the brunt of Russia's 1998 financial crisis without falling into a recession, and in 2000 Latvia's real GDP growth bounced back to a healthy 6.6%. Most small- and medium-sized enterprises have been privatized, and energy sector privatization and energy market liberalization is underway. With the transition to a functioning market economy nearly complete, the country's real GDP is projected to grow another 6.5% in 2001.

Oil

Latvia has no domestic oil production or refineries, so it is entirely dependent on imports of petroleum products to meet its consumption needs. Since 1992, when Latvia consumed an average of 52,200 bbl/d of oil products, domestic consumption has been on the decline, dropping to 25,000 bbl/d in 2000. Latvia imports all of its oil in the form of refined productst, mostly from Russia, Belarus, and Lithuania, with only a small amount coming from the EU.

In April 2001, Latvia announced a tender for licenses to search, explore, and develop oil deposits in the Latvian territorial waters in the Baltic Sea. The Latvian Development Agency claimed that the licenses covered fields possibly containing up to 733 million barrels of oil, although analysts have estimated the country's possible offshore oil reserves at 300 million barrels of crude oil. On October 31, 2001, the closing

date for bids for oil exploration, Latvia announced that one bidder, the U.S.-Norwegian joint venture TGS Nopec, had applied for a license. The non-exclusive exploration license, which will enable TGS Nopec to carry out exploration activities but not oil extraction, is for two years, although Latvia retained the right to extend the term of the license for up to five years.

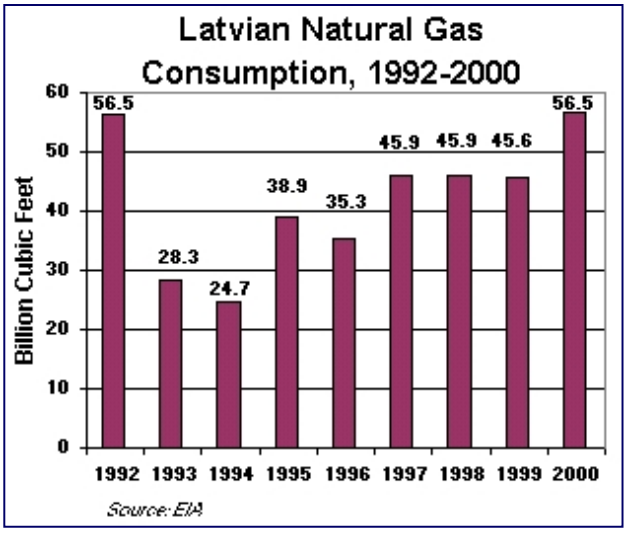
Bids for exploration and production licenses, which will grant exploration and production rights for up to 30 years, are due by January 25, 2002. Exploration and production in the tract covered by the tenders, which is close to Liepaja, had been delayed for several years due to Latvia's border dispute with Lithuania. In 1996, the Latvian Economics Ministry had issued oil licenses to Amoco (now BP Amoco) and OPAB (Sweden) to explore the Baltic shelf of the then-unidentified tract, but the deals were never signed after Lithuania vehemently protested and the border talks reached a deadlock. Latvian and Lithuanian officials initialed a border agreement in May 1999. Experts estimate that actual oil extraction in the tract will start only in five to six years after oil is found there.

Downstream/Refining

Although Latvia currently has no refineries, Russia's Lukoil has been considering building a small refinery in the country. After Lithuania decided to sell its Mazeikiai refinery--the only only refinery in the Baltics--to Williams International (USA) rather than to Lukoil, the Russian oil giant announced plans to build a $200-million, 40,000-bbl/d-capacity refinery in Latvia as an alternative refinery in the Baltics to compete with the Mazeikiai refinery. However, Lukoil has not set a timetable for when it might construct this refinery.

Natural Gas

Since Latvia has no domestic natural gas reserves, all of the country's natural gas for domestic consumption is imported, mainly from Russia. After fluctuating wildly in the first few years after independence, Latvia's domestic consumption of natural gas climbed to 56.5 Bcf in 2000, matching its 1992 total. Of this total, approximately 50% is consumed by the country's main electric utility, Latvenergo. Latvia's natural gas consumption is predicted to increase in the coming years as the country aligns its energy consumption patterns with EU directives.



Latvijas Gaze (Latvia Gas) controls the country's natural gas distribution system and its huge underground storage facility near Riga at Incukalns, the only natural gas storage facility in the Baltics and the third-largest storage facility in Europe. The former state-owned company has been restructured as a joint-stock company and has been substantially privatized, with the state holdings in the company reduced to just 8% after another 2% of the government's share was auctioned off in December 2000. Latvijas Gaze's largest shareholders are Gazprom, Germany's Ruhrgas and Eon Energie AG, and Itera Latvija, a subsidiary of Itera.

With a number of large storage facilities that can hold more than 70 Bcf of natural gas, Latvia has the potential to play an important role in Russia's bid to supply natural gas to Scandinavia via the proposed North TransGas pipeline. Latvijas Gaze typically pumps natural gas into the 141 Bcf-capacity Incukalns storage facility during the spring and summer, drawing it down as needed during heating season in the winter. Latvia has a number of other large natural gas storage facilities, and Gazprom exports a portion of

the natural gas stored in these facilities to Estonian, Lithuanian, and Russian consumers, while Latvijas Gaze is charged for the natural gas which is distributed within Latvia. An additional 7 Bcf of natural gas was pumped into Incukalns in the fall of 2001 as part of a project to increase the reservoir's storage capacity to 177 Bcf by 2005.

In late-October 2001, the Latvian Cabinet of Ministers approved a concept to liberalize the country's national gas market gradually in line with EU requirements (Latvia has concluded the energy chapter of its accession negotiations with the EU). Drafted by the Latvian Economics Ministry, the concept envisages market prices and promises to open up the market to multiple suppliers; currently, Gazprom is Latvia's only natural gas supplier. The Ministry's plan stipulates that Latvia's energy law should be amended by April 2002 in order to meet the EU directives concerning gas market liberalization. The EU has conceded that Latvia's lack of alternative pipeline routes make it impossible for the country to immediately open up its natural gas market to non-Russian suppliers.

Previously, in May 2001, the Latvian government had rejected amendments to the country's energy law, proposed by Latvijas Gaze's shareholders, that would have stopped natural gas price regulation for industrial consumers. In early October 2001, Latvijas Gaze took the Latvian government to the international court of arbitration over the state's failure to liberate natural gas prices for industrial consumers. Latvijas Gaze claimed that it was unable to recoup its rising production costs without instituting a price increase.

Coal/Peat

Latvia has no domestic coal reserves or coal production. The country imports a small amount of coal, mostly from Poland. Consumption has been on the decline since independence: in 1992, Latvia consumed 0.74 Mmst of coal, but by 2000, that figure had fallen to 0.15 Mmst. The drop reflects Latvia's attempt to shift its energy balance towards cleaner fuels in line with EU environmental standards.

Latvia produces about 500,000 metric tons of peat each year, as well as a substantial amount of wood for fuel. All peat production companies in Latvia have been privatized, but most of the peat deposits are still owned by municipal governments, which rent the deposits for extraction. There are now approximately 25 peat extraction companies. Peat covers approximately 10% of Latvia's territory, with the heaviest concentration in the eastern plains near Riga.

Electricity

Hydroelectricity plays a key role in the Latvian power sector. Nearly 73% of the country's 2.1 GW power-generating capacity is hydroelectric, and hydropower accounted for about 67% of all power produced in 2000, with the remainder generated by thermal plants using natural gas and, to a lesser extent, peat and fuel oil. The three hydro plants, Kegums-Plavinas-Riga, constitute the Daugava cascade located on the Daugava River. All three hydro plants have recently been modernized, with the Kegums hydropower station, built in 1939, officially re-opened in August 2001 after $21 million worth of renovation to extend its service life for another 40 years.

Hydroelectric power plants on the Daugava River are Latvia's main power producers, but their output, along with the TEC-1 and TEC-2 power plants that constitute 97% of Latvia's thermal power-generating capacity, is insufficient to cover the country's power needs. In 2000, Latvia produced 3.3 Bkwh of power domestically, but imported power was necessary to meet the country's electricity demand of 5.2 Bkwh, which was down nearly 31% from the 7.5 Bkwh Latvia consumed in 1992.

With the fluctuations in water levels affecting the output of its hydropower plants, at times Latvia has been forced to import between 30% and 40% of its electricity. According to Latvenergo, the country's state-run electric utility, in the first nine months of 2001 Latvia's electricity consumption grew 2.5% over the same period in 2000, with Latvenergo importing 24% of the total power consumed. Latvia regularly imports electricity from Estonia and Lithuania, both of which have excess capacity. The agreement between Latvia, Lithuania, Estonia, Russia, and Belarus to connect their electricity grids and to share power supplies when needed will give Latvia access to additional electricity imports.

Latvenergo, the country's largest company and the operator of all of Latvia's major hydro and thermal power plants, as well as the transmission and distribution system, was scheduled to be privatized in 2000, but public opposition to foreign ownership forced the Saeima (the Latvian parliament) to amend the country's energy law to prevent the company's privatization. Prime Minister Andris Berzins, who took office in May 2000 promising to speed up privatization, was dealt a major rebuke by the canceled privatization as the World Bank had made restructuring and privatizing Latvenergo by December 2001 one of the conditions for a 3-year, $120 million loan package signed in March 2000.

In October 2000, however, the Latvian government accepted a plan for the utility's reorganization. The reorganization, which will be guided by the EU directive with regard to energy market liberalization, is geared to prepare the utility for free market conditions. The EU directive demands that production, transmission, and distribution of power be separated at least as far as necessary to review their accounting reports and operations as individually and transparently as if they were completely independent companies. Large, so-called "qualified" electric power consumers already can choose alternative suppliers, and actual liberalization of Latvia's electric power market could take place by 2007, according to Latvenergo President Karlis Mikelsons.

Some Latvian privatization officials have warned that Latvenergo's energy distribution system may deteriorate unless there is a new influx of investment. In September 2000, Berzins announced that Latvenergo will increase its energy tariffs by an average of 9% annually over the next 10 years in order to finance renovations and repairs to its electric power generation and distribution system.

LITHUANIA

In March 1990, Lithuania became the first country to declare its independence from the Soviet Union. Since that time, the country has made efforts to reorient itself towards the West, applying for membership in the EU and NATO and taking steps to integrate its economy with Europe. The transition to a market-oriented democracy has proceeded relatively smoothly, although the repercussions of a controversial oil industry privatization in 1999 continue to be felt in the political sphere, with several changes in government in the past two years. In December 1999, Lithuania was invited to begin EU accession talks, and as Lithuania continues to fulfill membership requirements, the country is expected to become a member of the EU later in this decade.

Relations with Russia still affect much of Lithuania's activities

and, like Estonia and Latvia, the country remains heavily reliant on Russia for oil and gas supplies. In addition, as the Baltic state that has conducted the most trade with Russia, Lithuania faced its own economic and financial crisis in 1999 after the government's inadequate response to Russia's August 1998 financial crisis. Lithuania's economic recovery has been slow. Although the country climbed out of recession in 2000 with real GDP growth of 3.9%, the unemployment rate (11.5% in 2000) was at its highest point since independence. The unemployment rate is projected to increase to 12.7% for 2001, but inflation has remained low and economic growth is expected to accelerate to 4.6% for the year.

Oil

Lithuania has 12 million barrels of proven reserves, but the country's estimated total onshore oil resources amount to 337 million barrels, with reserves in the Lithuanian shelf of the Baltic Sea estimated between 220 million and 440 million barrels. Geonafta, Lithuania's oil exploration company, and several joint ventures are undertaking onshore drilling projects in western Lithuania. Minijos Nafta, the country's biggest oil producer, produced approximately 60% of the country's oil in 2000, when Lithuania's overall oil production increased to 6,000 bbl/d at 10 oil fields. Lithuania's oil production is projected to decline slightly in 2001, to 4,500 bbl/d, but with an average rate of 66,000 bbl/d of consumption, the country remains a net oil importer. Russia is Lithuania's main supplier of crude oil.

After winning its independence from the Soviet Union, Lithuania reorganized and unified much of its oil industry, creating Mazeikiu Nafta by merging the Lithuania's only refinery (the 263,000-bbl/d-capacity Mazeikiai refinery), Butinge Nafta (which operates a new oil terminal at Butinge that is connected by pipeline to the Mazeikiai refinery), and Naftotiekis of Birzu (which operates the Birzu oil pipeline bringing Russian crude oil into Lithuania via the Russian Druzhba pipeline). The unified company accounts for between 5% and 10% of the country's nominal GDP.

In October 1999, Lithuania concluded a controversial $150 million agreement to sell Williams International (USA) a 33% stake in Mazeikiu Naftu. The deal gave Williams, which committed another $650 million in investment and modernization, operational control of the refinery, pipeline and crude terminal, as well as the right to buy a majority stake within five years. In addition, the Lithuanian government promised to cover a $350 million capital deficit that the company had incurred. The deal also included provisions allowing a 10% stake to be transferred to financial institutions such as the European Bank for Reconstruction and Development (EBRD) and 10% to oil suppliers.

In addition to opposition from Lithuania's citizens, who were upset at the terms of the sale, Russian oil giant Lukoil was dismayed to be shut out of the partial privatization. Lukoil, the coordinator of Russian oil exports to Lithuania, had offered the Lithuanian government guarantees for an annual supply of 120,000 bbl/d of oil, provided that it be given an equal opportunity to participate in the privatization of the Mazeikiai refinery. When Lithuania's government expressed its preference to sell to Williams, Lukoil immediately began reducing oil supplies to the refinery.

Downstream/Refining

As a result, oil supply problems caused several shutdowns of the Mazeikiai refinery in 2000-2001, and Mazeikiu Nafta suffered $40 million in losses in 1999. In May 2000, Williams and Lukoil reached a tentative oil supply agreement, but the deal fell through. In 2000, the Mazeikiai refinery processed 98,000 bbl/d of oil, which was a 7% increase over 1999, but still far below the refinery's 263,000-bb/d capacity. Mazeikiu Nafta and Karazhbasmunai (Kazakhstan) had signed a 3-year oil supply deal in July 2000, with

supplies to Lithuania to reach as high as 60,000 bbl/d, but the lack of of an agreement with Russia regarding transportation tariffs has kept the agreement from being implemented.

The continued shortage of crude supplies left Mazeikiu Nafta with another $45 million in losses in 2000, and $18 million in losses in the first quarter of 2001 alone had the company facing possible bankruptcy. In June 2001, however, Williams reached an oil supply deal with Yukos, Russia's second-largest oil company, that should help the refinery overcome its supply problems. According to the 10-year agreement, which Lithuania's parliament ratified in August 2001, Yukos, already the refinery and oil terminal's biggest supplier, will guarantee to supply almost 100,000 bbl/d each year to the refinery, plus an additional 80,000 bbl/d per year for export through the Butinge terminal owned by Mazeikiu Nafta.

In exchange, Yukos received the right to buy 26.9% of Mazeikiu Nafta, becoming an equal partner with Williams, whose stake in the company decreased to 26.9% while the Lithuanian government's stake in Mazeikiu Nafta decreased from 59% to 40.6%. Williams retains management control of the company. Yukos, which provided over 38% of the refinery's supplies in 2000, began providing approximately 72,000 bbl/d to the refinery starting in July 2001. The refinery has a target figure to process 7 million tons of oil (140,500 bbl/d) in 2001, and through the first nine months of the year, Mazeikiai had refined 5.07 million tons of oil (135,757 bbl/d), an increase of 35% over the same time period in 2000.

In March 2000, Mazeikiu Nafta announced that it planned to borrow around $150 million for a modernization project in the Mazeikiai oil refinery. According to the plan, the first stage of the refinery's modernization will cost an estimated $400 million and take four years to implement. The EBRD has expressed its interest in participating in the refinery's modernization since Williams bought its stake in Mazeikiu Nafta in 1999.

Natural Gas

Lithuania has minimal natural gas reserves and no natural gas production, making the country completely reliant on imports. Lithuania consumed 91.8 Bcf of natural gas in 1999, which is 35% less than the country consumed in 1992 just after its independence. In December 1999, Lietuvos Dujos (Lithuanian Gas), the state-owned company that controls Lithuania's natural gas transmission, distribution, and export operations, signed a long-term agreement with Russia's Gazprom, starting with 53 Bcf in 2000 and increasing to 88 Bcf in 2005.

Itera also has begun supplying the Lithuanian market with Russian natural gas, and in line with the Lithuania's national energy strategy to diversify its supply sources, Lithuania is looking to Poland to supply it with Norwegian natural gas. Poland, which recently signed a 6-year, $11-billion deal to import a total of 2.6 Tcf of natural gas from Norway, hopes to build another part of a natural gas pipeline from Gdansk to Lithuania by 2004.

In October 2001, the Lithuanian government made a final decision on the privatization plan for Lietuvos Dujos. The plan calls for selling a 34% stake to a Western strategic investor and a 34% stake to a Russian gas supplier and its partners in Lithuania. The Western strategic investor, which will receive management control of the company, will be required to upgrade the gas distribution network, to ensure alternative natural gas supply sources, and to integrate the network with Western Europe (since Lithuania currently has no alternative to Russia for its natural gas supplies). The Lithuanian government, which currently owns 92.4% of Lietuvos Dujos, will hold on to a 24% share and sell it later on the stock exchange.

The Lithuanian government attempted to privatize Lietuvos Dujos in 1997, but the privatization failed because the company was not restructured first. In May 2000, the Lithuanian Cabinet of Ministers passed regulations for re-organization of the company, and in early 2001 the government approved privatization of Lietuvos Dujos. However, the privatization is already nine months behind schedule, and delays in reforming the country's natural sector caused have concerned the World Bank, which in June 2001 postponed the extension of a $50-million loan, the second tranche of its $100 million structural adjustment loan. Gazprom, Itera, and Williams International have all expressed interest in bidding in the privatization tender.

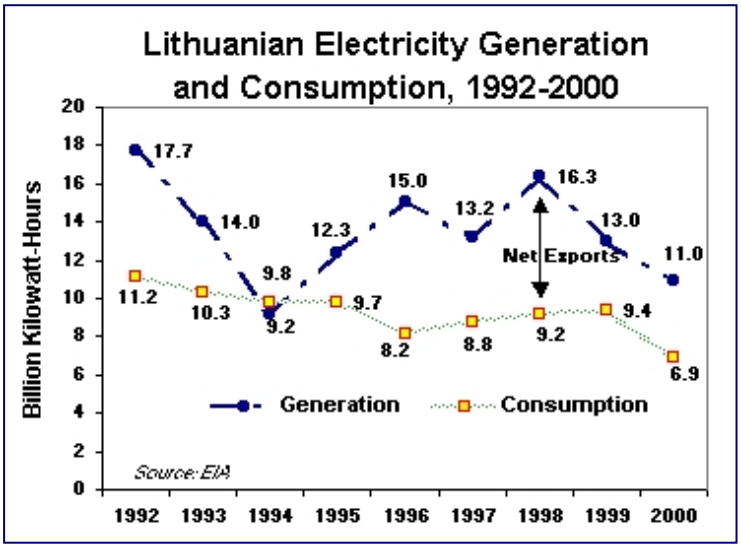
Coal

Lithuania produces no coal. Small amounts of coal are imported by Lietuvos Kuras, a joint-stock company that operates Lithuania's service stations. In 2000, Lithuania consumed 0.18 Mmst of coal, down 75% from its consumption level of 0.73 Mmst in 1992.

Electricity

With a generation capacity of 5.8 GW, Lithuania's power sector generates substantially more electricity than the country consumes domestically. In 2000, Lithuania produced 11.0 Bkwh of electricity compared to 6.9 Bkwh of domestic electricity consumption. In 1994, however, Lithuania actually consumed more electricity (9.8 Bkwh) than it produced (9.2 Bkwh), owing to a substantial decrease in electricity generation in the first few years after Lithuania's independence from the Soviet Union. In the past seven years, the country's electricity generation has rebounded and has outpaced domestic consumption, leaving Lithuania with excess power to export to neighboring countries.

Lietuvos Energija (Lithuanian Energy), a joint-stock company formed by the reorganization of the Lithuanian state power system in 1995, is the largest electric power company in Lithuania. Lithuania holds an 86.5% share in the company, with Vattenfall, a Swedish utility, owning an additional 10.1%. Besides transmitting and distributing all electricity generated in Lithuania, Lietuvos Energija owns the Ignalina Nuclear Power Plant, which generated over 70% of the country's electricity in 2000, as well as all major conventional fuel power plants in Lithuania, including Elektrenai, Kruonis Hydro Power Plant, Kaunas Hydro Power Storage Plant, and Mazeikiai Combined Heat and Power Plant. In 1998, the Vilnius Power Station became independent of Lietuvos Energija.



In August 1999, Lithuania's Ministry of Economy and the Lietuvos Energija Board of Directors approved the main guidelines for the restructuring of the company. Additionally, in January 2001, the Lithuanian parliament passed a law on the company's restructuring, paving the way for privatization of Lithuania's electricity industry. According to the restructuring plan, which the company has approved, Lietuvos Energija is to be split into five companies, including separate generation, transmission and distribution companies. No privatization timetable has been set for the soon-to-be-created companies, but Vattenfall previously confirmed its intention to increase its share in Lietuvos Energija, and several companies have expressed an interest in Lietuvos Energija's distribution network.

Nuclear

Lithuania is more dependent on nuclear power than any other country in the world. Nearly 73% of all of Lithuania's electricity is generated by the country's sole nuclear power plant, the massive, 2,370-MW Ignalina Nuclear Power Plant. However, the EU has expressed safety concerns over the Ignalina station, which is of the same Soviet-era design as Ukraine's ill-fated Chornobyl Nuclear Power Plant. Despite a number of safety measures introduced at Ignalina over the past decade, the EU considers the plant's two power units to be dangerous, and as a result the EU has made closure of the Ignalina plant a pre-condition for Lithuanian membership in that organization.

In exchange for the right to begin EU membership negotiations, in 1999 Lithuania's parliament pledged to take Ignalina-1 out of operation by January 1, 2005, while a decommissioning date for the second reactor is still undecided. Lithuania had planned to decide the fate of Ignalina-2 in 2004, but the EU has insisted that a decision on its closure should be made in 2002. The EU previously has tried to convince Lithuania to shut down the second reactor before 2009.

To facilitate the closure and to develop alternative sources of power, the EU announced at the end of 1999 that it would provide additional aid to Lithuania through its Phare program. In June 2000, representatives from countries around the world pledged nearly $195 million to help Lithuania shut Ignalina-1. However, preliminary estimates for shutting down only the first reactor block come to $530 million, while about $1 billion will be needed for the closure of the second reactor block. According to Lithuanian energy officials, the country also needs $910 million to modernize its non-nuclear power plants and transmission lines to ensure generation after Ignalina-1 is closed.

The most critical project is modernization of the 1,800-MW combined heat and power Lithuanian Power Plant (LPP). The LPP, which can run on both oil and gas, was built between 1962 and 1972 and operated at full capacity until 1992. Although the LPP has used over 80% of its technical lifetime, a Lithuanian government study has shown that it is less costly to modernize the plant than to build a modern plant of similar size. Once Ignalina shuts down, the LPP will be the country's primary source of power generation. Between 2001 and 2005, $13 million will be needed to renovate the LPP, with a further $264 million needed between 2006 and 2010.

A second project is renovation of the Kaunas combined heat and power plant, a 170 MW unit built in 1960 that also runs on gas or oil. Modernization is estimated to cost $13.2 million between 2001 and 2004, and Lithuanian officials hope to increase the plant's capacity by 100 MW when Ignalina-2 is closed. Another $331 million will be needed for modernizing Lithuania's transmission grid, a two-stage project planned for 2001-2005 and 2006-2010. About a quarter of the grid's substations have been operating for more than 30 years, and a significant amount of the equipment is obsolete.

BELARUS

Unlike the Baltic countries, Belarus has been reluctant to adopt structural and political reforms since becoming independent from the Soviet Union in 1991. After winning election to the presidency in 1994, Alyaksandr Lukashenko re-imposed administrative controls over prices and currency exchange rates, and expanded the state's right to intervene in the management of private enterprise. As a result, Belarus has seen little structural reform over the last seven years, and the International Monetary Fund (IMF) stopped lending to Belarus in 1996.

President Lukashenko's authoritarian policies and refusal to liberalize the economy have led to the country's isolation from the West. Only a few small businesses have been privatized, and there is little foreign investment in any sector of the Belarus economy because of the poor investment climate, as well as the very high rate of inflation (which slowed from 251% in 1999 to 107% in 2000). Nevertheless, Belarus has maintained a very close relationship with Russia, and boosted by Russian imports, the country's real GDP recovered from the effects of the 1998 Russian financial crisis to post 5.8% growth in 2000. On September 9, 2001, Lukashenko was re-elected president with a reported 75% of the popular vote.

Oil

Belarus has a small oil industry, and the country produced 37,000 bbl/d of oil in 2000. The country has 198 million barrels of oil in proven reserves, but the lack of political and economic reform in the past decade has hindered any investment to boost production. Belarusnafta, the state-owned oil production monopoly, estimates that active oil deposits may last for another 17 years, with more difficult deposits (e.g. those with a water content of over 80% or with high viscosity) lasting for 34 years, taking into account the company's plan for oil extraction will remain around 40,000 bbld/d.

Although oil consumption in Belarus has fallen by more than half in the past decade, from 375,000 bbl/d in 1992 to approximately 145,000 bbl/d in 2000, Belarus still must import nearly 80% of its oil. Most of this comes from Russia, as the northern branch of Russia's 1-million-bb/d-capacity Druzhba oil export pipeline runs through Belarus on its way to the oil terminal in Ventspils, as well as to Poland and Germany. Oil exported from Russia via Belarus (approximately 50% of Russia's net oil exports go through Belarus) is not subject to export duties due to the Russian-Belarussian Union agreement, which, along with high oil prices in 1999 and 2000, contributed to a significant increase in the amount of oil flowing through the pipeline and to Belarussian refineries.

Belarus also has been granted licenses for oil exploration and production in Russia. Belarus and Russia already jointly own the Slavneft oil company, and the two governments have signed agreements allowing Belarus to produce oil in several autonomous regions in Russia. In September 2001, Slavneft and Belneftekhim, the Belarussian state-run oil and chemical concern, founded the Slavic Oil Company, and Slavneft immediately reassigned its license to produce oil in the Taidakovskoye oil field in Western Siberia to Slavic Oil. The Taidakovskoye field in the Khanty-Mansi Autonomous Area is estimated to contain 454 million barrels of oil reserves. The oil produced is to be delivered to Belarussian refineries, with the

processed products to be sold both in and outside of Belarus.

Downstream/Refining

As one of the former Soviet Union's major industrial republics, Belarus specialized in the production of machinery and equipment, and the country's industrial base, as well as its location as a transit point, meant that it inherited a sizable refining industry. Although some excess capacity has been shuttered, Belarus has two refineries, the Naftan refinery in Navapolatsk Vitsebsk Region and the Mazyr refinery in the Homel Region, with a combined refining capacity of 493,000 bbl/d--still far higher than the country's oil production and its consumption needs. In addition, despite increased Russian oil exports, Belarussian refineries received reduced supplies from Russia during much of 2000 and 2001 as Russian exporters shipped their oil to Western customers able to pay market prices.

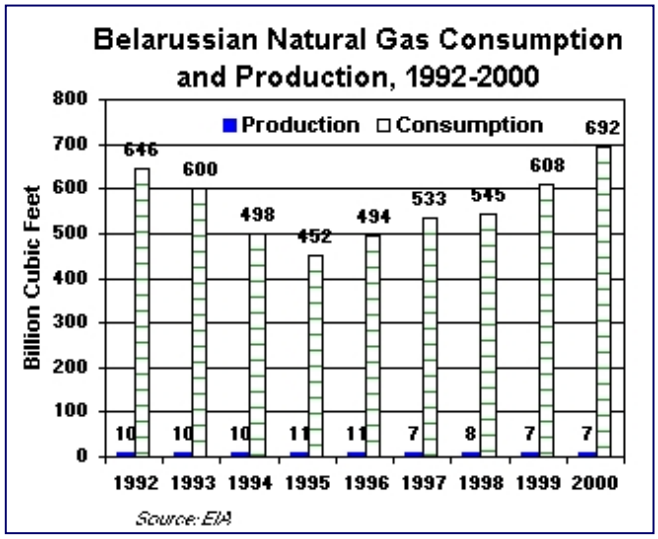
In September 2000, the Mazyr refinery's management completed an agreement with the Belarussian government to carry out the fourth stage of modernization at the refinery. According to Belapan, the Belarussian state news service, once the upgraded Mazyr refinery is completed in November 2003, it will become one of the most modern oil-processing plants in the CIS. Over $28 million was invested in the modernization of the refinery, with the total cost of the project estimated at $120 million. The Naftan refinery also is scheduled for modernization after signing a $90-million framework contract with Mitsui (Japan).

Natural Gas

Belarus is heavily reliant on natural gas imports from Russia. Belarus produced only 7 Bcf of natural gas in 2000 while the country's natural gas consumption, buoyed by a return to economic growth, rose to 692 Bcf. Due to Belarus's inadequate natural gas pricing structure and payment recovery from consumers, the country has built up large arrears to Russia's Gazprom. In April 2001, Gazprom and Beltransgaz, the Belarussian state-run gas distributor, signed an agreement on restructuring debt for the natural gas supplied to Belarus over 1997-1999.

Under the agreement, $40 million of Beltransgaz's direct indebtedness and $37.2 million of overdue-payment will be paid off over three years by supplying Belarussian tractors and Beltransgaz bills of exchange. Since the agreement, Belarus has paid Gazprom on time, leaving Belarus's total debt to Russia for natural gas at $183 million as of September 2001. Despite Belarus's debts to Russia for natural gas supplies, Gazprom has continued to supply Belarus with natural gas at the low price of $30 per 1,000 cubic meters in 2001.

Russia charges Belarus lower prices for natural gas since Russia receives reduced tariff rates for its natural gas that transits Belarus to customers in Western Europe. Beltransgaz, which operates 3,780 miles of natural gas pipelines in Belarus, charges Russia a transit tariff that is approximately one-third of the tariff in other countries. More than 883 Bcf of Russian natural gas transited Belarus via the Northern Lights and Yamal-Europe I pipelines to customers in Western Europe in 2000, and with the second extension of the Yamal-Europe I pipeline beginning operation earlier in 2001, Belarussian gas transit volumes for 2001 are estimated to exceed 1 Tcf.



Beltransgaz has said that the Belarussian natural gas transportation system is developing so that when the third extension of the Yamal-Europe I gas pipeline becomes operational, and new compressor stations are built, the pipeline's capacity will more than double. Construction of the Krupskaya compressor stations has already begun, and the Minsk and Orsha stations will be built within the next two to three years. By 2005, analysts say, natural gas transit to Europe via the transcontinental Yamal pipeline alone may exceed 1 Tcf.

Additionally, Gazprom announced plans in October 2000 plans to construct a new natural gas export pipeline, the Yamal-Europe II, that would run via Belarus. Gazprom's proposed route for the pipeline would link to the existing Northern Lights pipeline in Belarus and divert natural gas from crossing Ukrainian territory en route to Poland and Slovakia. Ukraine, which transits significant amounts of Russian natural gas to customers in Europe, has been accused of illegally taking Russian natural gas destined for other customers. Russian and Belarussian authorities have stated that the new pipeline will not lower the volume of natural gas pumped via Ukraine, but Poland has not yet agreed to the pipeline route, which would also lower Poland's transit fees fees. The cost of the Belarussian section of the proposed pipeline is put at approximately $70 million.

Coal

Belarus has no coal reserves, nor any coal production. The country consumed 2.05 Mmst of coal in 1992, but since the fall of the Soviet Union, coal imports have dwindled, and in 2000 Belarus imported only 0.66 Mmst of coal for domestic consumption.

Electricity

Belarus has a power-generating capacity of 7.5 GW. Oil- and natural gas-fired power plants make up 99.9% of Belarus's power generation, with hydroelectric accounting for just 0.1%. Both electricity consumption and generation have declined in the decade since independence, but the country's decaying infrastructure and a lack of investment in maintenance and upgrades has resulted in power generation slipping faster than consumption, leaving Belarus a net importer of electricity. In 2000, the country produced 24.7 Bkwh of power but consumed 26.8 Bkwh.

The Belarussian government has attempted to reduce consumption further by implementing incremental price increases, but fears of accelerating inflation have slowed the implementation of tariff reform to cover the costs of power generation, and price rises have been consistently outstripped by inflation. As a result, the

country's electricity consumption still exceeds its production, forcing Belarus to import about 20% of its consumption needs. As of September 2001, Belarus's debt for imported electricity stood at $69 million, including $19.4 million owed to Russia and $49.6 million owed to Lithuania.

With Lithuania periodically suspending electricity supplies to Belarus in order to force debt payment, Belarus has turned to Russia as its main source for its power imports. In 2000, Belarus consumed approximately 33 Bkwh, of which 7 Bkwh was imported from Russia. In the first nine months of 2001, Belenerha, the state-owned energy utility, imported 4.8 Bkwh of Russian electricity, with an additional 0.7 Bkwh of power imported from Lithuania. In October 2001, Russia's electricity monopoly, Unified Energy Systems (UES), and Belenerha signed an agreement by which UES will supply Belarus with up to 5.5 Bkwh of electricity in 2002.

Table 1. Economic and Demographic Indicators for Selected Baltic Sea Region Countries

Country	Gross Domestic Product (Nominal GDP), 2000E (Billions of U.S. $)	Real GDP Growth Rate, 2000 Estimate	Real GDP Growth Rate, 2001 Projection	Per Capita GDP, 2000E	Population 2000E (Millions)
Estonia	$5.0	6.9%	4.8%	$3,515	1.4
Latvia	$7.1	6.6%	6.5%	$3,017	2.4
Lithuania	$11.3	3.9%	4.6%	$3,064	3.7
Total/weighted average	$23.4	5.3%	5.2%	$3,120	7.5

Source: WEFA

Table 2. Energy Consumption and Carbon Dioxide Emissions in Selected Baltic Sea Region Countries, 1999

Country	Total Energy Consumption (Quadrillion Btu)	Petro-leum	Natural Gas	Coal	Nuclear	Hydro-electric	Other Electricity	Net Electricity Imports	Carbon Dioxide Emissions (Million metric tons of carbon)

Estonia	0.10	52.9%	33.9%	17.3%	0%	0.1%	0.2%	-4.3%	2.1
Latvia	0.16	46.4%	29.5%	1.8%	0%	18.3%	0%	4.0%	2.2
Lithuania	0.32	49.5%	23.7%	1.7%	32.7%	1.5%	0%	-9.0%	4.4
Total/ weighted average	0.58	49.2%	27.1%	4.4%	18%	5.9%	0.03%	-4.6%	8.7

Source: Energy Information Administration
Note: percentages may not add up to 100% due to rounding.

Table 3. Energy Supply Indicators, Selected Baltic Sea Region Countries

Country	Proven Crude Oil Reserves, 1/1/01 (Million Barrels)	Natural Gas Reserves, 1/1/01 (Trillion Cubic Feet)	Coal Reserves, 1/1/01 (Million Short Tons)	Petroleum Production, 2000 (Thousand Barrels Per Day)	Natural Gas Production, 2000 (Billion Cubic Feet)	Coal Production, 2000 (Million Short Tons)	Electric Generating Capacity, 2000 (Gigawatts)	Crude Oil Refining Capacity, 1/1/01 (Thousand Barrels Per Day)
Estonia	4 million mt of oil shale	none	none	4.4 (oil shale)	none	none	3.4	none
Latvia	minimal	minimal	none	none	none	none	2.1	none
Lithuania	12	minimal	none	6.0	none	none	5.8	263
Total	12+oil shale	minimal	none	10.4	none	none	11.3	263

Source: Energy Information Administration

Sources for this report include: Agence France Presse, Baltic News Service, The Baltic Times, BBC Former Soviet Union Monitoring Unit, CIA World Factbook, U.S. Department of Commerce's Central and Eastern Europe Business Information Center, Deutsche Presse-Agentur, Dow Jones, U.S. Deparment of Energy, U.S. Energy Information Administration, Environment News Service, Estonian News Agency, The Financial Times, FSU Oil and Gas Monitor, Interfax News Agency, ITAR-TASS, Nefte Compass, PAP Polish Press Agency, PlanEcon, PR Newswire, Radio Free Europe/Radio Liberty, Reuters, RosBusinessConsulting Database, Russian Business Monitor, Russian Economic News, Russian Oil and Gas Report, U.S. Department of State, The St. Petersburg Times, WEFA Eurasian Economic Outlook, and World Markets Online.

LINKS

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August 2002

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Ukraine

Ukraine is important to world energy markets because it is a critical transit center for exports of Russian oil and natural gas to Europe, as well as a major energy producer and consumer in its own right.

Information contained in this report is the best available as of August 2002 and is subject to change.

GENERAL BACKGROUND

Following eight consecutive years of recession, Ukraine experienced its second straight year of economic growth in 2001. Fueled by increases in industrial production and a strong harvest, Ukraine's real gross domestic product rose an impressive 8.9% in 2001, improving on the 5.8% GDP expansion in 2000. Although growth has slowed somewhat in 2002, analysts are still projecting Ukraine's economy to increase by 5.6% overall this year.

Although Ukraine has witnessed a substantial cooling of inflation (6% in 2001, down from 25.8% in 2000) and there has been a marked drop in unemployment, in many ways Ukraine remains mired in the transition from a centrally-planned economic system to a market economy. While the country's recent economic gains appear to signal that Ukraine has turned the corner, the government remains burdened by a 12 billion foreign debt that is continuing to increase.

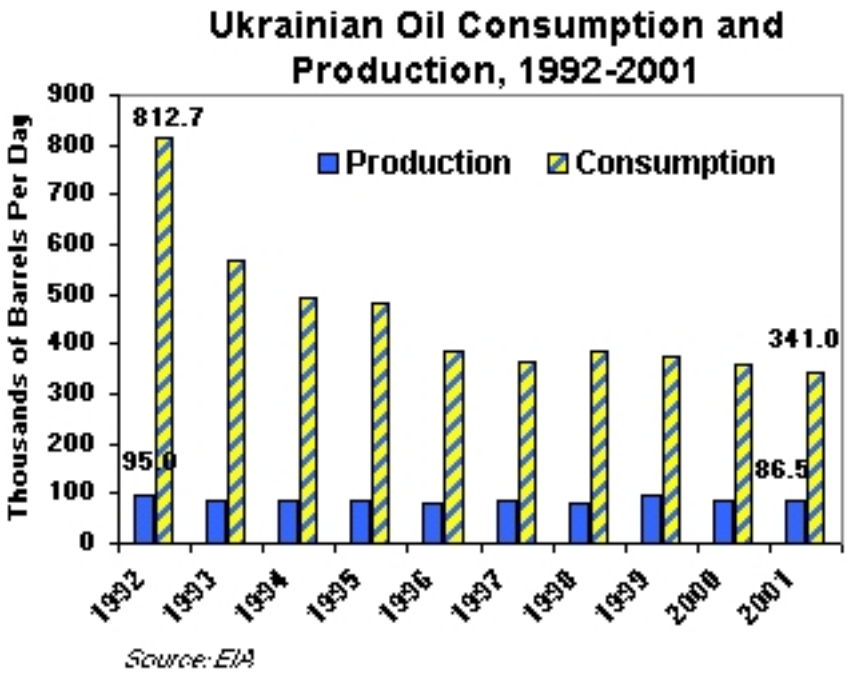
In addition, the confusing web of tax requirements and excessive state interference in the private sector has contributed to a poor investment climate, and the pace of reforms has slowed considerably since Victor Yushchenko was ousted as Prime Minister in April 2001. Yushchenko, a former chairman of the National Bank of Ukraine, pushed through a number of economic reforms during his time in office before he lost a parliamentary vote of no-confidence in Ukraine's parliament, the Verkhovna Rada.

Under the leadership of Anatoly Kinakh, who was installed as Prime Minister by Ukrainian President Leonid Kuchma in May 2001, the Ukrainian government pushed through tax and land reforms in the fall of 2001, but the reform process slowed in the run-up to parliamentary elections on March 31, 2001. Energy sector reforms are still needed, although the Ukrainian government has taken a number of halting steps forward in 2002. Still, Ukraine's energy sector is riddled with debt, and its energy sector suffers from outdated equipment and a lack of funds for modernization. In addition, Ukraine's lack of domestic natural resources means that the country is heavily dependent on Russia for energy supplies, making good relations with its eastern neighbor a necessity.

OIL

Ukraine has 395 million barrels of proven oil reserves, the majority of which are located in the Dnieper-Donetsk basin in the eastern part of the country. Although the pace of exploration has picked up, particularly in Ukraine's sector of the Sea of Azov, Ukraine's oil production steadily declined in the years following the country's independence, from 95,000 bbl/d in 1992 to 82,000 bbl/d in 1998. With the rise in world oil prices in 1999, Ukraine's oil output shot up to 98,500 bbl/d before tailing off again to 88,300 bbl/d in 2000. In 2001, Ukraine produced 86,500 bbl/d of oil, and Naftohaz Ukrainy, the country's state-owned umbrella oil and gas company, reported that oil production is down 0.7% through the first quarter of 2002.

Ukraine's oil production volumes satisfy only about 25% of the country's domestic needs, making Ukraine highly dependent on foreign oil supplies. Although Ukraine's oil consumption has dried up dramatically since it began the transition to a market economy--decreasing 58%, from 813,000 bbl/d in 1992 to 341,000 bbl/d in 2001--the country's consumption still far outstrips its production capacity. Ukraine imports the majority of its oil from Russia, with lesser amounts coming from Kazakhstan.



Oil Transit

With a highly developed oil pipeline system, Ukraine plays an important role as a transit country for Russian oil exports to Europe. The southern branch of the 1.2-million-bbl/d Druzhba pipeline from Russia transits Ukraine en route to Slovakia, Hungary, and on to western Europe.

In addition, due to its geographic location and its oil pipeline system, Ukraine has an excellent opportunity to play a major role in bringing increased oil exports from Azerbaijan and Kazakhstan to European oil markets. Rather than seeking to import Caspian Sea region oil for domestic consumption, Ukraine is hoping to reap tariffs for Caspian oil transiting its territory as it heads westwards.

The chief components of Ukraine's strategy are the newly constructed Pivdenny oil terminal and the 560,000-bbl/d Odesa-Brody pipeline, which cost a combined $750 million to build. Ukraine is hoping to entice Caspian oil exporters shipping oil via the Black Sea to bypass the crowded Bosporus Straits, already a major chokepoint for tankers, and instead send their oil to European markets via Ukraine. However, Ukraine has not yet found any oil companies to fill the pipeline, and the country's attempts to make itself more attractive to investors--by stepping up oil sector privatization efforts or by proposing that an international consortium to manage the pipeline--have seen only limited results thus far.

Refining/Downstream

Ukraine has six refineries, with a combined crude oil refining capacity of just over 1.1 million bbl/d. However, with domestic demand at just over 30% of the country's refining capacity, Ukraine's refineries are operating significantly below capacity. Until recently, Ukraine's refineries did not even receive enough crude oil supplies to supply the country's petroleum product demand.

Ukraine has begun to achieve better results in securing sufficient crude oil supplies for its refineries by offering oil exporters in Russia and Kazakhstan a stake in the country's refineries. Ukraine's recent success in privatizing its refineries has allowed the country to secure additional oil supplies to meet domestic demand, as well as to attract funds for necessary renovation work and to boost utilization rates at its refineries.

Although still operating far below its 320,000-bbl/d potential, throughput has increased at the Lisichansk (LiNOS) refinery since Russian oil major Tyumen Oil (TNK) purchased 67% of the refinery in July 2000. Likewise, with Lukoil's purchase of a controlling share in the Odesa refinery, the Russian oil company agreed to pay $39.6 million of the refinery's debts and promised to supply 48,000 bbl/d of crude to the refinery annually until 2004. Ukraine boosted its imports of petroleum products by 8% in the first quarter of 2002 while crude oil supplies to refineries declined, owing to increased exports of refined products from Russia.

NATURAL GAS

Ukraine has natural gas reserves of 39.6 trillion cubic feet (Tcf). The country's natural gas production, which stood at 636 billion cubic feet (Bcf) in 2000, has remained relatively flat since 1995. In the first five months of 2002, Ukraine produced 272.8 Bcf of natural gas, a 1% year-on-year increase. Of this total, Naftohaz Ukrainy, the country's state-owned natural gas company, extracted 262.2 Bcf, accounting for 96% of the country's total natural gas output.

According to Chornomornaftohaz, a division of Naftohaz Ukrainy, three new natural gas deposits have been found on the southern Sea of Azov shelf in the

last few years. As many as 13 natural gas and condensate and dry gas deposits with a combined 2.6 Tcf of possible reserves are on the shelf, but Ukraine's biggest natural gas deposits are already over 90% exhausted, and many of the country's recently developed natural gas deposits have been quite small. In June 2002, Chornomornaftohaz, which is developing four natural gas fields in the Black Sea, made a proposal to foreign investors to set up a $20 million joint venture to develop the Odesa natural gas field, which holds proven reserves of 389 Bcf.

Still, Ukraine's consumption of natural gas far exceeds the country's natural gas production. In 2000, Ukraine consumed 2.78 Tcf of natural gas, leaving the country dependent on imports for nearly 80% of its consumption needs. Traditionally, Russia has been Ukraine's major source of natural gas supplies, with Ukraine receiving up to 1.1 Tcf per year of Russian natural gas as payment for transiting Russian natural gas to European markets.

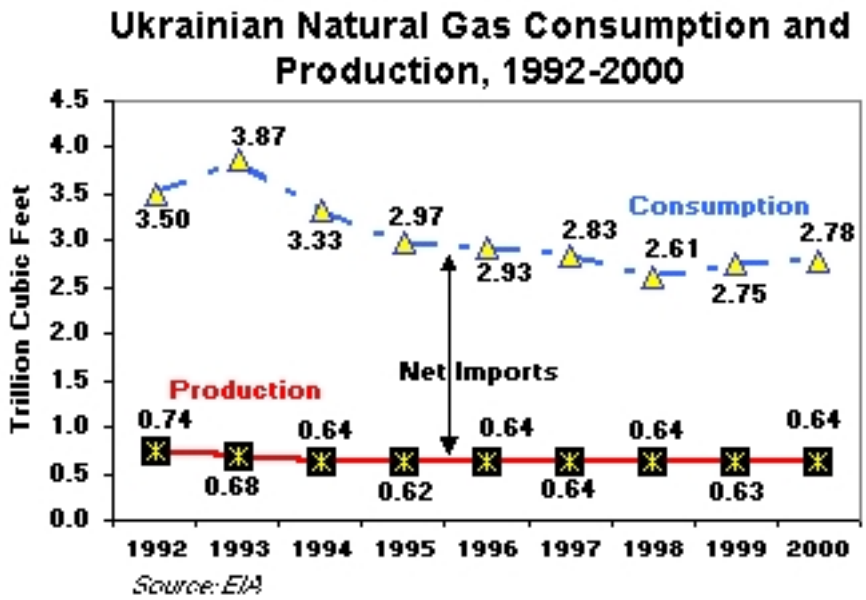
Due to Ukraine's deficiency of indigenous natural gas, Ukraine has been forced to buy additional natural gas from Russia beyond what it receives as compensation for transit. In 2002, for the first time, Ukraine received natural gas from Russia as payment for transit services, but did not buy any additional supplies. Instead, Ukraine imported natural gas from Turkmenistan in order to supplement its own domestic production.

Ukraine-Russia Natural Gas Accords

Ukraine has run up a substantial debt to Russia for natural gas already supplied. In addition, Russia accused Ukraine of illegally siphoning natural gas destined for European consumers between 1998 and 2000, leading to heightened tensions between the two countries and prompting Russia to pursue plans to build a "Ukraine bypass" natural gas pipeline to Europe. Nearly 90% of Russia's natural gas exports travel to Europe via Ukraine.

With Ukraine's continued illegal siphoning of Russian natural gas in early 2000, Russia clamped down, demanding Ukraine pay its nearly $2 billion natural gas debt and halt unauthorized Russian natural gas consumption. In

the fall of 2000, Russia offered to swap Ukraine's natural gas debt for equity in Ukraine's transit pipelines. However, Ukraine balked at the idea, and in May 2001 Ukraine reduced its dependence on Russian natural gas by contracting with Turkmenistan to receive 8.83 Tcf of natural gas between 2002 and 2006. The Turkmenistan deal will provide Ukraine with nearly 60% of its projected natural gas needs during that time period.



In December 2001, the sides broke the deadlock by coming to an initial agreement on Ukraine's debt for Russian natural gas supplies. Ukrainian and Russian negotiators agreed that Ukraine owes Russia $1.4 billion and that the sum will be paid over the next ten years, with no debt payments other than interest to be made in the first three years. In February 2002, the board of directors of Gazprom, the Russian natural gas monopoly, failed to address the issue of the proposed Ukrainian bypass pipeline, a move that analysts said signaled that the company did not have the financial wherewithal to undertake the project.

In June 2002, relations between Ukraine and Russia on the issue of natural gas transit warmed considerably as the sides agreed on a long-term transit agreement, as well as a preliminary deal to create an international consortium to manage and modernize Ukraine's natural gas transit pipeline system. The countries also signed a protocol to an earlier transit agreement, specifying that Ukraine would receive 918 Bcf of natural gas in 2003 as payment for transiting up to 4 Tcf of Russian natural gas to Europe, while Russia agreed to transit 1.06 Tcf of Turkmen natural gas for Ukrainian consumption. In addition, Ukraine agreed to allow Gazprom to operate Ukraine's underground

natural gas storage facilities until 2013.

Future Natural Gas Imports

According to a study by the Ukrainian National Academy of Science, Ukraine's natural gas consumption could double by 2030, while the country's natural gas production may only increase 33% over that time period. As a result, Naftohaz Ukrainy is considering alternative sources of natural gas, including Iran and Norway. However, Mikhail Derkach, deputy chief executive officer of Naftohaz Ukrainy, has stated that it is not beneficial to buy Norwegian natural gas through Poland because of the high cost.

With construction of a natural gas pipeline from Iran to Armenia under development, Ukraine believes that an Iran-Armenia-Georgia-Crimea pipeline is possible, linking the pipeline from Georgia across the Black Sea to Ukraine's Crimean port of Feodosia. Iran is looking to increase its natural gas imports to Europe, and Ukraine is interested in maintaining its position as the major transit point for natural gas to Europe. However, the distance and substantial projected cost of such a pipeline has inhibited the implementation of this plan.

Thus, according to Derkach, Ukraine's most realistic plan is to increase natural gas imports from Turkmenistan. Ukraine currently imports natural gas from Turkmenistan for $42 per 1,000 cubic meters (35,300 cubic feet), which Ukraine pays for 50% in cash and 50% through participation in construction and industrial projects in Turkmenistan. The May 2001 deal is contingent on Ukraine remaining current in its natural gas payments to Turkmenistan, but Ukraine still owes Turkmenistan approximately $280 million for natural gas supplied between 1993 and 1994. The two countries have agreed on a schedule of current debt payments of $46 million for natural gas supplies in 2002.

COAL

Ukraine has 37.6 billion short tons in proven coal reserves, accounting for over 60% of the former Soviet Union's total coal reserves. Most of Ukraine's

coal is mined in the Donetsk/Donbas basin in the eastern region of the country. In the mid-1990s, Ukraine's coal production dropped 43%, from 147.3 million short tons (Mmst) to 83.5 Mmst, before inching back up to 90.3 Mmst in 2000. Through the first five months of 2002, Ukraine produced 31.1 Mmst of coal, 0.4% less than in the same period of 2001.

The decline in Ukraine's coal production during the 1990s was caused in large part by the collapse of domestic demand--which, at 97.2 Mmst in 2000, still exceeds domestic supply--and the closing of heavy industry as Ukraine's economy contracted. Since Ukraine became independent in 1991, the country's coal sector has fallen into disarray: the industry, which counts 193 mines and employs around 450,000 people, suffers from labor strikes, hazardous working conditions, inefficiency and low productivity, corruption, consumer nonpayments, unpaid wages and huge debts, and outmoded equipment.

Ukraine's coal mining sector, which remains heavily subsidized by the Ukrainian government, has the world's highest death rate, mostly the result of obsolete equipment and low safety standards. On July 7, 2002, a fire at the Ukraina mine in eastern Ukraine killed 35 miners, the latest in a series of deadly accidents. Through the end of July 2002, over 150 miners had died in mining accidents in Ukraine this year, following nearly 300 deaths in 2001.

Meanwhile, the industry's debt level has risen to more than $2 billion--over 50% greater than the value of annual production and twice as much as its accounts receivable. Attempts to reform the sector began in 1996 but had little effect as the then-Ministry for Coal concentrated on barter deals, investments and subsidies while lobbying for a ban on coal imports. Although some reforms have begun to take root and wage arrears are beginning to be paid down, coal sector privatization has stalled, and a $300 million World Bank structural adjustment loan that was designed to close down more than 80 loss-making pits between 1997 and 2000 failed to close even half of those mines.

In September 2001, the Ukraine cabinet approved an $8.8 billion program to

revive the country's coal sector over the next ten years. The program recognizes that the industry must switch to cash payments, improve mines, budgeting and asset management, seek investment sources, and reduce the mines' high level of debts before proceeding with further privatization. The program also aims to improve mine safety and work practices, as well as providing for a reduction in the number of coal mines to 157 in 2010. About two-thirds of Ukraine's 193 mines are unprofitable.

The World Bank has criticized Ukraine's coal mining strategy, saying that it contains no major mechanisms that would reduce barter and that the plan closes too few mines too slowly. However, in February 2002, Viktor Yanukovich, the head of administration of the Donetsk coal mining region, described the World Bank's suggested plan to close 50 to 60 mines in the next two or three years as "unacceptable" because it would result in a considerable decrease of jobs in the region. Although Ukraine's mines are expensive to operate, the Ukrainian government has been reluctant to reduce the number of mines due to the social costs of closing so many pits in an area with few other jobs.

Instead, the Ukrainian government plans to hike coal prices for the country's power generators by 10% before the end of 2002 and reduce state subsidies for the sector. Coal prices are to be increased to approximately $28.20 per metric ton, up from the current $25.60 per metric ton. The price hike should help the coal sector raise an additional $165 million after the government cut state subsidies. The Ukrainian government originally planned to spend $324 million to subsidize the coal sector in 2002, but due to a financial crunch can provide only $159 million, according to analysts.

ELECTRICITY

Ukraine's power sector, with 53.9 gigawatts (GW) of installed capacity, is plagued by debt and inefficiency. Thermal power plants (oil natural gas, coal) account for nearly 50% of the power produced in Ukraine, with nuclear power generating another 40%, and hydroelectric accounting for approximately 10%.

With four major thermal-fired power plants with 17 power generators, as well as four nuclear power plants with 13 reactors, Ukraine has enough generating capacity to produce twice its electricity needs. However, due to the inefficient and antiquated transmission and distribution network that the country inherited from the Soviet Union, a significant amount of power generated in Ukraine is wasted via line losses. According to Ukraine's Fuel and Energy Ministry, losses in electricity lines accounted for 21% of the total amount of electricity generated in 2000. Overall, Ukraine produced 163.6 billion kilowatt-hours (Bkwh) of electricity in 2000 against consumption of 151.7 Bkwh.

In February 2001, Russia and Ukraine struck a deal to reconnect their energy grids, providing Ukraine with a more stable electric frequency and allowing Russia to export its electricity to other countries--including Moldova, Romania, Bulgaria, and the Balkans--via Ukraine. Although the grids were supposed to be reconnected on March 1, 2001, the grids were not actually linked until August 2001.

Until recently, Ukraine's power sector also was beset by shortages of fuel for power generators. Since natural gas accounts for over 40% of the primary fuel consumption of Ukrainian thermal power plants, the country's reliance on Russian natural gas affects Ukraine's electricity sector as well. In mid-January 2001, Itera cut off natural gas supplies to four Ukrainian thermal electric power generators in order to force payment of debts for natural gas already supplied. With the recent agreements between Russia and Ukraine on natural gas supplies and transit, as well as a plan for Ukraine to pay its natural gas debts, the problem of natural gas cutoffs to power generators appears be resolved.

Non-payment by consumers is another obstacle hindering the further development of Ukraine's power sector. Although Ukraine's 27 regional energy distributors--called *oblenerhos*--legally are allowed to cut off non-paying customers to reduce losses and enforce payment discipline, in practice

this often cannot be done without government permission. Nevertheless, owing to reforms in the sector and increased economic growth leading to a rise in per capita income, the percentage of power bills paid in cash has risen from below 10% in 1999 to approximately 86% as of July 2002.

With the cycle of debt in the state-run power generating and distribution sectors, Ukraine has been trying to privatize its regional energy distribution companies in order to relieve the government of the heavy debt burden. The country partially privatized the first seven *oblenerhos* in 1998, then sold stakes in another six of the regional distribution companies in April 2001.

However, in May 2001, President Leonid Kuchma ordered a temporary halt to the privatization of the remaining *oblenerhos*, pending a presidential review of the recent privatizations and additional reforms to the sector. In December 2001, Kuchma lifted the ban on the sale of the *oblenerhos*, and Ukraine is hoping to sell controlling stakes in 5 *oblenerhos* before the end of 2002, with the remainder to be sold in 2003.

Nuclear

Ukraine currently has four operating nuclear power plants. These power plants have a total capacity of 11.8 gigawatts, which accounts for approximately 22% of the country's total power-generating capacity. Ukraine's nuclear power plants produce 40% of the country's power output, despite frequent malfunctions and lengthy repairs and maintenance.

On December 15, 2000, Ukraine permanently shut down the 925-MW, Unit 3 at the Chornobyl power plant, disabling the last remaining working reactor at the ill-fated power plant. To replace the power generated by Chornobyl, which Ukrainian officials say produced approximately 5% of the country's total, Ukraine has resumed construction of two 1-GW reactors at the Khmelnitsky and Rivne power plants.

Construction of Khmelnitsky-2 and Rivne-4 was begun under the Soviet Union, and both were more than 80% finished when Ukraine received its

independence and ran out of money to complete them. Ukraine is hoping to finish construction of both reactors with the help of financing from the European Bank for Reconstruction and Development (EBRD), but an EBRD loan for the project was put on hold in December 2001. Russia then offered Ukraine a $500 million loan to allow the country to finish construction of the two reactors, but most experts believe the reactors cannot be completed without additional financing. Ukraine is still negotiating with the EBRD to secure additional financing for the estimated $1.4 billion project.

ENVIRONMENT

The 1986 Chornobyl nuclear meltdown exposed the Soviet Union's negligent environmental record and triggered alarm across the globe. The world's worst nuclear accident created disastrous consequences for the environment, both in Ukraine and in neighboring countries. As a result, Soviet policies that encouraged industrial development at the expense of the environment came under harsh international criticism, and Chornobyl became a rallying cry for environmentalists around the world.

While Chornobyl remains the lasting symbol of environmental degradation in Ukraine, today air pollution in the major cities is a major problem. Yet, despite increased vehicle traffic, energy use is significantly lower now than in the mid-1990s. Although policies encouraging energy conservation and energy efficiency can take some of the credit, Ukraine's economic woes account for much of the reduction: as the economy contracted through the 1990s, industrial production and consumer demand dropped as well, resulting in lower carbon emissions. Ukraine's recent economic growth has led to increases in both carbon emissions and energy consumption.

In terms of energy consumption per dollar, Ukraine suffers from one of the highest levels of energy intensity in the world. The country's heavy dependence on coal makes it correspondingly high in carbon intensity, and the continued reliance on nuclear power--as well as a lack of financial resources or economic incentives--has stifled the country's use of renewable

energies. In order to protect its environment better in the coming years, Ukraine will need to shift away from fossil fuels and break the link of economic output from environmental pollution.

COUNTRY OVERVIEW

President: Leonid Kuchma (since July 19, 1994)
Prime Minister: Anatoliy Kinakh (since May 29, 2001)
Independence: December 1, 1991 (from Soviet Union); National holiday: Independence Day, August 24, 1991
Population (7/01E): 48.7 million
Location: Eastern Europe, bordering the Black Sea between Poland and Russia
Size: 233,090 square miles, slightly smaller than Texas
Major Cities: Kiev (capital), Kharkiv, Donetsk, Dnipropetrovsk, Odesa, L'viv
Languages: Ukrainian (official), Russian, Romanian, Polish, Hungarian
Ethnic Groups: Ukrainian 73%, Russian 22%, Jewish 1%, other 4%
Religions: Ukrainian Orthodox - Moscow Patriarchate, Ukrainian Orthodox - Kiev Patriarchate, Ukrainian Autocephalous Orthodox, Ukrainian Catholic (Uniate), Protestant, Jewish

ECONOMIC OVERVIEW

Minister of Economy: Oleksandr Shlapak
Minister of Finance: Ihor Yushko
Currency: Hryvnia
Market Exchange Rate (8/5/02): US $1=5.22 hryvnia
Nominal Gross Domestic Product (GDP) (2001E): $37.2 billion; **(2002E):** $42.3 billion
Real GDP Growth Rate (2001E): 8.9%; **(2002E):** 5.6%
Inflation Rate (Change in Consumer Prices, Dec. 2000-Dec. 2001E): 6.1%; **(2002E):** 9.2%
Official Unemployment Rate (2001E): 3.8%; **(2002E):** 4.5%
Current Account Balance (2001E): $1.27 billion; **(2002E):** $1.12 billion
Major Trading Partners: Russia, EU, U.S., Turkey

Merchandise Exports (2001E): $17.0 billion; **(2002E):** $18.1 billion
Merchandise Imports (2001E): $16.8 billion; **(2002E):** $18.2 billion
Merchandise Trade Balance (2001E): $200 million; **(2002E):** -$123 million
Major Exports: ferrous and nonferrous metals, fuel and petroleum products, machinery and transport equipment, food products
Major Imports: energy, machinery and parts, transportation equipment, chemicals
External Debt (12/01E): $12.0 billion

ENERGY OVERVIEW

First Deputy Prime Minister (for Energy Issues): Oleh Dubyna
Minister of Fuel & Energy: Vitaliy Hayduk
President, Naftohaz Ukrainy (National Oil and Gas Company): Yuri Boiko
Proven Oil Reserves (1/1/02E): 395 million barrels
Oil Production (2001E): 86,500 barrels per day (bbl/d); **(2002E):** 80,000 bbl/d
Oil Consumption (2001E): 341,000 bbl/d
Net Oil Imports (2001E): 254,500 bbl/d
Crude Refining Capacity (1/1/02E): 1.15 million bbl/d
Natural Gas Reserves (1/1/02E): 39.6 trillion cubic feet (Tcf)
Natural Gas Production (2000E): 636 Bcf
Natural Gas Consumption (2000E): 2.78 Tcf
Net Natural Gas Imports (2000E): 2.14 Tcf
Coal Reserves (1/1/01E): 37.6 billion short tons
Coal Production (2000E): 90.3 million short tons (Mmst)
Coal Consumption (2000E): 97.2 Mmst
Electricity Generation Capacity (2000E): 53.9 gigawatts (GW)
Electricity Production (2000E): 163.6 billion kilowatt-hours (Bkwh)
Electricity Consumption (2000E): 151.7 Bkwh

ENVIRONMENTAL OVERVIEW

Minister of Ecology and Natural Resources: Serhiy Kurykin
Total Energy Consumption (2000E): 6.46 quadrillion Btu* (1.6% of world

total energy consumption)
Energy-Related Carbon Emissions (2000E): 104.46 million metric tons of carbon (1.6% of world total carbon emissions)
Per Capita Energy Consumption (2000E): 130.3 million Btu (vs. U.S. value of 351.0 million Btu)
Per Capita Carbon Emissions (2000E): 2.1 metric tons of carbon (vs. U.S. value of 5.6 metric tons of carbon)
Energy Intensity (2000E): 193,312 Btu/$1995 (vs U.S. value of 10,918 Btu/$1995)**
Carbon Intensity (2000E): 3.13 metric tons of carbon/thousand $1995 (vs U.S. value of 0.17 metric tons/thousand $1995)**
Sectoral Share of Energy Consumption (1998E): Industrial (61.6%), Residential (15.6%), Transportation (14.1%), Commercial (8.6%)
Sectoral Share of Carbon Emissions (1998E): Industrial (64.6%), Residential (16.2%), Transportation (11.8%), Commercial (7.4%)
Fuel Share of Energy Consumption (2000E): Natural Gas (45.0%), Coal (29.7%), Nuclear (12.1%), Oil (11.5%)
Fuel Share of Carbon Emissions (2000E): Coal (46.3%), Natural Gas (40.1%), Oil (13.5%)
Renewable Energy Consumption (1998E): 175 trillion Btu* (36% increase from 1997)
Number of People per Motor Vehicle (1998): 10.6 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified May 13th, 1997). Signatory to the Kyoto Protocol (signed March 15th, 1999, not yet ratified)
Major Environmental Issues: Inadequate supplies of potable water; air and water pollution; deforestation; radiation contamination in the northeast from 1986 accident at Chornobyl Nuclear Power Plant.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Antarctic Treaty, Biodiversity, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear

Test Ban, Ozone Layer Protection, Ship Pollution, Wetlands. *Has signed, but not ratified*: Air Pollution-Persistent Organic Pollutants, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar and wind electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP based on EIA International Energy Annual 2000

ENERGY INDUSTRY

Organization: Naftohaz Ukrainy (state-owned oil and natural umbrella company with many subsidiaries, including UkrNafta (oil productionl), UkrTransNafta (oil transit), UkrTransHaz (natural gas transit), etc.); Enerhoatom (state-owned nuclear energy company).

Major Oil/Gas Fields: Dnieper-Donetsk Basin in eastern Ukraine, Precarpathian Basin in western Ukraine, Crimea, Arkhangelskoye (NW Crimea) Field, and the Sea of Azov

Major Oil Ports: Odesa, Sevastopol, Feodosia, Pivdenny

Oil Export Pipelines Crossing Ukraine: Friendship (Druzhba) (1.2 million bbl/d), Odesa-Brody (180,000 bbl/d, rising to 500,000 bbl/d), Eastern Products (30,000 bbl/d)

Major Oil Refineries (1/1/01 crude processing capacity): Kremenchuk (361,000 bbl/d), Lisichansk (320,000 bbl/d), Kherson (236,000 bbl/d), Odesa (78,000 bbl/d), Drogobich (78,000 bbl/d), Nadvornaja (74,000 bbl/d)

Foreign Oil and Gas Company Involvement: CanArgo Energy, Karpatsky Petroleum, Epic Energy, EuroGas, Gazprom, JKX, LVR, Momentum Enterprises, Odesa Petroleum

Natural Gas Export Pipelines Crossing Ukraine (Capacity): Northern

Lights (0.8 Tcf), Progress (1 Tcf), Shebelinka (0.7 Tcf), Soyuz (1 Tcf), Urengoy (1 Tcf), West Ukraine (0.15 Tcf)
Major Coal Fields: Donets/Donbass Basin, Lviv-Volhynian (West Ukraine) Basin, Dnieper Basin (lignite)
Nuclear Power Plants (Capacity): Zaporozhia (6,000 MW), South Ukraine (3,000 MW), Rivne (1,880 MW), Khmelnitsky (1,000 MW)

Sources for this report include: BBC Monitoring International Reports, CIA World Factbook, Current Digest of the Post-Soviet Press, DRI/WEFA Eurasian Economic Outlook, DRI/PlanEcon, The Economist, The Financial Times, FSU Energy, FSU Oil and Gas Monitor, Interfax News Agency, ITAR-TASS News Agency, Oil and Gas Journal, Petroleum Economist, Petroleum Report, Platt's International Coal Report, Platt's Oilgram News, Polish News Bulletin, PR Newswire, Project Finance, Radio Free Europe/Radio Liberty, Reuters, Ukraine Business Report, U.S. Department of Energy, U.S. Energy Information Administration, U.S. Department of State, Warsaw Business Journal, and World Markets Energy.

LINKS

For more information from EIA on Ukraine, please see:
EIA: Country Information on Ukraine

Links to other sites:
U.S. Agency for International Development
U.S. Department of Commerce, Business Information Service for the Newly Independent States (BISNIS)
U.S. Department of Commerce, Country Commercial Guides
U.S. Department of Commerce, International Trade Administration: Energy Division
U.S. Department of Commerce, Trade Compliance Center: Market Access Information

CIA World Factbook
U.S. Department of Energy, Office of Fossil Energy: International Affairs
U.S. International Trade Administration, Energy Division
Library of Congress Country Study on the former Soviet Union
Radio Free Europe/Radio Liberty (RFE/RL)
U.S. Department of State: Background Notes
U.S. Department of State, International Information Programs
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Eastern Economist
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International Atomic Energy Agency (IAEA) Power Reactor Information System
International Energy Agency: A review of Energy Policies in Ukraine
Lonely Planet World Guide
Naftohaz Ukrainy
The Kyiv Post
TRACECA
Ukraine's Home Page
UkrNaftoGaz
UkrTransNafta

UNIAN: Ukrainian Independent Information and News Agency
University of Texas - Russian and East European Network Information Center
United Nations Framework Convention on Climate Change and the Kyoto Protocol
The Washington Post
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July 2002

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Caspian Sea Region

The Caspian Sea region, including the Sea and the littoral states surrounding it, is important to world energy markets because it holds large reserves of undeveloped oil and natural gas. The Caspian Sea's mineral wealth has resulted in disagreements between the five countries over ownership of the resources, and the region's huge energy potential has sparked fierce competition--between producers as well as consumers--over the final export routes for this oil and natural gas.

Note: Information contained in this report is the best available as of July 2002 and is subject to change.

GENERAL BACKGROUND

The Caspian Sea is located in northwest Asia, landlocked between Azerbaijan, Iran, Kazakhstan, Russia, and Turkmenistan. Since the breakup of the Soviet Union in 1991, the Caspian Sea--as well as the region surrounding it--has became the focus of much international attention due to its huge oil and natural gas reserves. The Sea, which is 700 miles long, contains six separate identified hydrocarbon basins, although most of its oil and natural gas reserves have not been developed yet. Although the littoral states of the Caspian Sea already are major energy producers, many areas of the Sea and the surrounding area remain unexplored.

The prospect of potentially enormous hydrocarbon reserves is part of the allure of the Caspian Sea region (which is defined here to include Azerbaijan, Kazakhstan, Turkmenistan, and the regions of Iran and Russia that are near the Caspian Sea). The Caspian region contains 10 billion barrels of proven oil reserves (defined as oil and natural gas liquids deposits that are considered 90% probable). In addition, despite a string of disappointing recent drilling results, mostly in Azerbaijan, the region's possible oil reserves (defined as 50% probable) could yield another 233 billion barrels of oil.

Overall, proven natural gas reserves in the Caspian region are estimated at around 170 Tcf. Possible natural gas reserves in the Caspian region are even larger, and could yield another 293 trillion cubic feet (Tcf) of natural gas. Turkmenistan (101 Tcf) and Kazakhstan (65 Tcf) are among the top 20 countries in the world in terms of proven natural gas reserves. Although it is not technically part of the Caspian Sea region, nearby Uzbekistan (66.2 Tcf in proven natural gas reserves) also holds significant natural gas deposits.

Since they became independent in 1991, Azerbaijan, Kazakhstan, and Turkmenistan have sought to develop their national oil and natural gas industries. Although the Soviet Union attempted to exploit each of the republic's energy resources, a lack of investment, deteriorating infrastructure, and out-dated technology resulted in declining rates of production in each of the countries at the time of the Soviet Union's collapse in 1991. Over the last 11 years, however, Azerbaijan and Kazakhstan, in particular, have received large amounts of foreign investment in their oil and natural gas sectors. With additional investment, the application of Western technology, and the development of new export outlets, oil and natural gas production in the Caspian region could grow rapidly.

Caspian Legal Status Unresolved

In order for the Caspian Sea region to realize its full energy potential, however, the littoral states must first agree on the legal status of the Sea. Prior to 1991, only two countries--the Soviet Union and Iran--bordered the Caspian Sea, and the legal status of the Sea was governed by 1921 and 1940 bilateral treaties. With the collapse of the Soviet Union and the emergence of Kazakhstan, Turkmenistan, and Azerbaijan as independent states, ownership and development rights in the Sea have been called into question.

Most of Azerbaijan's oil resources (proven as well as possible reserves) are located offshore, and perhaps 30% to 40% of the total oil resources of Kazakhstan and Turkmenistan are offshore as well. Currently, there is no agreed-upon convention that delineates the littoral states' ownership of the Sea's resources or their development rights. The potential oil and natural gas wealth, along with the corresponding environmental risks of resource development in the Caspian, have heightened the stakes for each country.

As a result, several conflicts have arisen over mutual claims to different regions of the Sea, especially in its southern waters. In July 2001, Iranian military gunboats confronted a British Petroleum (BP) Azeri research vessel exploring the Araz-Alov-Sharg structure, ordering the ship out of waters Iran

claims as its own. Azerbaijan, for its part, has objected to Iran's decision to award Royal Dutch/Shell and Lasmo a license to conduct seismic surveys in a region that Azerbaijan considers to fall in its territory. In addition, Turkmenistan and Azerbaijan remain locked in a dispute over the Serdar/Kyapaz field, while Turkmenistan claims that portions of Azerbaijan's Azeri and Chirag fields--which Turkmen officials call Khazar and Osman, respectively--lie within its territorial waters.

Thus, the unresolved status of the Caspian Sea has hindered further development of the Sea's oil and natural gas resources, as well as the construction of potential export pipelines from the region. Negotiations between the littoral states have made slow progress in ironing out differences between the countries: while Russia, Azerbaijan, and Kazakhstan have agreed on dividing the Sea by a "modified median" principle, Iran insists on an equal division of the Sea, and Turkmenistan agrees on the principle of dividing the Sea, but not the method. In April 2002, a long-delayed summit of the Caspian littoral heads of state failed to produce a multilateral agreement on the sea's legal status, prompting several states to sign bilateral agreements in an effort to solve the problem.

OIL

Despite the lack of a multilateral agreement on the Sea, several countries are undertaking active exploration and development programs in what is generally considered to be their sector of the Caspian Sea. In particular, Azerbaijan and Kazakhstan have made substantial progress in developing their offshore oil reserves.

Azerbaijan has signed a number of production-sharing agreements--both onshore and offshore--in order to develop its oil and natural gas industries. A significant percentage of Azerbaijan's oil production comes from the shallow-water section of the Gunashli field, located 60 miles off the Azeri coast. Although the country's oil production fell after 1991 to just 180,000 barrels per day (bbl/d) in 1997, Azerbaijan's oil production rebounded to 311,200 bbl/d in 2001 with the help of international investment in its oil sector.

Kazakhstan also has opened its resources to development by foreign companies. International oil projects in Kazakhstan have taken the form of joint ventures, production-sharing agreements, and exploration/field concessions. After Russia, Kazakhstan was the largest oil-producing republic in the Soviet Union, but after independence, Kazakhstan's oil production dropped more than 115,000 bbl/d, to 414,000 bbl/d, in 1995. Boosted by foreign investment in its oil sector, Kazakhstan's oil production has increased steadily since then, with output of 811,000 bbl/d in 2001, most of which came from three large onshore fields (Tengiz, Uzen, and Karachaganak). In addition, preliminary drilling in Kazakhstan's offshore sector of the Caspian has revealed bountiful oil deposits, especially in the Kashagan field, raising hopes that Kazakhstan may become one of the world's largest oil producers.

Overall, oil production in the Caspian Sea region reached approximately 1.3 million bbl/d in 2001. Production in the region is projected to increase severalfold, led by three major projects currently under development in Azerbaijan and Kazakhstan:

- In April 1993, Chevron concluded a historic $20 billion deal with Kazakhstan to create the Tengizchevroil joint venture to develop the Tengiz oil field, estimated to contain recoverable oil reserves of six to nine billion barrels. Tengizchevroil was producing approximately 250,000 bbl/d in June 2002, and the consortium is planning to invest $3 billion over the next three years to boost production capacity at the field now that Caspian Pipeline Consortium's Tengiz-Novorosiisk export pipeline is operational. Given adequate export outlets, the Tengizchevroil joint venture could reach peak production of 750,000 bbl/d by 2010.

- In what was described as "the deal of the century," in September 1994 the Azerbaijan International Operating Company (AIOC) signed an $8 billion, 30-year contract to develop three Caspian Sea fields--Azeri, Chirag, and the deepwater portions of Gunashli--with proven reserves

estimated at three to five billion barrels. Almost all of Azerbaijan's production increases since 1997 have come from AIOC, which produced an average of 120,000 bbl/d of oil in the first four months of 2002. In August 2001, AIOC and Azeri government officials signed an agreement to carry out an expansion, with oil production at ACG expected to reach 800,000 bbl/d by the end of the decade. The planned Baku-Ceyhan Main Export Pipeline will be the main vehicle for ACG oil exports.

- Although signed with less fanfare in 1997, the offshore Kashagan block being developed by the Agip Kazakhstan North Caspian Operating Company (Agip KCO, formerly OKIOC) may turn out to be more lucrative than both the Tengiz and the ACG group of deposits combined. Exploration and preliminary drilling in the Kashagan block has produced spectacular results, with analysts hailing the field as the largest oil discovery in the last 30 years. Although Agip KCO released estimates in June 2002 that the Kashagan field holds between seven and nine billion barrels of crude in proven reserves, as well as 38 billion barrels in probable reserves, both Kazakh officials and energy analysts have called that estimate "conservative."

These projects, along with others currently underway, could help boost Caspian Sea region production to around 3.7 million bbl/d by 2010. EIA expects production capacity from the Caspian basin to exceed 6.5 million barrels per day by 2020. Although not "another Middle East," as some analysts believed in the early 1990s, the Caspian Sea region is comparable to the North Sea in its hydrocarbon potential.

NATURAL GAS

Unlike with oil, the Caspian region's natural gas resources were extensively developed during the Soviet era. Caspian Sea region natural gas production, not including major Central Asian natural gas producer Uzbekistan, was 3.9 Tcf in 1990, but the collapse of the Soviet Union led to downturns across the region. After 1991, Caspian region natural gas, mostly from Turkmenistan,

became a competitor with Gazprom, the Russian state natural gas company. Since Gazprom owned all the pipelines, and since export routes for Caspian natural gas--such as the Central Asia-Center pipeline--were routed through Russia, Caspian natural gas was squeezed out of the hard currency market.

As a result, Turkmenistan's incentives for increasing its production of natural gas disappeared. The country's output dropped throughout the 1990s, plummeting from 2.02 Tcf in 1992 to just 466 billion cubic feet (Bcf) in 1998, when the country was locked in a pricing dispute with Russia over the export of Turkmen natural gas. With high world natural gas prices and a Turkmen-Russian agreement on Turkmen exports in place, the country's natural gas production rebounded to 788 Bcf in 1999, then skyrocketed to 1.64 Tcf in 2000. Turkmenistan has plans to boost natural gas output substantially over the next decade, contingent on securing adequate export routes, such as the proposed Trans-Caspian Gas Pipeline.

Uzbekistan is the third largest natural gas producer in the Commonwealth of Independent States and one of the top ten natural gas-producing countries in the world. Since becoming independent, Uzbekistan has ramped up its natural gas production nearly 32%, from 1.51 Tcf in 1992 to 1.99 Tcf in 2000. In order to offset declining production at some older fields such as Uchkir and Yangikazen, Uzbekistan is speeding up development at existing fields such as the Kandym and Garbi fields, as well as planning to explore for new reserves. However, since Uzbekistan is landlocked and its natural gas competes with Russian and Turkmen natural gas, Uzbekistan is limited in its ability to export. Instead, Uzbekistan has concentrated on supplying the Central Asian natural gas market, mainly through the Tashkent-Bishkek-Almaty pipeline.

With the emphasis on Azerbaijan's oil potential, the country's natural gas sector often has been overlooked. In the past, Azerbaijan has imported natural gas from Russia, Turkmenistan, and Iran to meet domestic needs, but consumption has been on the wane since the collapse of the Soviet Union, and in 2000, Azerbaijan's natural gas consumption and production were roughly equivalent at 200 Bcf. Azerbaijan is continuing to import natural gas, but the 1999 discovery of the Shah Deniz field will soon change that.

The Shah Deniz field, which is thought to be the world's largest natural gas discovery since 1978, is estimated to contain between 25 Tcf and 39 Tcf of possible (not proven) natural gas. Development of the field, which will cost upwards of $2.5 billion including related infrastructure, should produce the first natural gas by 2004, making Azerbaijan a significant net natural gas exporter. Already, Azerbaijan has secured an agreement with Turkey to export Azeri natural gas via a planned Baku-Erzurum pipeline.

As investment continues to pour into the Kazakh natural gas sector, the country's natural gas production is set to increase dramatically. In August 2001, the Kazakh Ministry for Energy and Mineral Resources approved a 15-year strategy for developing the country's natural gas sector that would increase natural gas production fivefold. According to the strategy, which the Kazakh government approved, Kazakhstan is aiming to increase its natural gas production to 1.2 Tcf by 2005, to 1.66 Tcf by 2010, and to 1.84 Tcf by

2015. Key to this strategy is the development of natural gas reserves at Kashagan, Karachaganak, and Tengiz. Provided that the necessary infrastructure is built, Kazakhstan soon could become a major natural gas exporter as well.

Overall, natural gas production in the Caspian Sea region reached nearly 2.1 Tcf in 2000. Projects currently underway could help boost Caspian Sea region natural gas production to over 6 Tcf by 2010, and the enactment of laws barring the flaring of associated natural gas may increase the region's total production. In 1999, Azerbaijan enacted a law requiring that each oil production project in the country include a plan to develop its natural gas potential, while Kazakhstan is requiring Agip KCO to capture and use all the associated natural gas from the Kashagan block. Previously, natural gas had been flared off in both countries instead of being piped to consumers because of a lack of a developed infrastructure to deliver natural gas from offshore fields.

EXPORT ISSUES

As increasing exploration and development in the Caspian Sea region leads to increased production, the countries of the region will have additional oil and natural gas supplies available for export. Already, in 2001, Kazakhstan's net oil exports were 631,000 bbl/d, while Azerbaijan's were 175,200 bbl/d. Overall, Caspian Sea region oil exports in 2001 amounted to about 920,000 bbl/d (of the 1.3 million bbl/d produced). With numerous oil projects in the region slated to boost production in the coming years, the region's net exports could increase to over 3 million bbl/d in 2010, and possibly another 2 million bbl/d on top of that by 2020.

With regards to natural gas, Turkmenistan led the way among Caspian Sea region producers with net exports of 1.38 Tcf in 2000. Overall, Caspian Sea region natural gas exports totaled just 1.2 Tcf in 2000, since both Azerbaijan and Kazakhstan have yet to tap their full natural gas production potential (and Kazakhstan is currently a net natural gas importer). With Azerbaijan's Shah

Deniz field in development, along with increased investment to develop infrastructure and markets for the region's natural gas, Caspian natural gas exports could increase by another 2-3 Tcf by 2020.

Existing Export Options

In order to boost oil and natural gas exports from the Caspian Sea region, a number of issues will need to be addressed. During the Soviet era, all of the oil and natural gas pipelines in the Caspian Sea region (aside from those in northern Iran) were designed to link the Soviet Union internally and were routed through Russia.

Prior to 1997, exporters of Caspian region oil had only one major pipeline option available to them, the 240,000-bbl/d Atyrau-Samara pipeline from Kazakhstan to Russia. Smaller amounts of oil were exported by barge and by rail through Russia, as well as by a second, smaller pipeline from Kazakhstan to Russia. In the decade since the collapse of the Soviet Union, several new oil export pipelines, such as the Baku-Novorossiisk, the Tengiz-Novorossiisk, and the Baku-Supsa pipelines, have been constructed, and the Atyrau-Samara pipeline recently was upgraded to increase its capacity to 300,000 bbl/d.

Nevertheless, the Caspian region's relative isolation from world markets, as well as the relative lack of export options, continues to hinder exports outside of the former Soviet republics. Of the 920,000 bbl/d exported from the region in 2001, only about 400,000 was exported to consumers outside of the former Soviet Union.

Natural gas exports from the Caspian region have been even more limited. All of the export pipelines from the region pass through Russia, requiring Caspian region natural gas exporters to make agreements with Gazprom, the Russian monopoly that owns the pipelines, in order to export their natural gas. Since Gazprom is also a competitor with the Caspian region for hard currency natural gas markets, the company has used its position to negotiate better deals and to limit pipeline access for Caspian region natural gas. Turkmenistan's economy, which is concentrated mainly in oil and natural gas,

experienced a huge 25.9% decrease in its gross domestic product (GDP) in 1997 when Gazprom denied Turkmenistan access to its pipeline network over a payment dispute.

Since Gazprom has reserved the hard currency markets of Europe for itself by limiting pipeline access for Caspian region natural gas producers, most exports from the region have remained in the Newly Independent States (NIS). Due to the ongoing transition process to a market economic system in much of the NIS, the majority of these former Soviet republics have been unable to pay existing world prices for natural gas supplies. Thus, in order to export their natural gas at all, the Caspian region's producers have had two options: either sell their natural gas to Russia at below-market prices or pay Gazprom a transit fee, then export those supplies via the Russian pipeline system to ex-Soviet states that cannot pay fully in cash or are tardy with payments for supplies already received.

In 1997, Turkmenistan and Iran completed the $190 million Korpezhe-Kurt Kui pipeline linking the two countries, thereby becoming the first (and so far, only) natural gas export pipeline from Central Asia to bypass Russia. Although Gazprom and Turkmenistan resolved their pricing dispute in 1998, in order to reach its full natural gas export potential, Turkmenistan and other Caspian region natural gas producers must solve the problem of how to pipe their natural gas to consumers and receive hard currency at market prices in return.

New Export Options

In order to bring much-needed hard currency into their economies, Caspian region oil and natural gas producers are seeking to diversify their export options to reach new markets. With new production coming online as well, new transportation routes will be necessary to carry Caspian oil and natural gas to world markets. To handle all the region's oil that is slated for export, a number of Caspian region oil export pipelines are being developed or are under consideration. Likewise, there are several Caspian region natural gas

export pipelines that have been proposed. Although there is no lack of export option proposals, questions remain as to *where* all these exports should go.

West?

The TRACECA Program (Transport System Europe-Caucasus-Asia, informally known as the Great Silk Road) was launched at a European Union (EU) conference in 1993. The EU conference brought together trade and transport ministers from the Central Asian and Caucasian republics to initiate a transport corridor on an West-East axis from Europe, across the Black Sea, through the Caucasus and the Caspian Sea to Central Asia.

In September 1998, twelve countries (including Azerbaijan, Bulgaria, Kazakhstan, Romania, Turkey, and Uzbekistan) signed a multilateral agreement known as the Baku Declaration to develop the transport corridor through closer economic integration of member countries, rehabilitation and development of new transportation infrastructure, and by fostering stability and trust in the region. The planned Baku-Ceyhan Main Export Pipeline to transport oil from Azerbaijan to Turkey and then to European consumers is the main component of this cooperation.

In addition, the EU has sponsored the Interstate Oil and Gas Transport to Europe (INOGATE) program, which appraises oil and natural gas exports routes from Central Asia and the Caspian, and routes for shipping energy to Europe. INOGATE is run through the EU's Technical Assistance to the Commonwealth of Independent States (TACIS) program.

East?

However, there is some question as to whether Europe is the right destination for Caspian oil and natural gas. Oil demand over the next 10 to 15 years in Europe is expected to grow by little more than 1 million bbl/d. Oil exports eastward, on the other hand, could serve Asian markets, where demand for oil is expected to grow by 10 million bbl/d over the next 10 to 15 years. In particular, Chinese oil consumption is projected to rise dramatically.

To supply this Asian demand, though, would necessitate building some of the world's longest pipelines. Geographical considerations would force any pipelines to head north of the impassable mountains of Kyrgyzstan and Tajikistan across the vast, desolate Kazakh steppe, thereby adding even more length (and cost) to any eastward pipelines.

South?

An additional way for Caspian region exporters to supply Asian demand would be to pipe oil and natural gas south. This would mean sending oil and natural gas through either Afghanistan or Iran. The Afghanistan option, which Turkmenistan has been promoting, would entail building pipelines across war-ravaged Afghan territory to reach markets in Pakistan and possibly India. With the ouster of the Taliban in Afghanistan in December 2001, proposals to build a Trans-Afghan natural gas pipeline and the Central Asian Oil Pipeline have re-emerged, but neither pipeline is realistic in the short-term.

The Iranian route for natural gas would pipe Caspian region natural gas (from Azerbaijan, Uzbekistan, and Turkmenistan) to Iran's southern coast, then eastward to Pakistan, while the oil route would take oil to the Persian Gulf, then load it onto tankers for further trans-shipment. Turkmenistan and Kazakhstan also have initiated low-volume oil "swap" deals with Iran, delivering oil in tankers to refineries in Iran's northern regions in exchange for similar volumes of crude at Iranian ports in the Persian Gulf. However, any significant investment in Iran would be problematic under the Iran and Libya Sanctions Act, which imposes sanctions on non-U.S. companies investing in the Iranian oil and natural gas sectors. U.S. companies already are prohibited from conducting business with Iran under U.S. law.

North or Northwest?

For its part, Russia itself has proposed multiple pipeline routes that utilize Russian oil pipelines to transport oil to new outlets being developed on the Baltic and Black Seas. In addition to the Caspian Pipeline Consortium's Tengiz-Novorossiisk pipeline, Russia's Baltic Pipeline System became

operational in December 2001, and the country is working with Croatia to connect the Adria pipeline with the southern Druzhba pipeline. Reversing the flows in the Adria pipeline and tying it to the southern Druzhba route will allow oil exports from the Caspian to run via Russia's pipeline system, across Ukraine and Hungary, and then terminate at the Croatian deep-sea Adriatic port of Omisalj.

In addition, Russia already has the most extensive natural gas network in the region, and the system's capacity could be increased to allow for additional Caspian region natural gas exports via Russia. However, there are political and security questions as to whether the newly independent states of the former Soviet Union should rely on Russia (or any other country) as their sole export outlet, and Caspian region producers already have expressed their desire to diversify their export options.

Bosporus/Black Sea Issues

A major problem with additional Caspian oil exports heading west is the increasing congestion in the Bosporus Straits. Turkey has raised concerns about the ability of the Bosporus Straits, already a major chokepoint for oil tankers, to handle additional tanker traffic. Most of the existing Russian oil export pipelines terminate at the Russian Black Sea port of Novorossiisk, requiring tankers to transit the Black Sea and pass through the Bosporus Straits in order to gain access to the Mediterranean and world markets.

Already, Turkey has stated its environmental concerns about a possible collision (and ensuing oil spill) in the Straits as a result of increased tanker traffic from the launch of the Caspian Pipeline Consortium's Tengiz-Novorossiisk pipeline in March 2001. The first tanker with CPC oil was loaded at Novorossiisk in October 2001, and exports are expected to increase to 400,000 bbl/d by the end of 2002. As a result, there already are a number of options under consideration for oil transiting the Black Sea to bypass the Bosporus Straits.

Regional Conflicts

In almost any direction, Caspian region export pipelines may be subject to regional conflicts, an additional complication in determining final routes. Despite the ouster of the Taliban government in December 2001, Afghanistan remains scarred and unstable after 23 years of war. The Azerbaijan-Armenia war over the Armenian-populated Nagorno-Karabakh enclave in Azerbaijan has yet to be resolved. Separatist conflicts in Abkhazia and Ossetia in Georgia flared in the mid-1990's. Russia's war with Chechnya has devastated the region around Grozny in southern Russia. In addition, the Uzbek government has been cracking down on Islamic fundamentalism in Uzbekistan, tensions between rivals Pakistan and India remain high, and the Caspian littoral states themselves have taken to bickering over territorial claims in the Sea.

Nevertheless, several export pipelines from the Caspian region already are completed or under construction, and Caspian region exports are already transiting the Caucasus. While the hope is that export pipelines will provide an economic boost to the region, thereby bringing peace and prosperity to the troubled Caucasus and Caspian regions in the long run, the fear is that in the short-term, the fierce competition over pipeline routes and export options will lead to greater instability.

Sources for this report include: Agence France Presse, BBC Monitoring Central Asia Unit, Central Asia & Caucasus Business Report, Caspian News Agency, Caspian Business Report, CIA World Factbook, DRI/WEFA Eurasian

Economic Outlook, The Economist, Environment News Service, The Financial Times, FSU Oil and Gas Monitor, Hart's European Fuels News, Interfax News Agency, The Moscow Times, PlanEcon, PR Newswire, Radio Free Europe/Radio Liberty, Reuters, RosBusinessConsulting Database, The Times of Central Asia, Turkish Business News, Ukraine Business Report, U.S. Department of Energy, U.S. Energy Information Administration, and U.S. Department of State.

LINKS

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Links to other U.S. government sites:
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CIA World Factbook
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U.S. International Trade Administration, Energy Division
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Library of Congress Country Study on Iran
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Radio Free Europe/Radio Liberty (RFE/RL)
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Ukraine: Oil and Natural Gas Transit

With its extensive network of oil and natural gas pipelines, Ukraine is a key transit state for Russian oil and natural gas exports heading to Europe. In addition, increasing oil and natural gas production in Russia and in the Caspian Sea region over the next decade should enable Ukraine to capture additional transit business--if the country can provide an economically and technically reliable transport service. Ukraine's geographic location makes it an ideal corridor for oil and natural gas transit to European markets, provided that the country invests in maintenance of its existing pipeline system. Ukraine also is looking to capture additional transit tariffs through the construction of the Pivdenny oil terminal and the Odesa-Brody pipeline.

OIL TRANSIT

Ukraine's highly developed oil pipeline system represents one of the country's main strategic advantages. Northwestern Ukraine hosts part of the 1.2-million-barrel-per-day (bbl/d) southern Druzhba oil pipeline, Russia's main overland crude oil export route. Ukraine also has the Pridniprovsky trunk pipeline, which transports oil to to southern Russia, as well as to several Ukrainian refineries. Including the new Odesa-Brody pipeline, Ukraine's oil transit capacity now exceeds 2 million bbl/d.

However, Ukraine plays a far less critical role as a transit corridor for oil exports to Europe than it does for natural gas, and its importance as an oil transit center is beginning to decrease. None of the export pipelines currently being planned or constructed by Russian pipeline company Transneft's touch Ukrainian territory, and some, such as the Sukhodolnaya-Rodionovskaya bypass, which became operational in 2001, are expressly designed to avoid Ukraine in order to avoid paying transit fees to Ukraine.

Through the first five months of 2002, Ukraine's transportation of transit oil fell 29.4% year-on-year, to an average of just 958,458 bbl/d. According to Ukraine's Fuel and Energy Ministry, oil transit to Western Europe (through Slovakia, Hungary, and the Czech Republic) fell 54% during the same time period, to an average of 518,000 bbl/d, as Ukraine received more oil via the Druzbha pipeline for its own needs.

Overall, oil piped from Russia via the Ukrainian section of the Druzhba pipeline only fell 3% in the first five months of 2002, but transit oil through the Pridniprovsky pipeline, which Russia is now able to

bypass via the Sukhodolnaya-Rodionovskaya pipeline, fell 38.9% during the same time period.

The 160-mile Sukhodolnaya-Rodionovskaya oil pipeline directly links two other pipelines, bypassing the Lisichansk-Tikhoretsk section in Ukraine, allowing Russia to save on transit costs. Although Russia did not use the Lisichansk-Tikhoretsk section section in the first few months of 2002, Russia has not imposed any limitations on Russian oil supplies to the Lisichansk, Odesa and Kremenchuk oil refineries that are served by the Pridniprovsky pipeline.

According to Oleksandr Todiichuk, board chairman of UkrTransNafta, a division of Naftohaz Ukrainy that was created in 2001 to handle Ukraine's oil transit system, Russia and Ukraine have reached an understanding that Transneft, the Russian pipeline monopoly, will pump some oil via the Ukrainian pipe when there is a peak load in the Sukhodolnaya-Rodionovskaya branch. Over 500,000 bbl/d of oil was transited via the Lisichansk-Tikhoretsk section in 2000, as well as 360,000 bbl/d in 2001.

Odesa-Brody Pipeline

Ukraine also is trying to avoid losing its position in the transit of oil from Kazakhstan. Until recently, about 320,000 bbl/d of Kazakh oil crossed Ukraine, mostly by rail to Black Sea export terminals. However, with the opening of the Caspian Pipeline Consortium's Tengiz-Novorossiisk pipeline in March 2001, Kazakhstan now has a more direct export route to world oil markets, and as a consequence it has reduced the amount of oil it exports via Ukraine.

Nevertheless, with the projected increase in oil production from the Caspian Sea region leading to concern over the Bosporus Straits' ability to handle increased tanker traffic, several years ago the Ukrainian government decided to build a new oil terminal and transit pipeline in an attempt to lure Caspian region oil exports to bypass the Bosporus and transit Ukrainian territory instead. The 400-mile Odesa-Brody pipeline, which Ukraine constructed with its own funds and completed in August 2001, has an initial capacity of 180,000 bbl/d, eventually rising to 560,000 bbl/d. The pipeline runs from the new Black Sea Pivdenny terminal, which was completed in December 2001, to the northwestern Ukrainian city of Brody, where it can tie in with the southern Druzhba pipeline.

Poland and Ukraine have discussed extending the Odesa-Brody pipeline with a 190-mile extension further north to Plotsk, Poland. From there, the pipeline could tie into the Druzhba northern route and/or an existing line to the Polish Baltic Sea port of Gdansk, thereby allowing Caspian region oil exports to reach Poland, Germany, and the Baltic states. Ukraine has argued that the Odesa-Brody route is the cheapest way to bring Caspian oil to northern Europe.

Poland, which supports the project in principle, has insisted that a multinational consortium be formed to extend the pipeline to Gdansk on the Baltic. Poland also wants the consortium to manage and market the pipeline. Ukrainian Prime Minister Anatoly Kinakh announced in June 2002 that Ukraine and Poland are stepping up work to create an international consortium to manage and complete the Odesa-Brody-Plotsk-Gdansk pipeline. Although Ukraine is using its own resources to construct additional pumping stations

for the Odesa-Brody pipeline section, the two countries are seeking outside financing to build the proposed extension for the pipeline.

An extension of the Odesa-Brody pipeline into Poland would take several years to complete, but Ukraine has other short- and medium-term options for selling crude oil via the Odesa-Brody pipeline to central European markets. In February 2002, U.S.-based oil services company Halliburton and Cambridge Energy Research Associates completed a U.S. Trade and Development Agency-funded feasibility study on the pipeline, concluding that the project would face tough market conditions in the short-term. In the medium-term, however, as more Caspian crude oil is exported from the region, the Odesa-Brody pipeline could become a more competitive route.

Although the pipeline was originally designed to allow Ukraine to transit Caspian oil and give central European countries an alternative to Russian oil, Russian oil companies have expressed an interest in the Odesa-Brody pipeline--but only if it pumps Russian oil in the opposite direction. However, Ukrainian officials have balked at the idea of using the pipeline to export more Russian oil via the Black Sea, and negotiations are continuing with Caspian Sea region oil exporters to pipe oil from Odesa to Brody. To date, Ukraine has not secured any contracts to ship oil via the Odesa-Brody pipeline.

NATURAL GAS TRANSIT

Ukraine is the main transit route for Russian natural gas exports to Europe. Designed in the Soviet era, Ukraine's natural gas pipeline network consists of over 36,000 kilometers (21,600 miles) of pipelines (including 13,680 miles of trunk lines), 112 compressor stations, and 13 underground natural gas storage facilities. The storage tanks, which are mainly located in the western part of the country, have a total capacity of 1.4 trillion cubic feet (Tcf), allowing it to enhance the stability of Russian natural gas exports to Europe. Overall, Ukraine's natural gas transit system has the capacity to pipe 170 billion cubic meters (6 Tcf) per year, according to Ukrainian officials.

Of the transit pipelines, Urengoy-Uzhgorod, Progress, Soyuz, Ivatsevitchi-Dolyna-Uzhgorod, and Torzhok-Dolyna transport natural gas to Slovakia and Hungary and to other European countries, while the Yelets-Kremenchuk and Kremenchuk-Ananiiv-Tiraspol-Izmail pipelines provide natural gas to Moldova, Romania, Bulgaria, and other Balkan countries. Ukraine also transits Russian natural gas to southern regions of Russia near the Black Sea. In 2001, Ukraine transited about 4.3 Tcf of Russian natural gas to Europe, and a similar amount of natural gas is expected to be sent in 2002.

Rather than receive payment for transiting Russian natural gas to European consumers, Ukraine has been receiving approximately 1 Tcf per year from Russia in kind. However, due to Ukraine's deficiency in domestic natural gas production, the country also has been buying natural gas from Russia. Ukraine's inability to keep current in its payments for natural gas already supplied, as well as the illegal siphoning of natural gas intended for European customers, led to a worsening of relations between Russia and Ukraine over the past few years.

As a result, Russia questioned Ukraine's reliability as a transit partner and began to make plans to build

an export pipeline that would bypass Ukraine. Ukrainian officials argued that renovations to the existing Ukrainian pipelines would be far more cost-effective than building a new pipeline. Russian officials also proposed a "debt for equity" swap, under which Russia would receive a stake in Ukraine's natural gas transit system in exchange for relieving Ukraine of its natural gas burden. Ukrainian politicians balked at this idea.

In December 2001, the two countries managed to reach an agreement on Ukraine's debt to Russia for natural gas supplies, as well as a deal on the transit of Russian natural gas for 2002. According to the transit deal, Ukraine will transit approximately 4.3 Tcf of natural gas to Europe in 2002, with Russian natural gas giant Gazprom supplying 918 billion cubic feet (Bcf) of natural gas to Ukraine this year for transiting the natural gas. Only 10% (91.8 Bcf) of the total volume of transit is to be paid in cash.

However, the two sides agreed to increase gradually the transit tariffs and the cost of natural gas used to pay for this transit. Thus, as of July 1, 2002, the tariff for natural gas via Ukraine rose to $1.44 per 1,000 cubic meters (35,300 cubic feet) from $1.09, with a simultaneous increase--from $50 to $67--in the cost of the natural gas used to pay for this transit.

Relations between Russia and Ukraine over Ukraine's transit of Russian natural gas have improved considerably in 2002. After Gazprom's board of directors appeared to shelve plans for the bypass pipeline in February 2002, Ukraine, Russia, and Germany signed a preliminary agreement in June 2002 to create an international consortium to manage and modernize the Ukrainian natural gas transit system, although specific details of the agreement still need to be worked out. Shortly thereafter, Russian and Ukrainian officials inked a deal that will ensure the long-term transit of Russian natural gas via Ukraine.

According to terms of the deal, Russian guarantee it will export at least 3.9 Tcf of natural gas per year (4.4 Tcf per year including exports to southern Russia and Moldova) via Ukraine between 2003 and 2013. Separate protocols will be signed each year to specify the actual volume of natural gas transit, with at least 4.5 Tcf of Russian natural gas scheduled to transit Ukraine in 2003. Fees for the transit natural gas will be paid in both cash and in kind. Additionally, Ukrainian and Russian officials signed an agreement on the operation of Ukraine's underground natural gas storage facilities by Russia's Gazprom up to 2013.

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March 2000

Poland: Environmental Issues

Introduction

During the 1980s, Poland was one of the most polluted countries in Europe. The Silesia region in southern Poland, best known at the time for its coal mines, steel plants, and polluted environment, epitomized the communist government's emphasis on maximum industrial activity, regardless of the environmental cost. Along with parts of northern Bohemia and eastern Germany, the environmental devastation in southern Poland earned the region the infamous nickname, "The Black Triangle."

In the wake of political changes since 1989, however, environmental issues have taken on greater importance. Policies promoting environmental protection have been introduced, and Poland's economic "shock therapy" has closed down many inefficient, polluting factories. In April 1997, the Polish parliament adopted a new energy law defining the principles for developing a national energy policy. The law, which went into effect in December 1997, was intended to ensure that the Polish government provides efficient and rational use of fuels and energy for the country, taking into consideration environmental protection requirements.

As a result, since 1989, river pollution in Poland has decreased by approximately 50% (in terms of contamination by discharges), and major air pollutant emissions have been significantly reduced (between 1987 and 1997, sulfur dioxide emissions were cut by nearly 50%). In addition, Poland's new commitment to environmental protection has brought to the forefront the need to modernize the country's obsolete and inefficient electricity generation facilities. Between 1992 and 2000, about 8,600 megawatts (MW) of electricity-generating capacity was retrofitted in order to increase energy efficiency and improve environmental protection.

Air Pollution

During the 1980s, Poland's Katowice district, which is part of the Silesia region and makes up 2.1% of the country, accounted for as much as 20%-25% of the country's total emissions of sulfur dioxide (SO2), nitrous oxides (NOx), and dust. In the region now known as "the Black Triangle," home to the largest basin of brown coal in Europe, approximately 200 million tons of coal were produced each year, leading to 3 million tons of SO2 and approximately 1 million tons of NOx emitted each year.

Environmental pollution in Silesia resulted from years of maximum industrial activity concentrated within a relatively small area. Emission of excessive amounts of pollutants resulted in severe acid rain, practically destroying the mountain forests and acidifying the soils in the Karkonosze and the Izerskie Mountains. As a result, the death rate for men in Katowice between the ages of 30 and 59 exceeds the national average by 40%, children are usually born underweight, and the occurrence of birth defects in the region is up to 60% more common than average.

Since 1991, however, Poland has spent an increasing amount of its gross domestic product on environmental protection. Investments in air quality protection in 1995 were four times as much as in 1992, with pollution control costs amounting to over $3 billion estimated through 1999. In addition, the Polish government has passed legislation, as well as given business and industry economic incentives, to improve the country's environmental situation.

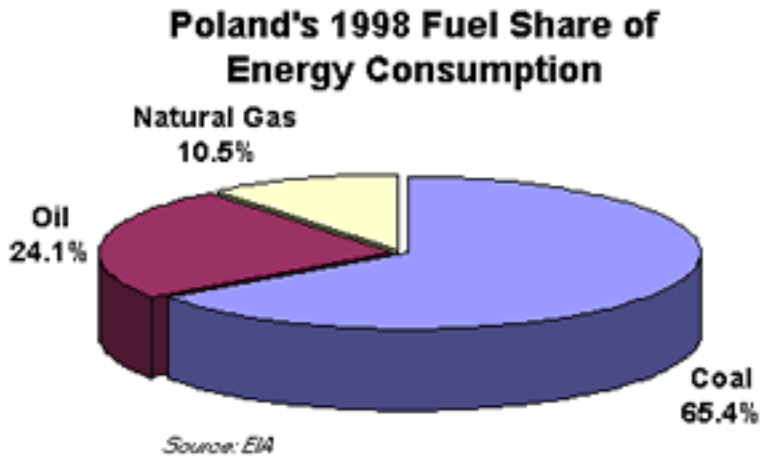
Poland's adoption of the EU's "Integrated Pollution Prevention Directive," mandating Best Available Control Technology, will require that plants use specific commercially available technology to control emissions, regardless of the current ambient conditions. Also, the government's facility-specific, compliance determinations option would give plants that are certified as environmentally EU-compliant tariff reductions earlier than non-compliant plants, a policy geared to encourage early adoption of EU requirements.

Working with the U.S. Environmental Protection Agency (EPA), the Krakow Air Monitoring Project has bought and installed a network of meteorological

instruments to provide real-time air quality assessments. The project has helped the Polish government identify stationary sources of air pollution, then order them to redesign their processes, install pollution controls, or shut down.

The effects of these efforts to improve air quality have been dramatic: air pollution by industry has decreased by 30-50% and is on the decline. The focus of Polish environmental efforts now has shifted to developing effective pollution control strategies for the more challenging "non-point" and mobile sources, where pollution has been on the rise.

Energy Consumption



Poland is the leading energy consumer among Central European countries, with 1998 total consumption of 3.5 quadrillion Btu. Coal accounts for the great majority of this consumption, with 65.4% of the total. Oil makes up an additional 24.1%, while natural gas accounts for 10.5%.

Coal is overwhelmingly dominant in the production of electricity in Poland, with 97% of all electricity generated in the country coming from coal-fired plants. Poland is an inefficient power consumer, however, as up to 30% of all electrical energy produced is lost.

Polish energy consumption trends have mirrored the country's transition to democracy. Between the years 1989-1991, as inefficient mines and factories were closed, Polish industrial production decreased by over 35%. Not surprisingly, then, a decrease in energy consumption (of approximately 25%) was apparent, as well as a reduction in the emissions of major atmospheric pollutants (about 25%-33%).

Since 1992, as Poland's economy has rebounded, the country has experienced

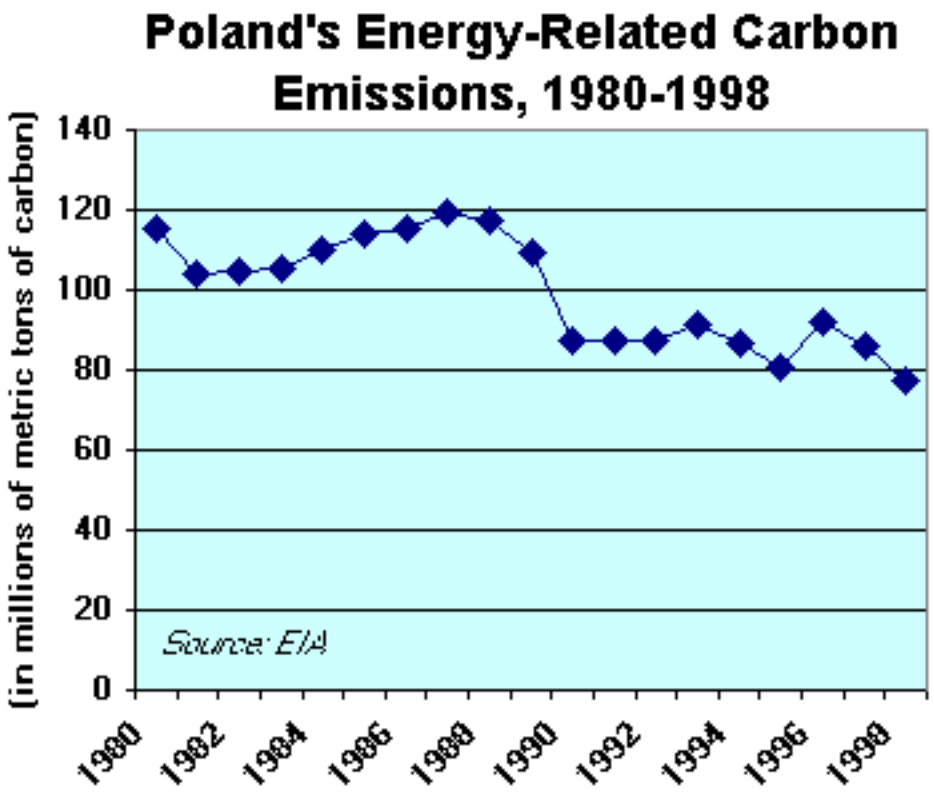
increased industrial production while energy consumption has remained relatively stable, at levels approximately 27% lower than in 1989. This is due to the fact that old, ineffective factories where energy was wasted were eliminated, reducing energy use, while many others were modernized, equipped with the newest energy-saving technology. Thus, although industrial production has increased, energy use has remained relatively constant at its new lower rate.

The European Bank for Reconstruction and Development is financing a multi-project facility to develop a network of energy service companies (ESCOS) for Central and Eastern Europe. ESCOS will install, at its own expense, appropriate technology in its clients' premises to reduce energy consumption. Along with government and market incentives to increase energy efficiency, these efforts should help reduce wasteful energy consumption in Poland.

Carbon and Energy-Related Emissions

Since 1989, energy-related carbon emissions in Poland have fallen sharply, to 77.1 million metric tons of carbon, compared to around 100-120 million metric tons emitted annually during the 1980s. By 1995, emissions of SO2 and dust were approximately 40% and 50% lower than in 1989, respectively.

Since 1994, there has been increasing financial investment in equipment for fuel desulfurization, as well as for reduction of dust emissions, nitrogen oxides and other toxic substances in Poland. The World Bank is financing desulfurization equipment installations for the Dolna Odra power plant and the Rybnik combined heat and power plant, and noteworthy investments have been made to reduce SO2 emissions from Poland's two largest power plants, Belchatow and Turow.



Although Poland's industrial sector is emitting less carbon and other toxic substances than it used to, one sector that has experienced a significant increase in emissions of atmospheric pollutants is the transportation sector. Poland has experienced a dynamic rise in the number of cars since the late 1980s--between 1989 and 1995, the number of personal automobiles in Poland skyrocketed by approximately 70% while the number of trucks increased by approximately 40%. At first, emissions rose since most of these cars were old and not equipped with modern environmental technologies, but the introduction of unleaded gasoline has tempered this rise; lead emissions in Poland decreased by 67% between 1990-1994 and continue to decrease. Increased emissions from the transportation sector figure to continue, although the introduction of catalytic converters should help somewhat.

The predominance of coal in Poland's energy production and consumption mix results in a great deal of carbon emissions and environmental pollution as well. Although the Polish government has planned to restructure and reform the industry to cut coal production and to make the industry more efficient, these structural reforms have met with strong opposition from the coal industry, which fears the loss of jobs.

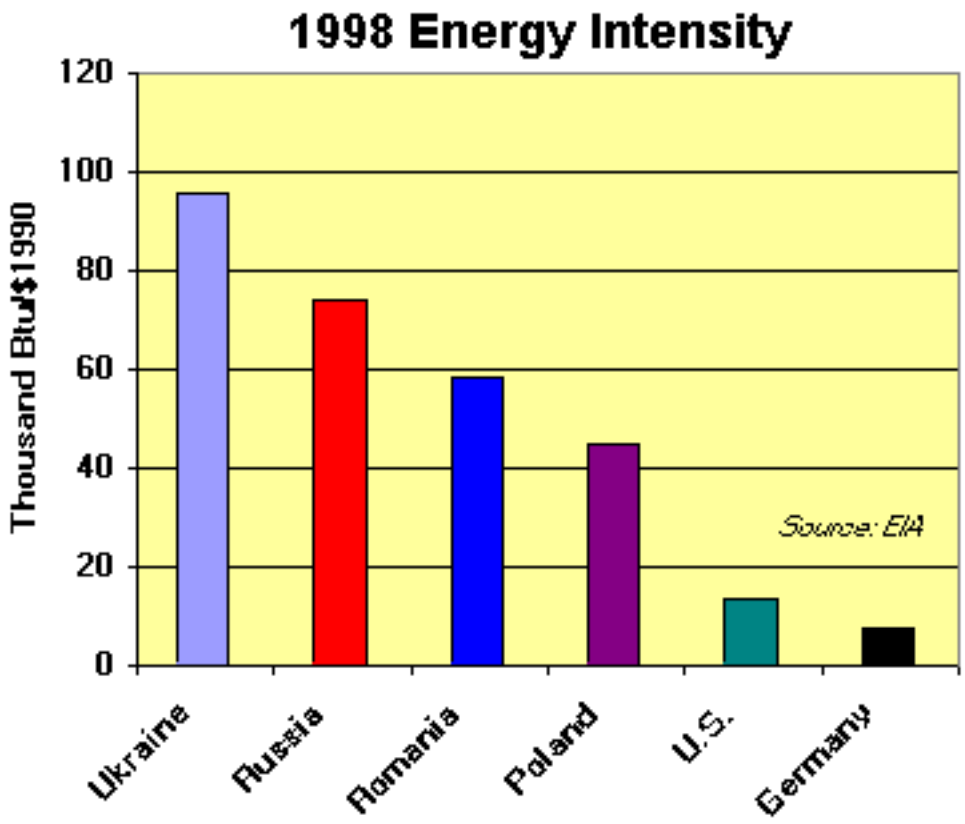
Nevertheless, Poland is likely to meet its commitments as an Annex I country under the United Nations Framework Convention on Climate Change. Under the Kyoto Protocol--which the Polish government signed on July 15th, 1998, but has not yet ratified--Poland has agreed to reduce greenhouse gases 6% below its

1988 levels by the 2008-2012 commitment period. By 2010, analysts estimate Polish CO2 emissions will level off at a rate 20%-25% lower than in Poland's baseline year of 1988.

Poland is not taking these emission reduction estimates for granted, however. In order to meet EU standards concerning emissions of SO2, NOx, and particulates, the Polish government in 1998 enacted new environmental regulations for emissions from boilers, requiring installation of sulfur control technology (such as scrubbers or fluidized bed boilers). With the support of the U.S. Agency for International Development, Poland's Environmental Action Programme Support (EAPS) assisted over 100 emission reduction projects and mobilized nearly $40 million in environmental financing. In addition, EAPS, which concluded in 1998, helped to develop management tools for local environmental financing institutions, train municipal officials, and disseminate information about environmental financing sources.

Energy and Carbon Intensity

Poland's energy intensity has decreased as the country has become more energy efficient, but it is still significantly higher than in most Western European countries. In 1998, Poland's energy intensity of 45,000 Btu/$1990 compared favorably to other transition countries, especially Ukraine (95,500 Btu/$1990), Russia (74,200 Btu), and Romania (58,400 Btu). By contrast, Poland's energy intensity was 3.5 times that of the U.S. (13,400 Btu) and more than 6 times that of its western neighbor Germany (7,300 Btu).



Poland's carbon intensity has shown the same downward trend over time, and Poland (1.0 metric tons of carbon/thousand $1990) ranks among the lowest of the transition countries but still high in comparison to the West. Poland has adopted a number of measures in efforts to lower the country's energy and carbon intensities to Western levels, including a number of energy saving initiatives at the local level in the past few years. Among these initiatives are the elimination of coal-heated stoves and small ineffective boiler rooms, thermoinsulation of buildings, and the introduction of thermostats and energy meters in centrally heated buildings.

In addition, Poland has officially adopted the "polluter pays" and "user pays" principles of environmental protection. Penalties for polluting the environment are collected by Poland's National Fund for Environmental Protection and Water Management, which has become one of the major financing sources for environmental ventures. To help finance environmental protection and restoration in the future, Poland also has sought debt-for-environment swaps, proposing that a portion of Poland's debt be redirected from the lender into an Ecofund.

Renewable Energy

Poland's renewable energy consumption is marginal, with a 1998 consumption estimate of 236 trillion Btu (compared to the U.S. level of 6.6 quadrillion Btu). Only about 3% of Polish power plants are hydroelectric, with a total installed capacity of 2,008 MW, about 7% of the total capacity of the national power

system. Although Poland's potential hydroelectric energy generation capacity is high, only a small percentage of this capacity is presently utilized, and only 11 of the 21 hydroelectric power plants have capacities over 10 MW.

Aside from several small hydro power plants, no other significant renewable energy carriers are in use, although there is potential for geothermal and biomass energy. Geothermal resources are estimated to be significant, especially in the southern part of the country. Solid waste fuels and biomass fuels also are in marginal use.

Poland in the 21st Century

Poland has made great strides in improving its environment over the past 10 years. However, the country continues to rely heavily on dirty coal, and despite Poland's surging economy, a major concern is Poland's ability to finance cleanup projects. Toxic effluents continue to pour into Polish rivers, yet most polluters go unpunished, either for lack of legislation, or, where it exists, because it is badly enforced.

Margot Wallstrom, European Commissioner for the Environment, has estimated that Poland must still spend up to $120 billion cleaning up the environment in order to meet EU criteria for membership. Although Poles point out that, as a percentage share of GDP, they have consistently spent more than the Organization for Economic Cooperation and Development country average on environmental remediation, Poland still has a long way to go to catch up.

In order for Poland to meet the EU environmental criteria and accede to the union, however, it will take more than money. Although the shift is underway in Poland from coal mining and heavy industry to modern services and lighter, more precise branches of production, such as car manufacturing, Poland's State Inspectorate for Environmental Protection 1998 Report recognized that the locus of environmental threats is changing. In addition to the need to switch from coal to cleaner energy sources, the Report stated that "not the industry anymore, but rather the growing individual consumption of energy and fuels, as well as uninhibited motorization growth, is posing ever increasing threats to the

environment."

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Energy Information Administration

September 2002

Norway

Norway is a major non-OPEC source of oil and was the world's third largest net oil exporter in 2001. Norway is the second-largest natural gas exporter to western Europe.

Note: Information contained in this report is the best available as of September 2002 and is subject to change.

BACKGROUND

Norway's economy is characterized by substantial oil and natural gas revenues, growing government expenditures, a tight labor market, and closer linkage to international oil and gas prices than to the OECD business cycle. Norway is the third largest net oil exporter in the world, and the recent period of high oil prices have made for government budget and current account surpluses and rising disposable income. The petroleum sector represents over 20% of Norway's gross domestic product (GDP). Norway continues to record large trade surpluses, mostly due to hydrocarbon exports. Real GDP growth for 2002 is forecast at 2.3%, a solid rate. Trade surpluses are expected to decline from about 14% to 8% into the later part of this decade. The consumer price growth forecast is at 1.5% in 2002, though the Norwegian Central Bank recently said that core inflation of 2.7% year-on-year in June had been "somewhat higher" than the bank had projected, so the bank raised interest rates slightly. The phasing-in of revenue from the state Petroleum Fund through additional spending and reduced taxation is expected to stimulate consumer spending. As this change is implemented, the central government's non-oil deficit is expected to rise from 2% of mainland GDP in 2001 to 5.5% by 2010,

increasing mainland GDP by 0.4% annually.

Norway has a small industrial base apart from its oil and gas, shipping, and fishing industries, and its mainland (i.e. excluding oil and natural gas) economy is forecast to grow by 1.2% in 2002. Manufacturing activity was up 1.4% year-on-year for the second quarter of 2002. Norway's government is concerned about its economic welfare once its oil runs out, as is predicted by the end of the first half of the 21st century. Norway makes annual contributions to its Petroleum Fund, a financial safety net for the time when oil revenues decline (and a means of reducing the inflationary impact of oil revenues). The government was able to pay Norwegian krone (Nkr) 53.5 billion (about $7.1 billion) into the Petroleum Fund in the second quarter of 2002, for a total value of Nkr 605.4 billion.

A new center-right coalition took power in October 2001 after the Labor Party lost seats in the parliamentary election. The coalition consists of Prime Minister Kjell Magne Bondevik's Christian People's Party, the Conservative Party, and the Liberal Party. The government has sought to lessen government involvement in business and to lower taxes, though it remains quite involved in social and environmental policy. The government currently does not have plans to seek membership in the European Union.

Norway is part of the European Economic Area (EEA), but Norwegians have voted in two referenda against joining the European Union (EU). Recent polls have shown some increase in support for joining the EU. Norway has a history of state control over major industry, but this is beginning to change. Norway's reliance on oil revenues in the past resulted in a government preference for keeping Norwegian businesses under Norwegian control.

North Sea Oil and Natural Gas

North Sea oil and natural gas were first discovered in the 1960s. The North Sea did not emerge immediately as a key non-OPEC oil producing area. North Sea production grew as major discoveries continued throughout the 1980s and into the 1990s. Although the region is a relatively high cost oil producer (breakeven is about $12-$14 per barrel, vs. $3-$4 per barrel in Iran, for example), its political stability and proximity to major European consumer markets have allowed it to play a major role in world oil and gas markets.

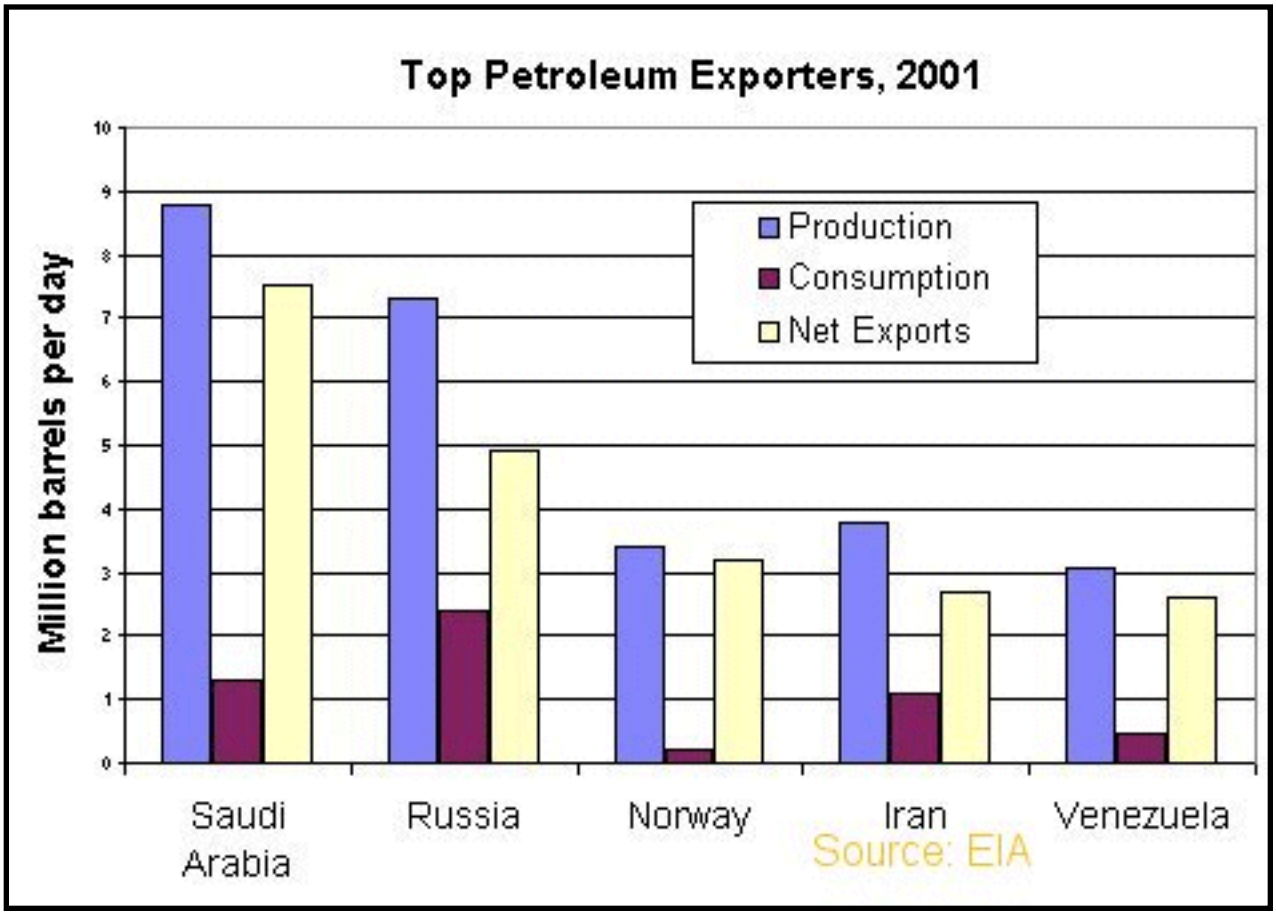
Many of the world's major crude oil prices are linked to the price of the North Sea's Brent crude oil - about $150 billion in annual petroleum trade. Brent crude is a blend of North Sea crude oils and does not come exclusively from the Brent field. Because Brent crude is traded on the International Petroleum Exchange in London, fluctuations in the market are reflected in the price of Brent. Therefore, all other crude oils linked to Brent can be priced according to the latest market conditions. Brent production is forecast to fall precipitously from its current 400,000 barrels per day (bbl/d) by 2005, making the Brent price marker increasingly dated. Liquidity has fallen to about 10 cargoes per delivery month compared with 300-400 deals per month in the early 1990s. In response to this, pricing service Platts made a change effective July 10, 2002 allowing for substitution - at seller's option - of UK Forties and Norwegian Oseberg for Brent in an attempt to increase potential volumes and reduce volatility resulting from traders

"cornering the market." The change has not been universally accepted, and it remains to be seen whether it will be successful. The International Petroleum Exchange (IPE), which runs the Brent futures market, appears to be waiting to see whether the over-the-counter market adopts Brent-Forties-Oseberg (BFO). The first full BFO contract was sold on August 8.

The late 1997-1998 oil price collapse had an adverse effect on North Sea production. In 1997 and 1998, North Sea oil production remained stable, whereas previous years had shown average annual increases of 400,000 bbl/d. The 1999-2000 oil price increase had the opposite effect: North Sea oil and gas production reached new heights in 2000, with oil production exceeding 6 bbl/d for the first time. However, the North Sea area is considered to be increasingly "mature," with few additional large discoveries likely to be made. Some predict that the North Sea will reach peak production of about 7 million bbl/d in the next two or three years, although technology developments could delay this. The average recovery rate for Norwegian fields is expected to eventually reach 44%. Because the North Sea is believed to be nearing its peak production, in both of the major North Sea producing nations, Norway and the United Kingdom (UK), government and industry are taking steps to restructure their oil and natural gas sectors to make them more internationally competitive and also are increasing cooperation between the two countries. On August 28, 2002, Norway and the UK released a joint plan to increase cooperation, cut costs, and raise output, especially on aging fields. However, taxation rates will remain unharmonized. Norway also signed a cooperation agreement with Russia that same day that opens energy dialogue on the Arctic Barents Sea shared by the two countries.

OIL

Norway has proven oil reserves of 9.44 billion barrels. In 2001, Norway was the world's third largest net oil exporter. Norway consumes very little of the oil it produces, and its oil exports are the country's greatest source of revenue. Norway's oil reserves are located exclusively offshore and mostly in the North Sea, with smaller deposits in the Norwegian Sea. The Barents Sea also is being explored. Oil production was about 3.4 million bbl/d in 2001, an increase of about 100,000 bbl/d over 2000. Production in the first half of 2002 was affected by a production cut agreement with OPEC.



In November 2001, Norway's Energy and Oil Minister announced that Norway would cooperate with OPEC and cut crude oil production for the first half of 2002 in an effort to shore up prices in the face of sagging demand. Norway later agreed to cut production by 150,000 bbl/d, with target production at 3.02 million bbl/d. Rather than cutting production steadily across the period, Norwegian production cuts were concentrated in the last month of each quarter, i.e., March and June. A preliminary estimate of crude oil production for the first half of 2002 is 3.06 million barrels per day. In June, it was announced by the Oil and Energy Ministry that "The Norwegian government has decided not to extend the restriction on oil production into the second half of 2002." By this time, Brent prices were some $5 per barrel higher than they had been in November 2001. In late June, Norway informed operators that they could produce at 13% above field production limits in an effort to reach a government target of 3.02 million bbl/d of crude oil for 2002.

Oil service workers struck from July 5 until August 10, when the Norwegian oil industry association (OLF) and oil union Nopef arrived at a new agreement covering 3500 employees in oil service companies The oil industry reportedly suffered a loss of more than Nkr 330 million ($42.2 million) during the strike. A strike began September 10, 2002 by dock workers at Statoil's 205,000-barrels-per-day refinery in Mongstad, Norway, that would curb exports from one of Europe's key gasoline-producing plants. The strike could curb crude production from Norsk Hydro's Troll B and C platforms, which send their output to the terminal at the Mongstad refinery via pipelines.

Oil Sector Restructuring

The Norwegian oil sector has undergone massive restructuring during the past few years. Norway's oil sector had been characterized by extensive public ownership. Its largest oil company, Statoil, was 100% state-owned, while Norsk Hydro, the second largest oil company, was majority state-owned. The only completely privately-held company was Saga Petroleum. In addition, state-owned Statoil managed

another entity even larger than itself, the State Direct Financial Interest (SDFI), which represented the state's holdings in 150 offshore oil and natural gas fields and about 40% of total production.

In late 1999, Norsk Hydro completed its acquisition of Saga, reducing its public ownership, originally 51%, to 44%. In April 2001, the Norwegian parliament approved plans to sell between 10% and 25% of Statoil to private investors and to sell 15% of the SDFI to Statoil prior to Statoil's listing on the New York and Oslo stock exchanges. Norsk Hydro (taking the largest share) and eight other Norwegian North Sea operators were sold another 6.5% of the SDFI in March 2002. The remainder of the SDFI (78.5%) was reorganized into a new state company called Petoro. Petoro is the world's fifth largest oil and gas firm in terms of production, with estimated production of 1.4 million bbl/d of oil, though Petoro functions entirely as a management company, having no operations itself. Statoil completed its purchase of 15% of the SDFI in May 2001 for $4.24 billion, and on June 18, 2001, Norway sold 17.5% of its holding in Statoil in an initial public offering for $2.9 billion. These changes should introduce more efficiency into the system, as Statoil was uncompensated for managing the SDFI, and raise more capital for Statoil in order for it to compete globally as the company explores regions such as offshore west Africa and Venezuela.

Norsk Hydro sold two production licenses to Marathon Oil of the United States in July. There is speculation that Norsk Hydro may spin off its oil unit to focus on its aluminum and fertilizers businesses. Statoil is the most likely buyer, which would create a company with production approaching 1 million bbl/d of crude, condensate, and natural gas liquids. Statoil announced in May 2002 that it is selling its 7,000 bbl/d assets in the Danish North Sea to Denmark state oil company DONG for $127 million in order to concentrate on core areas.

Oil Production

Norway's major Norwegian North Sea production areas include: Ekofisk, Sleipner, Frigg, Statfjord, and Oseberg and Troll. There are also five fields producing in the Norwegian Sea. (The 62nd line of latitude separates the North Sea and the Norwegian Sea.)

Norwegian oil investment was about Nkr 56.9 billion ($7.5 billion) in 2001, an increase from the $6.2 billion invested in 2000, but down from the peak of NKr 80 billion ($10.6 billion) in 1998. Investment levels reflect expectations that Norway's oil production will remain roughly constant until 2004, and then begin a gradual decline. Oil fields and projects under development include: Fram West, Grane, Tune, and the Valhall Flanks and water injection. Three new offshore oil fields came on stream in the second half of 2001: Tambar, Glitne, and Huldra. Some important oil discoveries offshore Norway in the past 12 months include: Staerne, near the Norne field, with estimated reserves of 30 million barrels; increased reserves in the Oseberg unit; and additional oil at the Goliat continental oil shelf in the Barents Sea (estimates of 75-107 million barrels increased to 91-250 million barrels). Overall, about 250 million barrels of oil and condensate were added to Norwegian reserves in 2001. A total of 32 blocks were offered at the 17th Norwegian Continental Shelf licensing round in June 2002. Eleven companies will share blocks that comprise six production licenses. This round focused on the Norwegian Sea.

Ekofisk, in the southern North Sea sector, was the first North Sea oil field to be discovered, in the late 1960s, and developed, with production beginning in 1971. Since 1975, oil has been piped from Ekofisk to the UK (Teesside, England). There are currently 29 platforms installed in the area, some of which are in the British North Sea. The most recent phase of development began in 1994, when the Phillips group (the U.S. company that leads the Ekofisk operating consortium, which includes TotalFinaElf, Norsk Agip, Norsk Hydro, and Statoil) installed two new platforms at "Ekofisk II". Ekofisk II came onstream in August 1998. The Phillips license runs through 2028. In December 2001, it was decided by the government that Phillips would remove 14 of the 29 Ekofisk platforms between 2003 and 2018, at an estimated cost of $1 billion (NKr 8 billion). About 10% of the removal cost will be paid by Phillips, 72% by the Norwegian government, and the remainder will be paid by the other members of the consortium. Phillips plans to bring the steel structures and the topside of the concrete Ekofisk tank ashore for recycling, to leave the rest of the concrete tank and barrier wall in place, and also to leave about 150 miles of pipelines buried. Ekofisk's production (including Eldfisk, Embla, and Tor) is expected to be about 381,000 barrels per day of crude oil in 2002. The Valhall field's production continues to decline, with expected production in 2002 at 72,000 bbl/d. However, the recently approved Valhall water injection and the Valhall flanks should improve recovery from the field. The Yme field has ceased production.

Sleipner West was discovered in 1974, but Sleipner East went into production first, in 1993. Sleipner West is tied back into Sleipner East, and the fields share the same operations organization. Sleipner is mostly important for natural gas production, including liquids and condensate (2002 condensate production in East and West is estimated at 3.7 million cubic meters), but the Varg field is estimated to produce 8,300 bbl/d crude oil in 2002. Varg is scheduled to cease production within the next few years.

Moving to the northern North Sea sector, the Frigg-Heimdal area is also mostly important as a natural gas producing area, though the Balder and Jotun fields together are expected to produce about 124,000 bbl/d of crude oil in 2002. Balder was proven as early as 1967, though production did not commence until 1999. Shuttle tankers are loaded from a production ship tied to subsea-completed walls. Several structures close to Balder are being developed by Ringhorne platform. Jotun also commenced production in 1999, from a floating production, storage, and offloading vessel (FPSO) that is serviced by shuttle tankers.

The Statfjord area is one of the largest oil producing areas in the North Sea. The Statfjord field itself was discovered by Mobil in 1974, and it extends into the British North Sea. Production began from Statfjord A in 1979, from Statfjord B in 1982, and from Statfjord C in 1985. Production from the Statfjord North and Stafjord East subsea installations are tied back into Stafjord C. Statoil took over the operations from Mobil in 1987. Three large concrete platforms with storage cells have been installed on Statfjord. Britain's 14.5% share goes by pipeline via the Brent field to Scotland. Statfjord's production has exceeded the most optimistic expectations, but all Statfjord fields are now in decline. Norway's share of Statfjord crude oil production in 2002 (including North and East) is expected to be 205,000 bbl/d. Statfjord should continue producing until 2020.

The Snorre field, with production rising, has become the largest single field in the area, with 2002

production estimated to be 228,000 barrels per day. It was discovered in 1979, and production commenced in 1992 (see above). Norway's third largest field is Gullfaks, which, including West and South, is expected to produce 223,000 bbl/d in 2002. Gullfaks (including West) has declined by over 50% since its peak in 1995, but Gullfaks South (including Rimfaks and Gullveig) has had increasing production since it came online in 1998, to 70,000 bbl/d expected for 2002. Vigdis continues to decline from its peak in 1999, but Visund, which is east of Snorre, has had its production increase, with 2002 expected to be 43,000 bbl/d.

The various Oseberg fields (Oseberg, East, South, West) together are the largest oil producing fields in their area, whereas Troll is the largest gas field in the area. Oseberg began production in 1988, and peaked at about 500,000 bbl/d in 1996, and has declined since to about 176,000 bbl/d (including West), far below the capacity of the three platforms there. The surrounding East and South Oseberg fields have come online in 1999 and 2000, respectively, supplementing the declining production at Oseberg with 130,000 bbl/d expected for 2002. Both East and South peaked in 2001. There is a pipeline from Oseberg to the Sture terminal on the Norwegian coast, with tie-backs from East and South to Oseberg. A thin layer of oil underlies the entire Troll field, but it is only sufficiently thick for commercial recovery in the Troll West region. This is where Troll Phase II is expected to produce 316,000 bbl/d in 2002 - production has been relatively flat since 2000, though Troll achieved a daily record of 440,000 bbl in May 2002. There is a pipeline from Troll West to the Mongstad crude oil terminal on the Norwegian coast.

The Norwegian Sea has seen production increase at a higher rate than North Sea production in recent years, though it is in an earlier stage of development, the first field having come on stream in 1993. Total production for the area for 2002 is predicted to be 725,000 bbl/d. Much of the increase comes from the new Asgard field, which went into production in 1999, and now produces about 148,000 bbl/d. Norne's production also increased in 2001, though a slight decline is predicted for 2002. Heidrun's production has declined to less than that of the Norne field. Draugen's production has been flat in the past two years, but it is still has the highest production at about 200,000 bbl/d. Shuttle tankers are used to take oil from the platforms or production ships, as there is currently not an oil pipeline from the Norwegian Sea.

NATURAL GAS

Norway holds 44 trillion cubic feet (Tcf) of natural gas reserves. Norway is not a major natural gas consumer, although its consumption is expected to increase in coming years as natural gas-fired power plants come online. It is estimated that just 16% of Norway's gas reserves have been extracted since output began, though Norway produced more gas than it discovered for the first time in 2001, as the increase in reserves was between 700-900 billion cubic feet (Bcf). Natural gas accounts for about 60% of Norway's overall offshore hydrocarbon reserves and is expected to account for an increasing portion of Norway's energy exports. Norway continues to be the second-largest natural gas exporter in Europe, with its growth outpacing that of Europe's largest natural gas exporter, Russia. Exports are forecast to be between 1.9-2.3 Tcf in 2002. Export volumes peaked at about 6.7 Bcf per day in the second quarter of this year, but will have to decline slightly if the forecast is correct. Norway's sub-sea natural gas export network is capable of transporting about 3 Tcf per year.

Natural Gas Exports

Norway, as a member of the European Economic Area (EEA), is bound by certain EU economic directives, and the EU recently has forced Norway to restructure the way it sells natural gas to other European countries. Prior to June 1, 2001, all Norwegian gas was sold through the Gassforhandlingsutvalget (GFU, meaning Gas sales negotiating committee). Although ownership of Norway's gas is held by many different companies and formerly the SDFI, now Petoro, the GFU consisted of just Norsk Hydro and Statoil. The GFU would set a price for all Norwegian gas available for purchase, instead of letting the various producers compete against each other. The EU claimed that this violated fair trading practices and threatened Statoil and Norsk Hydro with huge fines. In July 2002, Norway and the European Commission resolved this long-running dispute over the legality of long-term contracts negotiated by the defunct Gas Sales Negotiating Committee (GFU). The European Commission had threatened to take legal action against Statoil and Norsk Hydro because long-term contracts already in place that account for about 20% of western Europe's gas imports were negotiated by means of the GFU and because many of these contracts have destination clauses (prohibition of resale). Under the negotiated deal, the Commission relented on its demand to have the long-term contracts revised in return for Statoil and Norsk Hydro agreeing to sell 530 Bcf over a four-year period to new European customers (customers without GFU-era contracts). In May 2002, most natural gas exporting companies agreed to coordinate ownership of their pipeline assets through shares in the new government-backed Gas-Led company. The state-owned company Gassco is the operator on all of Norway's natural gas pipelines (since January 1, 2002), as the partial privatization of the former operator, Statoil, created a conflict of interest.

The effects of all these changes are yet to be seen, though the expectation is that the price of Norwegian natural gas will be reduced, at least in the short to medium run. A major constraint for upstream gas companies competing for sales in the newly deregulated market will be limited infrastructure to take the gas out, because various companies share the same pipeline. Norwegian gas arrives in Europe through the following trunklines: the Europipe I and Statpipe/Norpipe systems to Germany; the Zeepipe trunkline to Zeebrugge in Belgium; the NorFra line to Dunkerque in northern France; and the Europipe II line from Kårstø north of Stavanger to Emden. These Norwegian trunklines provide a combined gas transport capacity of 2.7 Tcf per year. There are also pipelines to the UK, including the new Vesterled pipeline, which opened in October 2001, with volumes at about 138 million cubic feet per day. Marathon is exploring the potential demand for its proposed Symphony natural gas pipeline, which would bring additional Norwegian natural gas to the UK through a link between the Heimdal complex and the Brae/Miller complex in the UK sector.

Statoil expects Norway's share of natural gas deliveries to continental Europe to rise from 14% in 1996 to 20% by 2005. The following companies currently buy Norwegian gas: Ruhrgas, BEB, Meeg, Thyssengas and Verbundnetz Gas (Germany), Gaz de France (France), Gasunie, SEP (the Netherlands), Distrigaz (Belgium), Enagas (Spain), Austria Ferngas, OMV (Austria), Snam (Italy), Energia (Italy), Polish Oil and Gas Company (Poland), Transgas (Czech Republic), and Centrica (UK). Germany is the largest natural gas market in continental Europe, and about 20% of the gas that Germany currently consumes comes from Norway. Ruhrgas expects Norway to supply 30% of Germany's imports. About half of the gas from the NorFra line transits through France to points in Italy and Spain, while the other half is consumed in France. By 2005, this pipeline is expected to supply one-third of France's total gas

consumption.

In July 2001, Stoltenberg and Polish Prime Minister Jerzy Buzak signed a joint declaration for the deliveries of 177 billion cubic feet (Bcf) of natural gas from Norway annually. Existing Polish infrastructure cannot support significant imports from non-Russian sources, so a pipeline across the Baltic through either Sweden or Denmark was being planned, but it now appears unlikely that a natural gas pipeline to Poland will be built because of insufficient demand volumes. There is a competing plan to import liquefied natural gas (LNG) from Norway to a planned LNG terminal on Poland's Baltic Coast. Norway began piping a relatively small amount of gas through Germany in October 2000, based on an earlier contract signed in May 1999, for the delivery of 17.7 Bcf annually, under an agreement between Germany's Ruhrgas and Verbundnetz Gas and Poland's state-held gas monopoly.

The United Kingdom, the largest natural gas market in Europe, will also soon become an importer of Norwegian gas again. Norway had once supplied up to a quarter of British demand in the 1980s, but this dwindled as the Frigg field that supplied the gas was depleted. Vesterled will connect the existing Frigg pipeline with the Heimdale platform, which is already connected by pipeline to the Sleipner gasfields, and from there to other areas of the Norwegian North Sea such as the Ormen Lange gasfield that is scheduled to come on stream in 2006. In July 2001, BP announced a 15-year contract to buy 56.5 Bcf natural gas per year from Statoil. In June 2002, Centrica of the UK signed a 10-year deal with Statoil for the purchase of 483.5 million cubic feet per day, with prices linked to natural gas rather than oil.

Natural Gas Production

The Troll field (East and West) contains over half of Norwegian natural gas reserves and, as Norway's largest natural gas field, Troll produces over 72 Bcf per month. It has a production capacity of 100 million cubic meters (3.5 Bcf) per day, and estimated production in 2002 is expected to be 22.8 billion cubic meters (805 Bcf). The Troll Gas development Phase I in Troll East comprises the Troll A platform, the gas treatment plant at Kollsnes near Bergen, and pipelines linking these two installations. Troll East is thought to contain two-third's of Troll's natural gas reserves. Phase III (under development) will extract gas from Troll West. Troll A is the tallest structure ever moved by humans. Its concrete gravity base structure has been built for a lifetime of 70 years. The division of roles on the field has been controversial. Currently, Statoil and the new Petoro have about three-quarters of the shares and Statoil is the operator, followed by Norsk Hydro, Shell, TotalFinaElf, and Conoco. The gas is taken by the Zeepipe to Zeebrugge and Statpipe/Norpipe to Emden.

Troll is not the only active natural gas field in Norway's North Sea. Gas sales began in 1977 from Ekofisk and Frigg. Ekofisk, in the southern North Sea sector, supplies Ruhrgas, Gaz de France, Gasunie and Distrigaz. Ekofisk has declined from its peak in the late 1970s and a production spike in the 1990s, though it is still expected to produce 5.95 billion cubic meters (210 Bcf) in 2002. Frigg production is sold to British Gas, though Frigg has declined to the point that production is expected to cease sometime this year. Nearby Heimdal's declining production is also set to cease this year. Agreements on selling gas from Statfjord, Gullfaks and Heimdal were signed in 1981 and deliveries began in 1985 to Ruhrgas, BEB, Thyssengas, Gaz de France, Gasunie, Distrigaz, Elf and Meeg. Remaining commitments under these deals average six billion cubic meters per year (212 Bcf). Sleipner, East and West, is expected to

produce 13.6 billion cubic meters (479 Bcf) in 2002; this gas is currently sold under the Troll gas sales agreements. Though Sleipner East is declining, most natural gas production is from Sleipner West, which continues to have sharply increasing production. The Norwegian share of gas from the field is piped through the Statpipe/Norpipe system to Emden in Germany via Kårstø, north of Stavanger.

Huldra commenced production with an unmanned platform in November 2001, with natural gas production steadily rising and already at about 350 million cubic feet per day (total expected production 3.19 billion cubic meters or 113 Bcf for 2002). Huldra also produces condensate and about 28,000 bbl/d of crude oil. The crude and condensate are piped to Veslefrikk B, and the gas is piped to Heimdal.

The Åsgard field on the Halten Bank in the Norwegian Sea is one of Norway's most important new projects. The field has been developed as a chain of four interconnected projects: development of Åsgard itself, construction of the Åsgard Transport gas trunkline from the field to the Kårstø gas treatment plant north of Stavanger, the Kårstø development project, and the Europipe II gas trunkline from Kårstø to Dornum in northern Germany. Gas production from the floating platform began in October 2000, and is expected to be 8.9 billion cubic meters (314 Bcf) in 2001. Statoil is the operator of the project, which is one of Norway's giant offshore developments, on par with Ekofisk and Troll. Subsea production installations in the field are planned to be the most extensive in the world, embracing a total of 51 wells grouped in 17 seabed templates. It will link the Halten Bank area to Norway's gas transport system in the North Sea.

Statoil now is developing the Halten Bank South area of the Norwegian Sea, having taken over as operator in January 2000 (Saga had been the operator). Recoverable reserves of the Halten Bank South fields are estimated at 140 billion cubic meters (almost 5 Tcf) of gas and about 440 million barrels of oil and condensate - on par with Åsgard. The Kristin field of the Halten Bank has already secured sales of up to 31 billion cubic meters (1.1 Tcf) from 2005 to 2016. ExxonMobil made the largest discovery of 2000 in this area, the Bella Donna field, with estimated reserves between 60 and 125 billion cubic meters (2.1-4.4 Tcf).

In March 2002, the Norwegian parliament approved Statoil's plans to develop the $5 billion Snohvit project. If it is completed, Snohvit will be the largest sub-sea liquefied natural gas (LNG) project in the

world, as well as the most northerly as it is located in the Barents Sea. Approximately 201 Bcf per year of natural gas would be piped to the coast, liquefied, and transported to customers in Spain and the United States by means of four carriers. In June 2002, El Paso of the United States, announced that it had final Norwegian and U.S. government approval for its plans to import 1.8 million metric tons of LNG to the United States from Snohvit. This is over 40% of the project's capacity, and much of the LNG may be delivered to El Paso's Cove Point, Maryland regasification facility. Construction of Snohvit restarted in June as well.

The huge Ormen Lange field in the Norwegian Sea, Norway's second largest natural gas discovery with estimated reserves of of 14.1 Tcf, has its blocks divided into three production licenses, with the unusual characteristic that Statoil/SDFI has only a 30% share of one of the licenses, such that non-Norwegian companies are the majority owners of one of the licenses. Norsk Hydro is the operator in the development phase, and Shell will be the operator in the production phase. Gas production is planned to commence in 2007.

COAL

Norway's coal production occurs on Spitsbergen of the Svalbard Islands, off the country's northern coast. This island also has Norway's only coal-fired power plant. In December 2001, the Norwegian Parliament voted to give a $16.9 million subsidy to state-owned coal monopoly Store Norske Sisbergen Kulkompani. Mining in Svalbard will be expanded and eventually, coal exports are planned. However, Norway is currently a net importer of coal, though overall consumption is small at 1.57 million short tons in 2000.

ELECTRICITY

In 2000, 99% of Norway's electricity generation came from its 27 million kilowatts of installed hydroelectric capacity. Norway has one of the highest rates of per-capita consumption of electricity in the world. In December 2001, state-owned Norwegian electricity company Statkraft purchased independent electricity company Trondheim Energiverk for $483 million. This makes Statkraft the second-largest electricity supplier in Scandinavia and gives the company over 50% of the Norwegian electricity market. Prime Minister Stoltenberg declared, in January 2001, that "the era of large-scale new hydropower is over" and that several large new hydro projects are to be abandoned, including Beiarn, Bjollaga, and Melfjord. A new hydro plant with greater capacity is being constructed to replace the exisiting one at Tyin.

Norway is planning to construct three new natural gas-fired power plants. Construction of two natural gas-fired power plants by Naturkraft appears set to go ahead sometime this year. Naturkraft recently asked the government to extend its license to build these plants beyond 2004. This issue, which has not been completely resolved, is extremely important in Norway, as Prime Minister Bondevik's previous term of office ended in a vote of no confidence that overrode his opposition to the plants. Industrikraft Midt-Norge also plans to build a natural gas-fired plant, and has an allowance to emit 2.2 million tones of carbon dioxide per year. This 2X400 gas-fired combined heat and power plant in Skogn, central Norway is slated to begin construction in 2002. U.S.-based Mirant has bought 40% of five-member industrial

consortium IMN, which will build, operate, and own the plant.

Norway has had a surplus of hydroelectric power in the past two years, but in drier years it must import electricity. In January 2001, E.On of Germany, Statkraft, and Elsam of Denmark agreed to free up capacity on key power cables linking the high tension electricity grids of Scandinavian countries to Germany, including the Skaggerrak cable, the only cable connecting western Denmark and Norway.

In May 2002, the European Free Trade Area (of which Norway is a member) informed the government that industry's exemption from taxation on electricity cannot continue. Consumers currently pay a 9% tax on electricity.

ENVIRONMENT

Norway is a proponent of "green power" from renewable sources and has made efforts to make its oil sector as environmentally friendly as possible. Under its Kyoto Protocol commitment, Norway has agreed to limit its carbon emissions to a 1% increase from 1990 levels by the 2008-2012 commitment period. In a dual effort to meet its Kyoto target and to further develop technologies to make oil and gas production less environmentally damaging, Norway has been a leader in alternatives for reducing carbon emissions. As a result of high activity in the oil and gas extraction sectors, Norway is relatively more energy-intensive than most OECD countries, and possesses one of the highest per capita energy consumption levels in the world. Air pollution in Oslo is not as severe as in other major world cities.

Sources for this report include: Economist Intelligence Unit, Financial Times, Hart's European Petroleum Finance Week, International Monetary Fund (IMF), Oil Daily, Norwegian Ministry of Oil and Energy, Petroleum Economist, Petroleum Intelligence Weekly, Platt's Oilgram News, Statoil, The Scotsman, DRI-WEFA, World Markets Energy .

COUNTRY OVERVIEW

Head of State: King Harald V
Prime Minister: Kjell Magne Bondevik (since October 2001)
Independence: October 26, 1905 (from Sweden)
Population (2001E): 4.5 million
Location/Size: Northern Europe, bordering the North Sea and the North Atlantic Ocean, west of Sweden/123,843 square miles (slightly larger than New Mexico)
Capital City: Oslo
Language: Norwegian (small Lapp- and Finnish-speaking minorities)
Ethnic Groups: Germanic (Nordic, Alpine, Baltic), Lapps (Sami) 20,000
Religions: Evangelical Lutheran 87.8% (state church), other Protestant and Roman Catholic 3.8%, none 3.2%, unknown 5.2%
Defense (8/98): Army, 28,900; Navy, 6,100; Air Force, 6,700 (including 16,500 conscripts)

ECONOMIC OVERVIEW

Finance Minister: Per-Kristian Foss
Minister of Trade and Industry: Ansgar Gabrielsen
Currency: Norwegian Krone (NKr)
Exchange Rate (9/09/02): 1 US Dollar = 7.52 Kroner
Gross Domestic Product (GDP, 2001E): $163.7 billion
Real GDP Growth Rate (2001E): 1.4% **(2002F):** 2.3%
Inflation Rate (consumer prices, 2001E): 3.0% **(2002F):** 1.5%
Unemployment Rate (2001E): 3.6% **(2002F):** 4%
Merchandise Exports (2001E): $58.6 billion
Merchandise Imports (2001E): $33.6 billion
Merchandise Trade Surplus (2001E): $25 billion
Major Trading Partners:UK, Germany, Sweden, Denmark, United States, other EU members
Major Exports: Fuels and other energy products; food and beverages; manufactured materials
Major Imports: Machinery and transport equipment, miscellaneous manufactures, food, beverages, and tobacco

ENERGY PROFILE

Minister of Petroleum and Energy: Einar Steensnaes
Proven Oil Reserves (1/1/02E): 9.4 billion barrels
Oil Production (2001E): 3.4 million barrels per day (bbl/d), of which 3.1 million bbl/d was crude oil
Oil Consumption (2001E): 0.2 million bbl/d
Net Oil Exports (2001E): 3.3 million bbl/d
Crude Oil Refining Capacity (1/1/02E): 310,000 bbl/d
Natural Gas Reserves (1/1/02E): 44 trillion cubic feet (Tcf)
Natural Gas Production (2000E): 1.81 Tcf
Natural Gas Consumption (2000E): 0.087 Tcf
Net Natural Gas Exports (2000E): 1.7 Tcf
Electrical Generation Capacity (1/1/00E): 27.2 gigawatts
Electricity Generation (2000E): 141 billion kilowatthours (bkwh)
Electricity Consumption (2000E): 112 bkwh
Recoverable Coal Reserves (12/31/99E): 1 million short tons (Mmst)
Coal Production (2000E): 0.55 Mmst
Coal Consumption (2000E): 1.57 Mmst
Major Systems: Statfjord, Oseberg, Gullfaks, Ekofisk
Major Companies: BP, ConocoPhillips, ExxonMobil, TotalFinaElf, Norsk Hydro, Shell, Statoil, Chevron, Petoro

ENVIRONMENTAL OVERVIEW

Minister of Environment: Borge Brende
Total Energy Consumption (2000E): 1.8 quadrillion Btu* (0.5% of world total energy consumption)
Energy-Related Carbon Emissions (2000E): 10.3 million metric tons of carbon (0.2% of world total carbon emissions)

Per Capita Energy Consumption (2000E): 399.6 million Btu (vs. U.S. value of 348.9 million Btu)
Per Capita Carbon Emissions (2000E): 2.3 metric tons of carbon (vs. U.S. value of 5.7 metric tons of carbon)
Energy Intensity (2000E): 10,619 Btu/$1995 (vs U.S. value of 10,390 Btu/$1996)**
Carbon Intensity (2000E): 0.06 metric tons of carbon/thousand $1995 (vs U.S. value of 0.17 metric tons/thousand $1996)**
Sectoral Share of Energy Consumption (1998E): Industrial (52.1%), Residential (21.7%), Transportation (13.1%), Commercial (13.1%)
Sectoral Share of Carbon Emissions (1998E): Industrial (57.0%), Transportation (37.9%), Residential (2.6%), Commercial (2.5%)
Fuel Share of Energy Consumption (2000E): Oil (21.9%), Natural Gas (5.3%), Coal (2.2%)
Fuel Share of Carbon Emissions (2000E): Oil (72.7.1%), Natural Gas (16.7%), Coal (10.6%)
Renewable Energy Consumption (1998E): 1,248 trillion Btu* (5% increase from 1997)
Number of People per Motor Vehicle (1998): 2.0 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (July 9th, 1993). Signatory to the Kyoto Protocol (signed April 29th, 1998- not yet ratified). Under the Protocol, Norway has agreed to a 1% increase from 1990 emissions levels of a basket of greenhouse gases.
Major Environmental Issues: Water pollution; acid rain damaging forests and adversely affecting lakes, threatening fish stocks; air pollution from vehicle emissions.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 2000

For more information from EIA on North Sea, please see:
EIA - Country Information on Norway

Links to other U.S. government sites:
CIA World Factbook - Norway

U.S. Department of Energy's Office of Fossil Energy's International section - Norway
U.S. State Department Consular Information Sheet - Norway
U.S. State Department Background Notes - Norway
U.S. Embassy in Oslo

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October 2001

Regional Indicators: European Union (EU)

The European Union, with increasingly integrated economies and energy sectors, is the world's second-largest energy consumer (behind the United States). EU members include: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

Note: Information contained in this report is the best available as of October 2001 and is subject to change.

BACKGROUND

The European Union (EU) was founded as the European Economic Community (EEC) by the Treaty of Rome in 1957 to promote economic and political integration in Europe. The founding of the EEC followed the creation of the European Coal and Steel Community, established after World War II as a means of promoting integration among former enemies. The EEC has expanded from its original six members (Belgium, France, the Federal Republic of Germany, Italy, Luxembourg, and the Netherlands) to include the United Kingdom, Ireland, and Denmark in 1973; Greece in 1981; Spain and Portugal in 1986; and Austria, Finland, and Sweden (former members of the European Free Trade Association) in 1995. The Treaty on European Union (known as the Maastricht Treaty) ushered in a new stage in European history when it entered into force on November 1, 1993. Maastricht renamed the community (now known as the EU), created European citizenship, strengthened the power of the European Parliament, laid out plans for Economic and Monetary Union (EMU), and committed members to negotiate for expansion of the EU to include Central and Eastern European countries. In 2000, EU members were estimated to account for 29% of world economic activity (see Table 1), a share that remained about constant during the 1990s. The United States has extensive trade relations with the EU. In 2000, 22% of U.S. exports ($152 billion) went to EU members, and 19% of U.S. imports ($195 billion) originated in EU countries.

As part of EMU, 11 EU member countries (Belgium, France, Germany, Italy, Spain, Portugal, Finland, Austria, the Netherlands, Ireland and Luxembourg) adopted a new common European currency, called the "euro," on January 1, 1999. The European Central Bank (ECB) is housed in Frankfurt, Germany. This means that a single monetary policy for the 12 particpating countries is elaborated at the ECB. Euro banknotes and coins are scheduled to begin circulating in all participating countries no later than January 1, 2002, and the euro is to replace completely all participating countries' national currencies by July 1, 2002. Most countries' banks have already been frontloaded with coins and banknotes, starting in September 2001.

Greece was the only EU member country that applied but was denied entry to EMU at its introduction; in June 2000, Greece's application was accepted and Greece became a member of the euro-zone on January 1, 2001. The

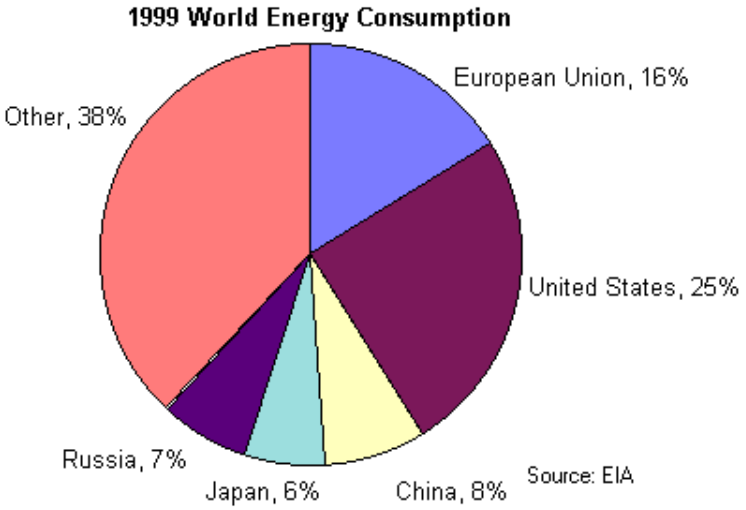
United Kingdom and Denmark opted out and Sweden purposely did not meet requirements. The euro-zone represents about 80% of the EU's GDP. The euro currently functions as a base currency for the currencies of all the countries participating in the euro; they are all fixed to the euro, and although the euro is not used as banknotes or coinage, the euro is the only currency that fluctuates in value with other currencies, including the U.S. dollar. The euro fell in value intially against the dollar, from being worth $1.18 in January 1999, to about $1.00 by the end of 1999, and $0.85 in October 2000, before rising again to $0.93 in January 2001. Since then, the euro has stabilized at between $0.93 and $0.85, being valued most recently at $0.91.

In 2001, the Treaty of Nice was signed by member governments. This treaty changes the way the institutions of the EU operate in order to make possible the admission of new member states in the future. Central and Eastern European EU applicants expected to join in the next phase of EU expansion include Poland, Hungary, the Czech Republic, Estonia, Slovenia and Cyprus. Some EU members are calling for a target date by which these applicants will be admitted officially. No date has been set, but membership is expected to extend to these six countries by about 2005. Slovakia, Bulgaria, Romania, Latvia, Lithuania, Turkey and Malta also have begun discussions of accession.

EU legislation has played a significant role in member countries' domestic energy policies. The EU Directive on Electricity was passed in January 1997 and required members to begin opening up their electricity markets to competition within two years (Greece, Belgium and Ireland were granted waivers). The EU Natural Gas Directive was passed in June 1998 (Greece, Belgium,and Ireland again were granted waivers), requiring the opening of EU members' gas markets. The Gas Directive has also affected Norway, as it is a member of the European Economic Area (EEA).

ENERGY CONSUMPTION

In 1999, EU countries consumed 62.7 quadrillion British thermal units (Btu) of energy (16% of the world's total) and generated 915 million metric tons of energy-related carbon emissions (15% of the world's total). Oil is the dominant fuel (see Table 2), accounting for 44% of 1999 total energy consumption in the region, followed by natural gas at 22%. In 1999, EU members consumed about 34% of the world's nuclear power, 18% of the world's oil, 16% of the world's natural gas, and over 10% of the world's coal. Over the past decade, natural gas has been the fastest growing fuel source in the EU, mainly at the expense of coal, whose share has declined sharply. This is in part due to environmental considerations, but also due to increased availability of natural gas supplies because of pipelines from Algeria, Norway, and Russia. Nuclear power generation has grown only slightly over the past decade. Nuclear power is gradually being phased out in Germany over the next twenty years, so its share of EU energy consumption is likely to drop. Hydroelectric power generation has remained about constant over the past decade. Other "renewables" (geothermal, biomass, solar, wind) doubled between 1992 and 1999, from a relatively small base level. Renewable energy and natural gas are expected to be the two fastest growing fuels in the EU over the next 20 years.



The combined economies of the EU are similar in size to the U.S. economy ($8.5 trillion gross domestic product for the EU in 2000 and $10 trillion for the United States), and the EU population of 379 million exceeds the U.S. population of 278 million. However, EU total energy consumption for 1999 of 63 quads is less than the U.S.

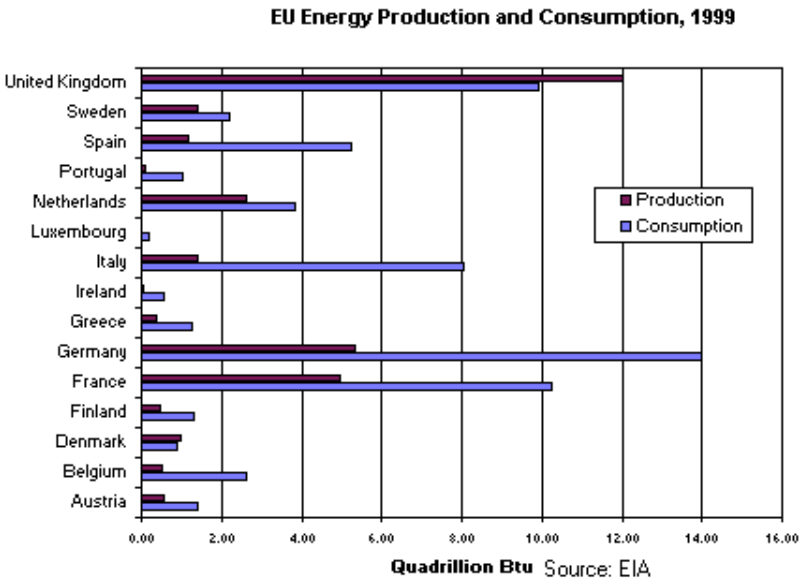
consumption of 97 quads.

ENERGY RESOURCES AND SUPPLY

EU members possess only about 0.7% of the world's proven reserves of oil and 2.2% of the world's natural gas reserves (see Table 3). However, they have 7.4% of proven coal reserves, 16% of the world's capacity for refining crude oil into petroleum products, and 16% of the world's electric generating capacity. In 1999, they produced 5% of the world's crude oil, 9% of the world's natural gas, and 8% of the world's coal.

IMPORT DEPENDENCY

The EU region is a net importer of energy. In 1999, while the EU's 15 members consumed 16% of the world's energy, they produced only 8%. Import dependency varies by fuel and individual country, with an overall import dependency for the entire EU of around 50%. In 1999, the EU was a net importer of coal (8% of world production in terms of tonnage vs. 11% of consumption in terms of tonnage); natural gas (9% of world production vs. 16% of consumption); and oil (5% of world production vs. 18% of consumption). Germany, Italy, and France are the EU's largest net importers of energy; the United Kingdom is the only significant net exporter. EU oil is imported primarily from Russia, the Persian Gulf region, Norway, and North Africa.



ENERGY USE AND CARBON EMISSIONS

The 15 EU countries collectively emitted 915 million metric tons (Mmt) of carbon from the consumption of fossil fuels in 1999. This accounted for 15% of world carbon emissions in that year. Of the EU countries, Germany emitted the most carbon (230 Mmt), followed by the United Kingdom (152 Mmt), Italy (121 Mmt) and France (109 Mmt). Overall, the EU emitted 2.4 metric tons of carbon per person in 1999, compared to a U.S. average of 5.6 metric tons per person. Under the December 1997 Kyoto Protocol, the EU is obligated to reduce its greenhouse gas emissions 8% from 1990 levels (in that year, the EU emitted 913 Mmt of carbon) by 2008-2012. All EU member states signed the Kyoto Protocol on April 29, 1998. On June 17, 1998, the EU agreed on how it would meet the 8% reduction. Under this agreement, different EU member states are assigned varying degrees of emission cuts, ranging from a 4% increase in the case of Sweden, to a reduction of 28% in the case of Luxembourg, with other countries somewhere in between.

Table 1. Economic and Demographic Indicators for EU Countries

	Gross Domestic Product (GDP) (purchasing power parity)				
	2000E (Billions of U.S. Dollars)	Real GDP Growth Rate		Per Capita, 2000E(U.S. Dollars)	Population, 2001E (Millions)
		2000 Estimate	2001 Projection		

Austria	$203	3.1%	2.6%	$25,000	8.2
Belgium	$259.2	4.1%	2.5%	$25,300	10.3
Denmark	$136.2	2.8%	2.2%	$25,500	5.4
Finland	$118.3	5.6%	4%	$22,900	5.2
France	$1,448	3.1%	2.7%	$24,400	59.6
Germany	$1,936	3%	2.4%	$23,400	83
Greece	$181.9	3.8%	3.9%	$17,200	10.6
Ireland	$81.9	9.9%	8.4%	$21,600	3.8
Italy	$1,273	2.7%	2.5%	$22,100	57.7
Luxembourg	15.9	5.7%	5.5%	$36,400	0.4
Netherlands	$388.4	4%	3.2%	$24,400	16
Portugal	$159	2.7%	2.8%	$15,800	10
Spain	$720.8	4%	4.4%	$18,000	40
Sweden	$197	4.3%	2.8%	$22,200	8.9
United Kingdom	$1,360	3%	2.4%	$22,800	59.6
Total	**$8,478.6**	**3.3%**	**2.8%**	**$22,446**	**378.7**

Source: CIA, WEFA World Economic Outlook.

Table 2. Energy Consumption and Carbon Emissions in EU Countries, 1999

	Energy Consumption								**Carbon Emissions (Million metric tons)**
	Total (Quadrillion Btu)	**Petroleum**	**Natural Gas**	**Coal**	**Nuclear**	**Hydroelectric**	**Other Renewable Electricity**	**Net Electricity Imports**	
Austria	1.39	39%	22%	9%	0%	30%	1%	-1%	18

Belgium	2.61	46%	23%	12%	18%	0.1%	0.4%	0.3%	38
Denmark	0.89	53%	23%	22%	0%	0.03%	5%	-3%	17
Finland	1.31	34%	11%	11%	17%	10%	8%	9%	13
France	10.26	41%	14%	6%	38%	7%	0.2%	-6%	109
Germany	13.98	41%	21%	23%	12%	1%	1%	0.1%	230
Greece	1.28	63%	4%	29%	0%	4%	0.3%	0.1%	26
Ireland	0.56	62%	23%	12%	0%	2%	0.5%	0.4%	10
Italy	8.04	51%	30%	6%	0%	6%	1%	5%	121
Luxembourg	0.19	49%	15%	2%	0%	2%	0.4%	31%	2
Netherlands	3.85	45%	40%	8%	1%	0.03%	1%	5%	64
Portugal	1.02	68%	8%	15%	0%	7%	1%	-1%	17
Spain	5.23	57%	11%	14%	11%	5%	1%	1%	82
Sweden	2.20	34%	1%	4%	30%	33%	1%	-4%	16
United Kingdom	9.92	35%	35%	16%	11%	1%	1%	%	152
Total	**62.73**	**44%**	**22%**	**13%**	**14%**	**5%**	**1%**	**0.4%**	**915**

Source: Energy Information Administration *Note: Percentages may not add to 100% due to independent rounding.*

Table 3. Energy Supply Indicators--EU Countries								
	Fossil Fuel Proved Reserves			**Fossil Fuel Production, 1999**				
	Crude Oil, 1/1/01(Million barrels)	**Natural Gas, 1/1/01 (Trillion cubic feet)**	**Coal (Billion short tons)**	**Oil (Crude, liquids, and processing gain; Thousand barrels/day)**	**Natural Gas (Trillion cubic feet)**	**Coal (Million short tons)**	**Electric Generating Capacity, 1/1/99 (Million kilowatts)**	**Crude Oil Refining Capacity, 1/1/01 Thousand barrels/day)**

Austria	86	0.9	0.0	21	0.1	1.3	14	209
Belgium	0	0.0	0.0	12	0.0	0.4	13	768
Denmark	1,069	3.4	0.0	304	0.3	0.0	13	176
Finland	0	0.0	0.0	0	0.0	0.0	16	200
France	145	0.5	0.1	80	0.1	6.3	108	1,895
Germany	380	11.5	73.9	132	0.8	226.1	108	2,259
Greece	10	0.0	3.2	4	0.0	67.2	9	407
Ireland	0	0.7	0.0	1	0.0	0.0	4	71
Italy	622	8.1	0.0	147	0.6	0.0	66	2,359
Luxembourg	0	0.0	0.0	0	0.0	0.0	0	0
Netherlands	107	62.5	0.5	114	2.6	0.0	14	1,204
Portugal	0	0.0	0.0	2	0.0	0.0	10	304
Spain	21	0.0	0.7	20	0.0	26.7	45	1,294
Sweden	0	0.0	0.0	0	0.0	0.0	33	423
U.K.	5,003	26.8	1.7	2,967	3.5	40.9	70	1,771
Total	**7,443**	**114.4**	**80.1**	**3,804**	**8.0**	**368.9**	**523**	**13,340**

Sources: Energy Information Administration, *Oil & Gas Journal*.

Sources for this report include: Energy Information Administration, International Energy Agency; European Union; Oil and Gas Journal.

LINKS

Links to other U.S. government sites:
International Trade Administration, Country Commercial Guide
Department of Commerce "Showcase Europe"

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July 2001

Background | Oil | Natural Gas | Electricity | Links

Balkans Region

The Balkans have been the scene of political turmoil since the dissolution of the former Yugoslavia in the early 1990s. Even so, the Balkans are becoming an important transit center for energy supplies from the Black Sea area and beyond to Europe.

Note: All information contained in this report is the best available as of July 2001 and can change.

GENERAL BACKGROUND

The Balkans at its broadest conception can be considered to comprise the entire landmass south of Ukraine, Slovakia, and Austria, and east of Italy. However, for the purposes of this report, the countries that once encompassed the former Yugoslavia (Bosnia and Herzegovina, Croatia, The Former Yugoslav Republic of Macedonia (F.Y.R.O.M.), Slovenia, and the current Federal Republic of Yugoslavia (Serbia and Montenegro)), as well as Albania, will be the focus. Coverage will include energy projects and relationships of larger regional significance. Note that Bosnia and Herzegovina consists of two autonomous entities: the Federation of Bosnia and Herzegovina (FBiH) and the Republika Srpska (RS). The Former Yugoslav Republic of Macedonia will be referred to as simply "Macedonia." Serbia, one of the two constituent republics of Yugoslavia, consists of Serbia proper, as well as two

autonomous provinces: Vojvodina and Kosovo.

Prior to its dissolution, the former Yugoslavia had an energy infrastructure and general level of economic development comparable to that of other eastern block states such as the former Czechoslovakia and Hungary, but there was considerable diversity within the former Yugoslavia, with Slovenia being the most advanced and the Kosovo province of the Serbian Republic being the least developed. With the exception of Slovenia, the warfare and political instability that has occurred since 1991 has damaged the economic, and specifically, the energy infrastructures of all the constituent republics of the former Yugoslavia. Albania, prior to the demise of its isolationist communist regime in 1991, was far less developed economically than any part of the former Yugoslavia, and was the poorest country in Europe. Since that time, the Albanian economy has progressed, but it is still among the least developed in Europe. However, with the exception of Macedonia, the region appears poised for a more peaceful and prosperous decade than the 1990s. Slovenia is likely to be one of the countries to join the European Union (EU) when it expands, having completed many of the requirements of the *acquis communitaire*.

At the beginning of 2001, ethnic Albanian guerillas in Macedonia started a rebellion in Tetovo, the country's second-largest city, that has now caused months of fighting and has partially disrupted the country's economy. Negotiations between the government and ethnic-Albanian parties began after a partially effective cease-fire was put into effect in mid-June, but those negotiations broke down. Special envoys from the United States and EU conducted an urgent assessment of the deteriorating situation in the country on July 25, 2001, one day after riots in the capital and intense fighting between government forces and ethnic Albanian rebels renewed fears of civil war. Later that night, the Macedonian government announced that it had reached a new, NATO-brokered cease-fire with ethnic Albanian rebel forces, which had reached the outskirts of Tetevo. NATO plans to send peacekeepers if a permanent accord can be reached.

Following the end of former Yugoslav President Slobodan Milosevic's government in October 2000 and the initiation of democratic changes in Yugoslavia, all oil sanctions against Yugoslavia were lifted. In June 2001, the Serbian government handed Milosevic over to the United Nations War Crimes Tribunal in The Hague, where is currently imprisoned. Following this move, a conference of western nations pledged to donate $1.3 billion for the rebuilding of Yugoslavia, including at least $100 million from the United States. Montenegro was much less heavily damaged in the Kosovo crisis than was Serbia.

The total population of the former Yugoslavia and Albania is approximately 26.2 million, slightly less than the population of Bulgaria and Romania combined. Total GDP in 1999 (purchasing power parity) was $85.3 billion. Growth rates in 2001 are expected to be above

3% for all of the countries, although it is worth noting that there is significant uncertainty regarding Macedonia because of the political situation, and that Yugoslavia and to a lesser extent Bosnia, are still recovering from massive economic loss due to warfare during the 1990s.

In June 2001, seven Balkan countries - Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, and Yugoslavia - signed an agreement to create a free trade zone for certain goods to come into effect by the end of 2002.

OIL

The countries of the former Yugoslavia and Albania are very small consumers of oil, and even smaller producers, on a world scale, accounting for less than 0.01% of total world production and consumption. The region imported about 218,000 barrels per day (bbl/d) in 1999, mostly overland from Russia and from tankers at Adriatic ports. Total proven oil reserves for the area are 335 million barrels, all in Croatia, Yugoslavia, and Albania. Nevertheless, the region is likely to become relatively more important as a transit center (Figure 1).

International Projects

Currently, there is little cooperation between Balkan countries in oil production development. Some large international oil companies from outside the region have begun to invest in a few projects, but as the production potential of the area is limited, so is international investment. Most international interest is in Albania, which has the second-largest oil reserves in the Balkans, after Romania. Lundin AB of Sweden, Occidental, Forest Oil, OMV of Austria, Hellenic Petroleum (HP) of Greece, and INA of Croatia have all purchased shares of blocks in Albania. Exploration is active, but none are producing yet. U.K.-based Premier Oil is developing part of the Patos-Marinza field, which is already in production by Albanian state oil company Albpetrol. Premier expects initial peak production of 15,000 bbl/d.

Pipelines and Transit

The most important oil pipeline project in development in the Balkans is the AMBO pipeline. The Albanian Macedonian Bulgarian Oil Corporation (AMBO, U.S.-based) will construct a 567-mile, $1.13-billion crude oil pipeline from the Bulgarian port of Burgas to the Albanian port of Valona (Vlore) through Macedonia. The estimated capacity will be 750,000 bbl/d. The pipeline would reduce tanker traffic through the Bosphorus Straits and the Aegean Sea as Black Sea (and indirectly Caspian) oil could be shipped from the Adriatic. AMBO began to assemble financing for the project in June 2001, after letters of acceptance from the three governments and a positive feasibility study. Once the financing is in place, construction is expected to take three years. Also in Macedonia, the construction of

the Skopje-Thassaloniki (Greece) oil pipeline was formally launched in November 1999. This 143-mile, $107-million pipeline has the capacity to carry about 50,200 bbl/d. It is being built by a subsidiary of HP, El Pet Balkiniki. This pipeline will be able to provide a supply nearly triple Macedonia's current requirement. Meanwhile, Greece and Bulgaria have a pipeline planned from Burgas on the Black Sea to Alexandroupolis on the Aegean that would be another alternative to the Bosphorus. Russian backing to supply the oil is crucial to the project going forward.

Another key project is the reversal of the 400,000 bbl/d-capacity Croatian Adriatic Oil (Adria) Pipeline run, by Jadranski Naftovod (JANAF) of Croatia. Currently, oil that arrives by tanker at the Croatian Adriatic port of Omisalj is taken by the pipeline into the interior of Croatia, where it bifurcates at Sisak, with one branch going to Hungary and the other branch going to Yugoslavia (Vojvodina), touching the border with Bosnia at the refinery at Srpski (Bosanski) Brod, before heading on to a connection with a pipeline to Novi Sad (Figure 2). The reversal of the pipeline, accompanied by integration of the Adria and Druzba pipelines (Druzba runs from Russia to Hungary), will mean that Russian oil could be exported by tankers from the Adriatic. Russian oil major YUKOS has signed a $20-million contract with JANAF to finance the upgrading of the Adria pipeline in order to integrate it with the Druzhba pipeline. YUKOS is setting up the company YUKOS-Adria to implement the project, which will allow the export of up to 5 million tons per year (100,000 bbl/d) of Russian crude oil via Belarus, Ukraine, Slovakia, Hungary, and the deep-water port at Omisalj. YUKOS has guaranteed the supply of 2.5 million tons (50,000 bbl/d) for the pipeline, which will give Russian exporters a direct route to world markets via the Adriatic Sea, instead of through the Bosphorus. This pipeline is already used internationally - in March 2001, there was an agreement between JANAF and Serbian Oil Industry (NIS) to transport 13.9 million barrels of oil from Omisalj to refineries in Novi Sad and Pancevo during 2001.

NATURAL GAS

Total natural gas reserves in the former Yugoslavia and Albania are 3,037 billion cubic feet (Bcf), with most of that in Yugoslavia and Croatia, and a small amount in Albania. This is less than 0.01% of total world reserves. This is far smaller than neighboring Romania (13,200 Bcf). Production is likewise small; only Albania, the smallest consumer by far, is self sufficient. Total imports were 206.6 Bcf in 1999. Imports are expected to rise, and new pipelines are being planned and constructed to deliver these imports.

International Projects

Croatia is attempting to increase its domestic production by developing five gasfields in the northern Adriatic, through the Inagip joint venture with ENI of Italy (INA of Croatia and

ENI subsidiary Agip). The $187-million Ivana platform's construction is nearly complete. It is expected to have production of 67 million cubic feet per day (Mmcf/d). The field is estimated to contain 279 Bcf, though gas can only be piped to Italy, then back to Croatia through Slovenia's pipeline network. Under the agreement, Croatia will receive half of all gas produced. Inagip announced that in its exploration of the central Adriatic seabed it had discovered a new gasfield (Marica) in the Aiza Laura block with unproven reserves of 106 Bcf. Gas production at the remaining four northern Adriatic gasfields (IKA, IDA, Irina, Anna Maria) is expected to commence in the near future. These projects open the possibility of building a gas pipeline to the Croatian coast, according to Croatian Prime Minister Ivica Racan.

Pipelines and Transit

There are several new natural gas pipeline projects in progress in the region, in an effort to import more natural gas that originates in Russia, the world's largest natural gas exporter. Bulgaria has been at the forefront of these efforts, investing $44 million in 2001 to expand its natural gas pipeline network in order to pump more Russian gas to its Balkan neighbors, particularly Turkey, Greece, and Macedonia. Under an agreement between Bulgaria (Bulgargas) and Gazprom of Russia, transit volumes to Turkey, Greece, and Macedonia should increase to 494 Bcf after 2002 and to some 671 Bcf by 2010. About 90% of the gas goes to Turkey. Current transit volume to these three countries from Bulgaria is 424 Bcf annually.

Hungary is another country that is becoming increasingly important as a transit center for natural gas. Serbia and Bosnia (through Serbia) import all their natural gas through Hungary's Bratsvo (Brotherhood) pipeline that carries Russian natural gas to Central Europe, and enters Serbia from Horgos, Hungary (near Szeged). Recent agreements between Gazprom and NIS of Yugoslavia that resolve a debt dispute and increase imports from 9 Bcf in 2000 to 53 Bcf in 2001 will assure Hungary's importance as a transit center in the Balkans. Energoinvest imports the Russian gas into Bosnia and Herzegovina from the pipeline connection at the border town of Zvornik. It has an exclusive contract with Gazprom (the details of which are not released), to avoid problems with the often disputing state-owned natural gas companies of Bosnia and Herzegovina's two administrative entities. The pipeline from Belgrade bifurcates at Zvornik, and serves various parts of the two entities, though there are still areas of Bosnia and Herzegovina reliant on truck-delivered canisters. BH gas handles the actual transport arrangements for Energoinvest. MRKS-Holding of Switzerland is planning to build a $100-million, 283-mile pipeline from Zvornik to Novigrad (outside Sarajevo) that would service areas of the RS that currently have no gas supply. Throughput capacity would be over 35.3 Bcf per year, and the pipeline will be connected to the existing Belgrade-Sarajevo pipeline at Zvornik. It is unclear whether

ITERA of Russia or Gazprom will supply the gas.

Romania is expanding its pipelines to supply more gas to its Balkan neighbors. The first 56 miles of a pipeline between Isaccea and Negru Voda in southeastern Romania was completed in December 2000. Tranzgas of Romania concluded an agreement with Gazprom in February 2001, to deliver the gas for this pipeline expansion at preferential rates. Romania aims to transit 988 Bcf annually to Turkey, Bulgaria, Greece, and Macedonia starting sometime in 2002.

Slovenia and Russia are in talks to lay a new Russian natural gas pipeline to Italy through Slovenia. The 186-mile project is estimated to cost $500 million and would have an annual capacity of 777 Bcf.

ELECTRICITY

All of the countries of the former Yugoslavia and Albania were net importers of electricity in 1999, except Slovenia, the second-largest total generator, and the largest generator on a per capita basis (Figure 3). Total net electricity imports were 3.6 billion kilowatt hours (BkWh) in 1999. Total electrical generation capacity in 1999 was 231.3 gigawatts (GW), and total amount of electricity generated was 72.2 BkWh. Generation sources in 1999 for the former Yugoslavia and Albania were 54% thermal, 39% hydro, 6% nuclear, 1% other. Croatia is very hydro-dependent (over 50% of capacity), and Albania is extremely hydro-dependent (over 80% of capacity). Slovenia has the region's only nuclear plant, though its output will soon be shared with Croatia.

Prior to its dissolution in the early 1990s, the former Yugoslavia had a single electricity grid, the Union for the Coordination of the Transmission of Electricity (UCTE) network. UCTE was connected to the Western European power grid. Only Croatia, Slovenia, and the FBiH have been reconnected to the UCTE. However, Yugoslavia (Serbia and Montenegro) is still a major importer from neighboring countries. In February 2001, Czech and Serbian industry/energy ministers signed a memorandum of cooperation in the energy sector, covering mining, power station construction, and the construction, maintenance, and reconstruction of distribution networks. In June 2001, energy ministers from Albania, Bosnia and Herzegovina, Bulgaria, Greece, Macedonia, and Romania signed a memorandum for the creation of a competitive energy market in the Balkans. The Regional Association of Energy Regulators (ERRA) was established in December 2000, in order to create a common power market in South Eastern Europe and the Former Soviet Union. The countries that co-established ERRA are Albania, Armenia, Bulgaria, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia and Ukraine. Albania and Macedonia are members of the Black Sea Regional Energy Center (BSREC), an organization for cooperation the energy field, comprising Albania, Armenia, Azerbaijan,

Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Macedonia, Turkey and Ukraine. Programs concern promotion of energy policy development, diversification of energy supply, and the development of energy interconnections.

In June 2001, the long-running dispute between Slovenia and Croatia over the 664-megawatt (MW) Krsko Nuclear Plant, the only nuclear plant in the former Yugoslavia and Albania, was resolved. The plant is located in Slovenia, but was built jointly by Croatia and Slovenia prior to the dissolution of the former Yugoslavia. Slovenia had made the Krsko plant into a public company, and stopped supplying Croatia with power from the plant in 1998. Under the current agreement, Croatia will be co-owner of the plant (including assuming partial responsibility for the nuclear waste produced), and will begin receiving electric power from the plant again by July 2002.

Croatia is planning to build a hydroelectric plant on the Drava River, which is the border with Hungary. Croatia has agreed to cooperate with Hungary, and will not take unilateral steps to advance the project. However, the Trebisnjica hydro plant in Bosnia and Herzegovina (in the RS), and the nearby Dubrovnik hydro plant in Croatia are involved in a dispute over power sharing. Croatia agreed to send the output from one of the generators of its 2X108 MW Dubrovnik hydro plant to Albania in January 2001, as Albania has had to increase imports because of low rainfall. Albania's grid, however, is unable to support the maximum potential from the Dubrovnik unit. Macedonia offered Albania the use of its heavy oil-fired, 210-MW Negotino plant at cost in November 2000. In 2000, Macedonia also allowed more water from Lake Ohrid to drain into the Black Drin River in an attempt to increase flow to Albanian hydro stations further down the river. In anticipation of more rainfall in future years, Enelpower of Italy plans to build a 100-MW hydro plant on the river Vjosa in Albania, with power sold to any or all of Albania, Greece, and Italy (by submarine cable).

Although Albania has had to import exceptional amounts of electricity in 2000-2001 because of a drought, electricity import/export is becoming more important throughout the Balkans (see table). Albania, in addition to borrowing neighboring electric plants as mentioned above, has new agreements to import power from Slovenia and Slovakia (by using spare capacity associated with Croatia's Dubrovnik hydro plant), and continues to import from Greece. Yugoslavia has also suffered shortages, first from damage due to the 1999 Kosovo crisis and then from a drought and increased demand as the economy began to recover from the downturn of 1999. Yugoslavia imports from Bulgaria, Greece, Hungary, and the RS in Bosnia and Herzegovina. Slovenia, the only net power exporter of the former Yugoslavia in 1999, has export agreements with Croatia, although Slovenia's net exports are declining as it consumes more and more power domestically. Bulgaria is planning to expand its electricity exports in the Balkans to become a major hub. In 2000, Bulgaria exported 4.4

BkWh to Turkey, Greece, Macedonia, and Serbia, and added exports to Kosovo in 2001.

A new 400-kilovolt (kV) transmission line between the Macedonian and Bulgarian grids is under construction, and another 400-kV line to Bulgaria is planned (Dubrovo-Radomir). An internal 400-kV line from the power plants in Bitola to Skopje was constructed in 1999. A 220-kV transmission line from Vrutok to Bureli (Burrel) in Albania is also planned.

Albania

Albania, despite a lack of warfare and the lowest per capita energy consumption in Europe, has had enormous difficulties in meeting the country's energy demand. Albania's energy infrastructure uses out-of-date technology, and much of it is in a state of disrepair. Given Albania's heavy reliance on hydropower (85.8% of generating capacity in 1999), a recent severe drought has brought about an energy crisis in Albania, characterized by constant power cuts. Albania can produce only 12 GWh per day, and the power grid cannot handle importing more than the current 5 GWh per day.

Albania's oil industry, though small by international standards, is Albania's most important industry. Crude oil production was just 5,575 bbl/d in 1999, though proven reserves of 165 million barrels are the second-highest in the Balkans, after Romania. The state oil company, Albpetrol, is the dominant upstream and downstream player. Since 1993, foreign companies have been able to drill on-shore in Albania, and exploration wells recently have been spudded by a number of companies. However, currently producing fields are off-limits to foreign companies. Albanian production is characterized by numerous wells producing very small amounts of oil, though one field, Marinz-Patros in the southern part of the western plateau, accounts for nearly half of total production. Albania imports slightly less than half of its oil consumption. Its two operational refineries, run by Albpetrol at Ballshi and Fier, have refining capacities of 17,800 bbl/d and 8,500 bbl/d, respectively. There is a 122-mile, 12-inch internal pipeline that connects some of the country's producing fields, Tirana (the capital), and Albania's refineries. Most oil imports are brought in by truck or rail, though there is a small oil pipeline from Montenegro to Shkoder, near the border, from which oil and oil products must still be put in trucks or trains.

Albania's small natural gas reserves are estimated at 100 Bcf. Production was 706 Mmcf for 1999, all of which was consumed domestically. Albania does not have an international pipeline to import natural gas, though it does have an internal natural gas grid connecting some of Albania's cities and natural gas fields. All of Albania's oil and gas pipelines are corroding and in need of repair.

Coal reserves in Albania have been estimated at 772 million tons, though this figure is uncertain. Production was 49.6 thousand short tons in 1999, almost all lignite. There are

eight mines in operation, which are operated by various state-owned stock companies. All coal is consumed domestically, not just for electricity generation, but also for home and commercial heating.

Korporata Elektroenergjetika Shqiptare (KESH) is Albania's state-owned electric power monopoly (generation, transmission, distribution). The utility suffers from enormous problems, including an unbalanced capacity mix that leaves Albania vulnerable to droughts, high levels of electricity theft and non-collection of bills, flat rates that do not encourage conservation, an infrastructure unable to support needed electricity imports, and inefficient polluting power plants. KESH is implementing plans to improve billing and collection, reduce theft, make billing commensurate with usage, and import electricity throughout the year. The World Bank, IMF, and other multilateral agencies have made loans and grants to improve Albania's infrastructure contingent on such reforms being successfully implemented. KESH is also rehabilitating a 150-MW thermal plant at Fier that is offline and plans to add 99 MW to the plant. KESH is attempting to get foreign investment in new thermal (gas) and even hydro plants, though many of the problems in Albania's power sector have made investors wary. In March 2001, China agreed to build a hydro power plant on the Drini River that is expected to produce 350 MmkWh annually. KESH announced on July 26, 2001,that it was imposing daily power cuts of up to 10% on consumption to conserve its water reserves until the rainy season arrives. This comes after the IMF urged the government to take swift measures to avoid a repetition of last year's crisis, when a drought the previous summer led to black-outs of up to 12 hours a day during the winter.

Countries of the former Yugoslavia

1. Bosnia and Herzegovina

Bosnia and Herzegovina suffered greatly during the war in the first half of the 1990s, and as of July 2001, its energy production, consumption, and infrastructure have still not returned to pre-war levels. Per capita energy consumption is the second-lowest in Europe. Bosnia and Herzegovina produced 0.03 quadrillion Btu (quads) of energy and consumed 0.09 quads in 1999, thereby importing more than half its energy needs.

Bosnia and Herzegovina has no crude oil or natural gas production. In 1999, it imported about 22,000 bbl/d of oil, all refined products as Bosnia has no refineries of its own. Natural gas is imported from Russia (Gazprom) through Hungary and Serbia (Yugoslavia). The natural gas company servicing the RS is the RS-owned Gaspromet Pale and the company servicing the FBiH is the FBiH-owned Bosnia Herzegovina (BH) Gas. There have been financial disagreements between the two companies that have resulted in Gaspromet Pale on occasion reducing the flow of gas into the FBiH that comes through the RS. There is a gas pipeline from Serbia to the border town of Zvornik that bifurcates, with one branch going to

Sarajevo and onward to Zenica in the FBiH, and another branch going to Birac and Bijeljina in the RS. Another pipeline is planned, also from Zvornik, to service areas of the RS that currently rely on gas cylinders. It has not been decided whether Gazprom or ITERA will supply the gas. The RS announced a tender for construction of the 283-mile pipeline in June 2001. Its planned capacity is over 35.3 Bcf per year.

Bosnia and Herzegovina's electricity network was heavily damaged by war during the 1990s. It is estimated that by 1996, at the end of the war, more than half of Bosnia and Herzegovina's generating capacity was not in operation and about 60% of the transmission and distribution network was seriously damaged. In addition, Elektroprivreda Bosnia and Herzegovina, which had been Bosnia and Herzegovina's monopoly producer, transmitter, distributor and supplier, was disbanded after the Dayton Peace Accords. Three vertically integrated systems were created: two for the FBiH (Elektroprivreda of Bosnia and Herzegovina (EPBiH) and Elektroprivreda Hrvatske Zajenice Herceg-Bosne (EPHZHB), and one for the RS (Elektroprivreda of Republika Srpska (EPRS). These three utilities trade extensively. Currently, about 80% of pre-war capacity has been restored, which is sufficient at present as electricity consumption remains below 50% of pre-war levels. Bosnia and Herzegovina is now able to be a net exporter of electricity (about 20% of generated electricity in 2000), after being a net importer of electricity in 1999. International donors have contributed about $513 million since 1996 toward improving Bosnia and Herzegovina's electricity infrastructure. The World Bank is currently negotiating Bosnia and Herzegovina's third power reconstruction project (Power III), which not only aims to reconstruct several thermal and hydro power plants, but also to rehabilitate the 400-kV transmission grid.

2. Croatia

Although Croatia's economy was damaged by warfare in the early 1990s, and still has not reached pre-1991 levels of energy consumption or production, the country made a substantial economic recovery in the latter part of the 1990s. Croatia's total energy consumption increased 24% from 1993 through 1999 but its total energy production fell by about 10% in the same period. Oil, gas, and power appear to have increased in 2000 and into 2001, but not enough to overcome the trend of increasing energy consumption in Croatia's growing economy. Croatia's electricity and petroleum/natural gas monopolies are slated for break-up and subsequent privatization in 2001-2002. In July 2001, Croatia's parliament passed a set of laws liberalizing the energy sector in preparation for privatization, and also in compliance with European Union regulations.

Croatia's oil reserves have been estimated at 92 million barrels. Although the country has reserves in the north along the border with Hungary and also along the Adriatic coast, the majority of Croatia's oil fields are in the eastern region of Slavonia. When the region came under rebel Serb control in 1991, Croatia was deprived of a valuable economic resource, and

despite the return of eastern Slavonia to Croatian control in 1998, production in this area has yet to recover to pre-war levels. Overall, Croatia's oil production is still lower than pre-1991 levels, with output estimated at 33,000 barrels per day (bbl/d) in 2000. Croatia's oil consumption in 2000 was estimated at 85,000 bbl/d. However, oil production rose slightly in the first four months of 2001. Industrija Nafte (INA) Oil and Gas is Croatia's state-owned oil and gas company, with authority over drilling, refining, and processing crude oil throughout the country. Prior to 1991, INA had supplied all of the former Yugoslavia. As Yugoslavia split into six separate countries and amidst tense fighting however, INA saw its production drop by more than 50%, had one of its storage sites severely damaged, and lost significant market share. Although INA is still suffering losses, according to INA President Tomislav Dragicevic, by mid-June 2000, INA had recovered 70% of its pre-1991 market in Croatia, 60% of its market in Bosnia and Herzegovina, and 30% of its market in Slovenia--the company is re-establishing links in the former Yugoslavia. INA has small producing fields in Russia, Egypt, and Angola. Most of Croatia's oil is imported via the Adria pipeline, which has a 400,000-bbl/d capacity and connects Slovenia, Hungary, Slovakia, Serbia, and Croatia. It runs from Croatia's Adriatic port of Omisalj eastwards to Sisak, where it splits into a northern route to Hungary, as well as an eastern route to Serbia. INA has three refineries in operation, two in Zagreb and one in Rijeka, with a total capacity of 253,000 bbl/d.

Croatia has estimated natural gas reserves of 1.2 trillion cubic feet (Tcf), with considerable reserves located in the Adriatic Sea. In 1999, Croatia's 17 gas fields produced a total of 54.7 billion cubic feet (Bcf) of gas. With natural gas demand at 93.9 Bcf in 1999, Croatia is forced to import natural gas to meet domestic demand. The Croatian city of Karlovac is laying 559 miles of a local pipeline network at a cost of $46 million. The network will connect to a planned trunkline from the existing gas-pipeline network that goes to Slovenia, Zagreb, and Croatia's small on-shore gas fields in the north of the country. Croatia is expected to face gas shortages if new sources do not come on line soon because of its declining annual gas production from depleted on-shore fields. Imports of 40-42 Bcf of gas annually from Russia are not likely to be sufficient to cover future demand. With natural gas consumption predicted to increase as the country's economy recovers and gas-fired plants come on-line, Croatia has begun exploring for natural gas with foreign partners. In 1996, INA and Agip (Italy) signed a $320-million production sharing agreement to explore for and exploit the natural gas reserves in the northern Adriatic in the Ivana area. INA will contribute $154 million to exploit four gas fields, which have total proven gas reserves of about 282 Bcf. Construction of the INA/Agip gas platform Ivana in the Adriatic is nearly complete, and drilling should commence soon. Production is expected to be 67 Mmcf/d. The field is estimated to contain 279 Bcf, though gas can only be piped to Italy, then back to Croatia through Slovenia.

Croatia has a very small coal industry. The country has 43 million short tons (Mmst) of coal

reserves, 36 Mmst of which is lignite or subbituminous. In 1999, Croatia's coal consumption, which at 0.42 Mmst was less than half of its 1993 total of 0.85 Mmst, still far outpaced the country's minimal 0.02 Mmst of coal production.

Croatia has an electricity-generating capacity of approximately 3.6 gigawatts (GW). Although Croatia's electricity generation has increased from 8.6 billion kilowatt-hours (Bkwh) in 1992 to nearly 11.0 Bkwh in 1999, the country's electricity consumption, which has risen from 10.9 Bkwh in 1992 to 13.6 Bkwh in 1999, continues to exceed domestic generation, forcing Croatia to rely on electricity imports to meet domestic demand. Hydroelectric power is Croatia's largest source of domestic energy, accounting for approximately 35% of domestic energy production and around 20% of total energy consumption. The country's hydroelectric plants are located along the Adriatic coastline at Obrovac, Senj, and Zakucac, as well as along Croatia's border with Slovenia and Hungary at Varazdin. Croatia also has three oil-fired plants in Zagreb, Sisak, and Urinj, and several smaller gas and coal-fired plants that account for about 40% of the country's total electricity generation. The Krsko nuclear plant in Slovenia will begin to supply Croatia with electricity by July 2002, and Croatia will become joint owner of the plant in January 2002. Croatia built the plant jointly with Slovenia, although it is located in Slovene territory. Enron is developing, constructing and will own a $175 million, 240-MW natural gas combined cycle power plant at Jertovec, north of Zagreb, to be completed at the end of 2002.

Croatia's power sector is dominated by the state-owned Hrvatska Elektroprivreda (HEP). HEP supplies about 95% of the total electricity requirements of the country, with the remaining 5% is produced in industrial co-generation plants mainly for consumers' own needs and in small private hydro power plants. The Transmission Division of HEP controls the power transmission grid in Croatia. Electricity distribution is operated exclusively by HEP's Distribution Division through 21 distribution regions that largely correspond to the country's counties.

3. The Former Yugoslav Republic of Macedonia

Macedonia is a small energy producer and consumer. Macedonia produced 0.076 quads in 1999 and consumed 0.129 quads in 1999. Per capita energy consumption was 64.7 million Btu in 1999. According to the Macedonian Ministry of the Economy's estimates, total energy use will be 23% higher in 2001 than it was in 2000.

Macedonia has neither domestic crude oil production nor any crude oil reserves, and imported 24,000 bbl/d in 1999. Crude oil refining capacity was 51,180 bbl/d as of January 1, 2001, with Macedonia's sole refinery the OKTA facility near Skopje. Most oil supplies are imported via the Greek port of Thessaloniki and then by tanker truck. Hellenic Petroleum (HP) has acquired a majority share of OKTA. The Macedonian Ministry of the Economy

expects oil usage to increase by 18% in 2001 over 2000, much of this increase for the mazut-fired (heavy viscous oil) Negotino thermoelectric plant which was put back in use due to declining coal reserves and reduced hydro capacity. This plant is a heavy polluter. ESM is planning to convert it to gas eventually, and construct a gas pipeline from Skopje to the plant.

Macedonia's natural gas consumption was 1.4 Bcf in 1999, all of which was imported. A natural gas pipeline from Skopje feeds into Bulgaria's natural gas network. Macedonia's state-owned gas company is GAMA, but Makpetrol owns a significant share. Efforts are under way to expand the pipeline network and increase natural gas consumption by constructing gas-fired plants and converting other thermoelectric plants to gas.

Macedonia produced 8 million short tons of coal in 1999, most of it brown lignite. Most of the coal is consumed domestically, and coal is used to generate about 60% of Macedonia's electricity. Macedonia's net exports of coal are negligible, while some anthracite and coke must be imported for the proper mix in power plants and for industry. Reserves have been estimated at more than 1 billion tons, but declining.

Macedonia's electrical generating capacity was 1,440 MW in 1999, with about 70% thermal and 30% hydro. Electricity generation was 6.4 billion Kilowatt hours in 1999. According to Macedonia's sole power utility, Elektrostopanstvo Na Makedonija (ESM), electricity consumption rose by 2.8% for households and 10% for commercial customers in 2000. ESM expects demand to rise by 20% in 2001. ESM is planning major investments (upwards of $1.4 billion) over the next 14 years in Macedonia's power sector, in order to increase generating capacity by about 809 MW and make use of natural gas imports. ESM will also invest some of this amount in the improvement and expansion of the electricity grid. Among the most important projects is a gas-fired combined heat and power (CHP) plant near Skopje to be constructed by ESM and Toplifikacija with an installed capacity of 200 MW. Completion is expected in 2005. Several hydro plants will be built and several others will be renovated. Macedonia also imports a small amount of electricity from Bulgaria to make up for insufficient capacity, mostly in months when hydro capacity is low. Since the conflict with rebel ethnic-Albanians began, the debts of ESM have increased dramatically, to $130.7 million.

4. Slovenia

Slovenia is a small energy producer and consumer. It produced 0.135 quads and consumed 0.274 quads in 1999. Per capita energy consumption of 137.8 million Btu in 1999 was slightly higher than that of Spain (132.6), and much higher than the other former Yugoslav republics.

Slovenia has insignificant crude oil and natural gas production; over 99% of total petroleum and natural gas consumption is imported. Oil reserves have been estimated as high as 50 million barrels. In April 2001, Nafte Lendava and Nemmoco Slovenia signed a $25 million agreement to pump oil in the northeastern part of the country. The Nafte Lendava refinery (jointly owned by the government and Petrol) processes 13,500 bbl/d of crude oil. Petrol, the Slovene Petroleum Company, accounts for 75% of the downstream oil market. Slovenia has signed a letter of intent with Energetika Lubljana and Toplotna Oskrba Maribor for setting up a 90-day reserve of oil and oil products as required by the EU for accession. Most of Slovenia's natural gas is imported from Russia or Algeria (by way of Italy). Slovenia has 552 miles of gas pipelines that supply up to 45 Bcf per year of gas. Slovenia is connected to Austria, Italy, and Croatia. Geoplin, the state-owned gas company, is involved in trade and transit of natural gas and is supported by 12 distribution companies.

Slovenia has some coal reserves (65 million tons), which has enabled it to be almost entirely self-sufficient in coal, an energy source that accounted for about 19% of total energy consumption in 1999.

Slovenia's electricity generating capacity and production are quite small, though on a per capita basis close to the European average. Slovenia's generating capacity is diverse in origin, with thermal, hydro, and nuclear plants all having a substantial share. Slovenia was able to export (net) 1.56 billion kilowatthours in 1999, about 12% of total generation. The growing economy in the past few years has meant increasing electricity demand in Slovenia, which is estimated at having grown between 4% and 6% for 2000. Despite reduced hydro output because of unfavorable weather, total power output increased, but not as much as demand, so electricity imports rose and exports fell, though net trade was still positive. Slovenia operates a single reactor of Western design at Krsko, soon to be on a 50/50 basis with Croatia. The reactor is a U.S. built pressurized water reactor and is operated to Western standards. The only possible problem with the reactor could arise over the capability of the plant to withstand seismic shocks. There is a Slovenian Nuclear Safety Administration (SNSA) responsible for ensuring the safety of the Krsko plant and the disposal of its waste. On April 29, 1999 an arrangement between the SNSA and the United States Nuclear Regulatory Commission for the Exchange of Technical Information and Co-operation in Nuclear Safety Matters was signed in Ljubljana.

ELES (Elektro-Slovenija) was the state-owned trading and transmission monopoly, but the first stage of deregulation of the internal electricity market went into effect in April 2001. Large users now can choose among other distribution companies competing with ELES, though prices are controlled during a six-month transition period. In January 2003, the deregulation will extend to households. Prices are expected to fall for large industrial customers, but rise for household customers, bringing Slovenia in line with European prices.

The Slovene Energy Agency has received over 20 applications from companies vying to be independent distributors. The Slovene Energy Agency will also set tariffs charged for using the grid, thereby retaining some government control of consumer prices. In June 2001, Slovenia's three state-owned hydropower producers merged into one holding company, Slovenske Hidroelekrarne, which is intended to make them better able to compete in a deregulated internal market and internationally. The new company has been granted a government concession to develop a chain of five new hydro plants on the Lower Sava River with a total installed capacity of 207 MW.

5. Federal Republic of Yugoslavia (Serbia and Montenegro)

Yugoslavia's energy infrastructure has not fully recovered from the breakup of the former Yugoslavia and the subsequent wars in the Balkans during the first half of the 1990s, let alone the Kosovo war of 1999. Montenegro suffered comparatively little compared to Serbia and its two autonomous provinces. At end-2000, former Yugoslav Minister of Energy and Mining Saboljud Antic estimated energy infrastructure needs at $7 billion.

Serbia produces 18,000 bbl/d of crude oil in the autonomous province of Vojvodina in the north, enough to supply about one-third of domestic oil consumption. The first discovery was in 1949, and to date 45 small oil fields and 43 natural gas fields have been discovered. The Serbian region near Pozarevac is also believed to contain hydrocarbons, and there is an oil shale deposit at Aleksinac north of the Serbian town of Nis. In addition, Ramco (U.K.) is conducting upstream work in Montenegro through a joint venture with Montenegrin state oil company Jugopetrol Kotor. Ramco operates the Ulcinj Block, which covers the southern part of Montenegro's continental shelf together with an adjacent strip along the coast. In July 2001, Yugoslavian officials discussed oil barter deals with Iraq, and the first deal worth about $45 million may already be set.

Nafta Industrija Srbije (NIS) Jugopetrol is the state-run oil and gas company. Privatization efforts have begun, according to the Serbian government, along with efforts to settle the company's debts with Russia's Gazprom. NIS assumed total control over oil imports on March 6, 2001. Previously, up to two-thirds of oil trade was undertaken on the black market, leading to tax and revenue losses for the government. However, the government's decision to monopolize oil imports was challenged in May 2001, when private traders created the Nafta shareholding society. Nafta plans to import light crude oil from sources such as Syria and Russia and have it processed into high octane gasoline. Serbia has two refineries -- at Novi Sad and Pancevo, and several smaller oil facilities for making lubricants and other oils. The refineries are thought to be operating at a capacity of about 60,000 bbl/d, after being damaged in the Kosovo conflict and partially repaired. If and when they are fully repaired, capacity will be about 158,000 bbl/d, and include more refined products. These refineries receive much of their crude oil supplies via the eastern spur of the Adria pipeline, which

runs from the Adriatic Sea port of Omisalj (Croatia) to Sisak (Croatia), before splitting into an northern spur to Hungary and an eastern spur to Serbia. Shipments resumed in November, 2000, although imports have been limited by the ability of Yugoslavia to pay for imported oil.

Although a small amount of natural gas is produced domestically in the autonomous province of Vojvodina in the north, imports (all from Russia) accounted for more than 60% of Serbian gas consumption in 2000. Natural gas is used by industry to make fertilizer and synthetic rubber, by power plants, and for district heating, particularly in Vojvodina, where most of the natural gas reserves and the bulk of the natural gas distribution network are located. Russian natural gas exports stopped in June 2000 after Serbia fell behind in payments. Russian exports resumed in November 2000 after credit was arranged by the Russian government, but were reduced in December after Serbia again failed to pay for all of the gas that they received. Negotiations have since begun over payment of Serbia's outstanding debt to Russia's Gazprom.

Yugoslavia is the only country in the Balkan region with large coal deposits. Proven coal reserves of 18.2 billion short tons are found in five basins: Kostolac, Kolubara, Kosovo, Metohija and Pljevlja. Over 95% of this coal is lignite accessible by surface mining, but only about 10% has been mined. Serbia estimates that as much as one-third of the coal resources in Yugoslavia are in Kosovo. Kosovo's lignite is particularly valuable because of its low sulfur content. Annual coal production at the two main mines in Kosovo accounted for a quarter of Yugoslavia's total coal output in recent years. Total coal production in Yugoslavia increased by over 8% in 2000.

Most of Serbia and Montegnegro's electricity production, transmission, and distribution is carried out by two state-run companies: Elektroprivreda of Serbia (EPS) and Elektroprivreda of Montenegro (EPCG), which has been slated for privatization in 2001. Electricity is Yugoslavia's primary source of energy, and prior to the crisis in Kosovo electricity accounted for about 75% of domestic energy needs. The primary fuel for power generation is coal, with Yugoslavia containing sufficient reserves potentially to become a significant exporter of electric power. Hydroelectricity represents Yugoslavia's other major source of electric power. Hydropower plants are located on the Danube, Drina, and Morava rivers in Serbia, and the Moraca, Piva and Zeta rivers in Montenegro. The electrical grid was hurt by the overall lack of investment by the Milosevic regime and because of the war, past sanctions, and the lack of payment by electricity customers. Serbia was an electricity exporter prior to the breakup of the former Yugoslavia, but during the 1990s poor maintenance and state-imposed below-market prices have made Serbia into an importer, with daily imports of about 25-30 million kWh in early 2001. Because of the electricity's low cost, it is used extensively for home heating. Prior to the Kosovo crisis, Serbia (i.e.

excluding Montenegro) had a generating capacity of 9,560 MW, but at end-2000 operable capacity was estimated at 5,300 megawatts. Serbian officials have indicated that as little as one third of required maintenance was performed on the Serbian grid in 2000. The failure to invest in and maintain infrastructure has led to frequent power cuts in recent months, with cuts often lasting for four or five hours per day, though these cuts are also due to the same drought and dependence on hydropower that have led to severe power problems in Albania. Serbian officials plan to raise electricity prices and complete the half-constructed 2 x 350 MW Kolubara B power complex (coal-fired) and rehabilitate other power plants if international funds are provided.

Table 1. Economic and Demographic Indicators for Selected Balkan Countries

	Gross Domestic Product (GDP)				Population, 2000E (Millions)
	1999E (Billions of US$ -- PPP*)	Real GDP Growth Rate		Per Capita GDP, 1999E (US$ -- PPP)	
		1999 Estimate	1999-03 Projection		
Bosnia and Herzegovina	$6.2	5%	11%	$1,770	3.8
Croatia	$23.9	0%	N.A.	$5,100	4.3
F.Y.R.O.M.	$7.6	2.5%	5.3%	$3,800	2
Slovenia	$21.4	3.5%	N.A.	$10,900	1.9
Yugoslavia	$20.6	-20%	N.A.	$1,800	10.7
Subtotal/weighted average	$79.7	-3.59%	N.A.	$3,357	22.7
Albania	$5.6	8%	7.7%	$1,650	3.5
Total/weighted average	$85.3	-2.845%	N.A.	$3,133	26.2

Sources: CIA World Factbook; Energy Information Administration estimates; World Bank. N.A. = not available *PPP = Purchasing Power Parity exchange rates.

Table 2. Energy Consumption and Carbon Dioxide Emissions in Selected Balkan Countries, 1999

	Energy Consumption									Carbon Dioxide Emissions* (Million metric tons of carbon)
	Total (Quadrillion Btu)	Petroleum	Natural Gas	Coal	Nuclear	Hydro-electric	Other Electricity	Net Electricity Imports	Per Capita (Million Btu)	
Bosnia and Herzegovina	0.09	52%	8%	18%	0%	19%	0%	3%	23.1	1.2
Croatia	0.41	48%	24%	2%	0%	16%	0.03%	9%	87.5	5.49
F.Y.R.O.M.	0.13	39%	1%	50%	0%	9%	0.4%	0%	64.7	2.71
Slovenia	0.27	44%	13%	19%	16%	14%	0%	-6%	137.8	4.16
Yugoslavia	0.61	22%	11%	48%	0%	18%	0%	2%	57.5	10.94

Subtotal/weighted average	1.52	36.5%	13.6%	28.8%	3.0%	15.9%	0.01%	2.2%	65.40	24.5
Albania	0.08	26%	1%	1%	0%	67%	0%	6%	20.3	0.42
Total/weighted average	1.59	36.0%	13.0%	13.0%	2.8%	18.5%	0.01%	2.4%	58.88	24.91

***Includes carbon dioxide emissions from the consumption of petroleum, natural gas, and coal, and from the flaring of natural gas. Tons of carbon can be converted to tons of carbon dioxide gas by multiplying by 3.667.**

Source: Energy Information Administration, International Energy Database, July, 2001.

Table 3. Energy Supply Indicators-- Selected Balkan Countries

	Fossil Fuel Proved Reserves			Fossil Fuel Production, 2000			Electric Generating Capacity, 1/1/99 (Million kilowatts)	Crude Oil Refining Capacity, 1/1/01 (Thousand barrels per day)
	Crude Oil, 1/1/01 (Thousand barrels)	Dry Natural Gas, 1/1/01 (Billion cubic feet)	Coal, 12/31/96 (Million short tons)	Petroleum[1] (Thousand barrels per day)	Dry Natural Gas (Trillion cubic feet)	Coal[2] (Million short tons)		
Bosnia and Herzegovina	0	0	N.A.	0	0	1.98	3.58	0
Croatia	92,196	1,237	43	24.45	0.0612	0.017	3.6	252.6
F.Y.R.O.M.	0	0	N.A.	0	0	8.03	1.44	51.18
Slovenia	0	N.A.	65	0.002	0.0018	5.29	2.65	13.5
Yugoslavia	77,500	1,700	18,157	16.17	0.0257	36.1	11.78	158.25
Subtotal	169,696	2,937	18,265	40.622	0.0887	51.407	23.06	475.53
Albania	165,000	100	N.A.	6.23	0.0053	0.05	1.684	26.3
Total	334,696	3,037	18,265	46.852	0.094	51.467	24.74	501.83

[1] *Crude oil only.* [2] *1999 figures.*

Sources: Crude Oil and Natural Gas Reserves: PennWell Publishing Co., *Oil & Gas Journal*, 12/28/00. Crude Oil Refining Capacity: PennWell Publishing Co., *Oil & Gas Journal*, 12/28/00. Crude oil and and natural gas production figures: PlanEcon, April 2001. All Other Data: Energy Information Administration, International Energy Database, July 2001.

Table 4. Electricity Generation, Imports, and Exports, Billion Kilowatthours, 1999, Selected Balkan Countries

	Electricity Generation	Exports	Imports	Net Exports (- means Net Imports)
Bosnia and Herzegovina	2.59	0.15	0.43	-0.28
Croatia	10.96	1	4.45	-3.45
F.Y.R.O.M.	6.40	0.03	0.08	-0.05
Slovenia	12.45	2.2	0.65	1.56
Yugoslavia	34.46	0.96	1.92	-0.96
Subtotal	66.85	4.34	7.52	-3.18
Albania	5.33	0.1	0.52	-0.42
Total	72.18	4.44	8.04	-3.60

Source: Energy Information Administration, International Energy Database

Sources for this report include: CIA World Factbook 2000; Central Europe Review; Central Europe Online; U.S. Department of Commerce's Central and Eastern European Business Information Center; Economist Intelligence Unit ViewsWire; U.S. Energy Information Administration; Electricity Daily; Financial Times; Oil and Gas Journal; Petroleum Economist; Radio Free Europe/Radio Liberty; Reuters; WEFA Eurasia Economic Outlook; World Markets Online.

LINKS

For more information from EIA on the Balkans, please see:
EIA - Country Information on Bosnia and Herzegovina
EIA - Country Information on Croatia
EIA - Country Information on Former Yugoslav Republic of Macedonia
EIA - Country Information on Slovenia
EIA - Country Information on Yugoslavia
EIA - Country Information on Albania

Links to other U.S. government sites:
2000 CIA World Factbook
U.S. International Trade Administration, Energy Division
Radio Free Europe/Radio Liberty - Balkans Report
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Southeastern Europe

The countries of Southeastern Europe--including Romania, Bulgaria, and Moldova--occupy a strategic location on the west side of the Black Sea, exporting electricity through much of the Balkan Peninsula and transporting Russian natural gas to Western Europe and Turkey. Southeastern Europe also is a potentially significant transit region for Caspian oil exports to Europe.

Note: Information contained in this report is the best available as of November 2001 and is subject to change.

GENERAL BACKGROUND

The countries of southeastern Europe--here including Romania, Bulgaria, and Moldova--share a troubled history in addition to their geographical location. Since the Eastern European revolutions of 1989 and the fall of the Soviet Union in 1991, the three countries have been independent democracies, but each has had significant problems in transitioning from a centrally-planned economic system to a market-based economy. While Bulgaria and Romania avoided the warfare and bloodshed that devastated the Balkans region in the 1990s, they were both significantly affected by the economic embargo placed on Yugoslavia, suffering several billion dollars' worth of losses due to disrupted trade, transport, and investment.

Moldova, although relatively less affected economically by the wars in the former Yugoslavia, suffered through a civil war of its own in the 1990s. Fighting broke out shortly after the country received its independence, paralyzing the country's already stagnant economy. Russian settlers and Moldovans on the industrialized left bank of the Dnistr River set up the secessionist Trans-Dnistrian Republic as the conflict stalemated. Moldova's economy has crept along as fighting has subsided, but there is no formal resolution to the conflict in sight and Western investment, which is desperately needed, is nearly non-existent.

Unlike in central Europe and in the Baltic countries, the process of shedding the totalitarian past has proceeded slowly in southeastern Europe. Political reform did not match the sweeping changes elsewhere in the former Eastern bloc, and as a result, former Communist leaders were able to hold on to the administrative controls of government. As a result, economic and structural reform in southeastern Europe was delayed. Although the pace of reform has picked up, the transition to democracy and a market-based economy in Romania, Bulgaria, and Moldova has lagged behind other parts of Europe.

In the past year, Romania, Bulgaria, and Moldova all have held general elections. In Romania in December 2001, voters elected Ion Iliescu to the presidency, returning the former Communist Party official to the post that he held from 1990 to 1996. In Moldova, the Communist Party swept to a resounding victory in February 2001 elections, winning an absolute majority in the parliament and installing Vladimir Voronin as president. In Bulgaria, former King Simeon II, returning to his homeland after the monarchy was abolished by the Communists in 1946 and entering politics for the first time, rode his National Movement for Simeon II to a victory in June 2001 parliamentary elections, then swore allegiance to a republican constitution and accepted the post of prime minister.

REGIONAL ENERGY ISSUES

Romania, Bulgaria, and Moldova occupy a strategic location in the world energy picture. Although none of the three countries is a major oil or gas producer, their geographic location between major producers and major consumers makes southeastern Europe an important transit point for oil and gas supplies. In addition, Romania is an important regional oil refiner, while Bulgaria is the region's major electricity exporter.

Caspian Oil Transit

Increasing oil and gas production in and around the Caspian Sea, along with forecast increases of oil consumption in the European Union (EU), means that Bulgaria, Romania, and Moldova may play a strategic role in the European transport corridor to bring Caspian oil exports to European markets. The recent launch of the Tengiz-Novorossiisk Caspian Pipeline Consortium (CPC) pipeline from Kazakhstan to Russia means that additional oil will be transported via the Black Sea through the Bosporus Straits, which is already a major chokepoint for oil tankers. The difficulty in navigating the narrow straits, exemplified by a number of accidents, has led Turkey to raise environmental concerns over the increase in tanker traffic through the Bosporus.

The projected increase in oil exports from the Caspian Sea region in general, and Kazakhstan in particular, has led to the proposal of a number of Bosporus bypass options. Bulgaria, Romania, and Moldova all have made proposals to allow Caspian oil exports to bypass the Bosporus, although Moldova, lacking a Black Sea port, is highly unlikely to transport any Caspian oil exports coming via the Black Sea. Ukraine has an advantage over the countries of southeastern Europe in capturing Caspian oil export transit, since its Odesa-Brody pipeline already has been completed. Nevertheless, several Bosporus bypass pipeline options running through Bulgaria or Romania are being seriously considered.

Burgas-Alexandropoulis Pipeline

In January 1997, Bulgaria, Greece, and Russia agreed on a plan to build an oil pipeline linking the Bulgarian Black Sea port of Burgas with Alexandropoulis on the Mediterranean coast of Greece. The proposed 178-mile, underground pipeline would allow Russia to export oil through the Black Sea while bypassing the Bosporus. However, the $600-million project has been stalled by a wide range of technical and economic disputes. Russia has ensured that the pipeline, with proposed capacity ranging from 600,000 barrels per day (bbl/d) to 800,000 bbl/d, will work at least at 50% of its capacity, and Russian oil major Yukos has expressed its interest in the project, which may ease concerns over filling the pipeline.

Russia, Bulgaria, and Greece have agreed on a memorandum of trilateral cooperation on the project, with plans to establish the Trans-Balkan Oil Company. In February 2001, the three countries agreed to conduct a $2.2-million feasibility study for the pipeline, and results of the second stage of the feasibility study were delivered on October 31, 2001. In addition to Yukos, a number of Greek and Bulgarian companies have indicated their interest in investing in the pipeline. In October 2001, officials for the three countries held a tri-lateral meeting, continuing negotiations to launch a joint-stock company to develop and construct the pipeline

Burgas-Vlore Pipeline

A 750,000-bbl/d pipeline connecting Burgas with the Albanian Adriatic port of Vlore via Macedonia also has been proposed. This pipeline proposal has received letters of acceptance from the governments of Albania, Bulgaria, and

Macedonia, and a $980,000 feasibility study, partially funded by the U.S. Trade and Development Agency, concluded that the 560-mile pipeline project was feasible. The Albanian-Macedonian-Bulgarian Oil (AMBO) Pipeline Corporation has been established with exclusive rights to construct the pipeline, which is estimated to cost between $850 million and $1.1 billion.

A joint venture to carry out the project was to be set up between AMBO and potential investors. Fundraising for the project already has begun, with construction originally scheduled to start in 2001 and completion by 2005. However, luring foreign investment to the troubled region has been difficult, and ethnic violence that erupted in Macedonia in February 2001 near the proposed route further hindered efforts to fund the pipeline's construction. In September 2001, AMBO's Ted Ferguson said that AMBO is hoping to begin construction of the pipeline by the end of 2001.

Constanta-Trieste Pipeline

Romanian government officials have advocated that a pipeline to transport crude oil from the Caspian Sea to European markets pass through its territory, claiming that Romania, which has sought to develop its infrastructure to increase its chances of sharing in the Caspian oil bonanza, offers the shortest route, best refining technology, and links via waterways to major ports in the West. The proposed 660,000-bbl/d Constanta-Trieste pipeline would allow crude oil from Kazakhstan to be shipped via the Novorossiisk port on the Black Sea to the Romanian port of Constanta, where it would then be piped to Italy across the Balkan Peninsula.

The pipeline, estimated to cost $900 million to construct, would be used mostly to provide oil to the countries along the route, and would incorporate existing pipelines connecting Constanta with 10 refineries. Several alternatives exist for the route, with a proposed northern route transiting southern Hungary and central Slovenia before terminating at Italy's oil terminal of Trieste. From there, the Constanta-Trieste pipeline would be linked with the Trans Alpine Pipeline (TAP), which would carry the oil further to customers in Austria, Germany, and the Czech Republic. The southern route for the pipeline, sometimes know as the South-East European Line (SEEL), would transport Caspian oil from Constanta via a similar route as the northern route, but instead would pass through Yugoslavia and an intermediate transit point at Croatia's Adriatic port of Omisalj before crossing Slovenia and ending at Trieste. The SEEL pipeline also would link to the TAP to deliver oil to Central Europe.

Feasibility studies have shown that both proposed Constanta routes are viable, but neither pipeline has moved forward as potential investors await a political accord providing security guarantees for the lines. Representatives of Romanian, Yugoslav, and Croatian oil companies have agreed that an inter-governmental accord likely would boost the pipeline's prospects and help to secure financial resources to construct the pipeline, which would provide Romania with a significant amount of revenue in the form of transit tariffs.

In addition to serving as a transit point for Caspian oil, Romania is hoping to offload some Caspian crude at Constanta and deliver it to its own refineries in order to offset the country's declining domestic production. Already, in June 1999, Romania's national oil company, SNP Petrom, signed a protocol with KazakhOil and KazTransoil to refine 140,000 bbl/d of Kazakh oil at Romanian refineries. Romania hopes to supply its own domestic market as well as transport refined products to Europe via barges on the Danube-Main-Rhine link. Romania also could use its own distribution network to transport refined products into other European lines.

Russian Natural Gas Transit

In addition to oil, southeastern Europe also represents an important transit site for Russian natural gas exports, mainly to Turkey. Russia's Gazexport, the export arm of Gazprom, transports natural gas from Russia via Ukraine and Moldova to Romania to Bulgaria and other Balkan countries. Russian natural gas is delivered via Bulgaria to Turkey, Greece, and Macedonia. In the past few years, the countries of southeastern Europe have sought to upgrade their pipeline links and increase their natural gas transit capacity in order to ensure that Russian natural gas continues to flow their way. Although Russia is looking to deliver natural gas directly to Turkey via the Blue Stream pipeline below the Black Sea, that will be in

addition to natural gas flowing to Turkey via southeastern Europe. With Russia seeking to increase its natural gas exports, the countries of southeastern Europe will remain important transit centers.

In 1996, Romania and Russia reached an agreement on the construction of a 120-mile long pipeline from the Romanian-Ukrainian border to the Romanian-Bulgarian border, part of a project to develop the natural gas transit corridor in southeastern Europe. However, a shortage of funds in Romania delayed the construction until 1999, when Russia's Gazprom offered credit (in the form of natural gas) to Romania to finance the pipeline's construction. The first 54-mile segment of the pipeline, from Issacea to Negru Voda in southeastern Romania, was commissioned in December 2000. When the remainder of the pipeline is completed (scheduled for the first half of 2002), it will give Romania the ability to transit approximately one Tcf of natural gas through its territory.

Bulgaria also is increasing its natural gas transit capacity, mainly by widening its existing network and building new compressor stations rather than by building new pipelines. In the last two years, Bulgargas, which owns and operates Bulgaria's 1,554-mile pipeline network (which includes over 400 miles of transit pipelines), has enlarged the country's natural gas transiting network to pump more Russian natural gas to its Balkan neighbors. From a transit capacity of 283 Bcf of natural gas per year before the enlargement program began, in 2000 Bulgaria transported to Greece, Macedonia, and Turkey some 423 Bcf of Russian natural gas, up 14% from 1999, according to Bulgargas chief executive director Kiril Gegov. Nearly 388 Bcf of that natural gas went to Turkey, the region's biggest energy consumer. Under a 1998 agreement with Gazprom, Bulgaria's only natural gas supplier, transit volumes to Greece, Macedonia, and Turkey should increase to 494 Bcf after 2002 and to 670 Bcf by 2010. Bulgargas said that it would spend $45 million in 2001 to continue enlarging the country's natural gas pipeline network.

Regional Electricity Exports

While Moldova remains a net electricity importer, both Bulgaria and Romania have become net electricity exporters in the past decade. Romania, which re-started electricity exports to Moldova in the wake of a violent snowstorm that devastated Moldova's northern power networks in November 2001, has sent its electricity supplies mainly to Moldova, while Bulgaria has supplied electricity to Turkey, Greece, Yugoslavia, and Macedonia in recent years.

Bulgaria is seeking to become the regional power hub in the Balkan Peninsula. In 2000, Bulgaria more than doubled its electricity exports, sending 5.6 billion kilowatt-hours (Bkwh) of electricity to its neighbors and earning more than $105 million in the process. Turkey, the region's largest power consumer, imported 3.4 Bkwh of power from Bulgaria in 2000, up from 2.2 Bkwh of Bulgarian electricity in 1999. In addition, Bulgaria exported power to Greece, Yugoslavia, and Macedonia in 2000, and in August 2001, Bulgaria began exporting power to Albania for the first time ever. Bulgaria is hoping to increase electricity exports by an additional 60% in 2001.

Bulgaria and Turkey have agreed to increase Bulgarian power supplies to Turkey to 4 Bkwh in 2001 and 5 Bkwh in 2002. In order to fulfill these planned increases in electricity exports, in May 2001 Bulgaria began construction of a 400-kilovolt electricity cable linking Bulgaria's power system with Turkey. The 42-mile long link, which is estimated at $35 million, will be the second such line between the two countries and will allow Bulgaria to maintain average exports of 3.4 Bkwh of power per year to Turkey under an agreement until 2008.

ROMANIA

Throughout the 1990s, Romania lagged behind most of its Eastern European neighbors in the pace of economic restructuring. The slow pace of reform has hindered the development of a truly market-based economy, leaving Romania with one of the lowest living standards in Europe and hampering the country's efforts to join the EU. In 1996, Romanians elected Emil Constantinescu as president, replacing Ion Iliescu and the former communists and stepping up reform efforts. Constantinescu's government embarked on a macroeconomic stabilization and market reform program, including further restructuring of energy-intensive industries and the energy and utility sectors.

However, the social impact of price liberalization, combined with an austere government spending program and a 3-year recession from 1997-1999, led to growing frustration among Romanians as living standards continued to decline. In November 2000 presidential elections, former President Ion Iliescu received 37% of the vote, while Corneliu Vadim Tudor, an outspoken nationalist, polled 28% of the vote. Iliescu's Party of Social Democracy finished first in the parliamentary election with 38%, followed by Tudor's Greater Romania Party with 21%. Iliescu proceeded to win a December 2000 runoff for the presidency, vowing to return hope for a better life to Romanians.

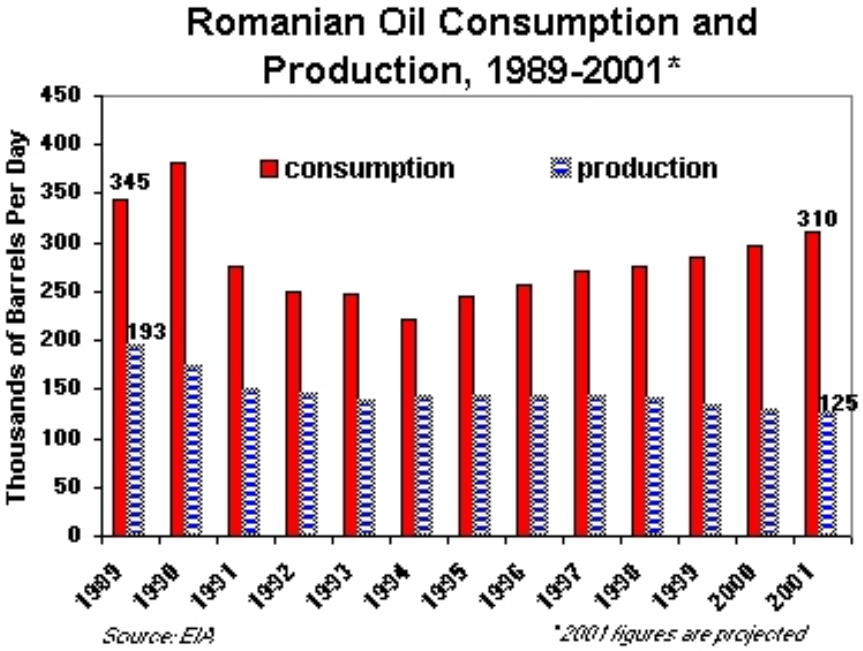
Oil

Romania has proven oil reserves of 1.4 billion barrels, and despite a steady decline in its crude oil production over the past 25 years, the country remains the largest oil producer in Central and Eastern Europe. From 294,000 bbl/d in 1976, Romania's oil production has decreased 57%, sliding to 127,400 bbl/d in 2000. With the country's oil production projected to dip to 125,000 bbl/d in 2001, Romania's oil demand now outstrips domestic production by a a ratio of more than two to one. Romania's oil consumption, which dropped from 345,000 bbl/d in 1989 to just 220,800 bbl/d in 1994, has been on the increase ever since, reaching 298,000 bbl/d in 2000 and expected to increase to 310,000 bbl/d for 2001.

The Romanian government has committed itself to increasing domestic production of oil and gas in order to reduce the country's reliance on imports. The removal of state price ceilings, plus relatively high world oil prices in 1999 and 2000, allowed SNP Petrom, the vertically integrated national oil company, to restart some of its idled wells, and the introduction of Western technology and production methods is expected to boost Romania's reserves and production in the next few years. In addition, SNP Petrom, which is 92% state-owned, is being restructured to streamline its operations and management. In July 2001, Romania's Industry Minister, Dan Popescu, said that partial privatization of SNP Petrom would be launched in 2002 after the completion of the restructuring plan.

Romania also is opening up its oil and natural gas sectors to outside investors, and numerous oil and natural gas blocks have been opened for exploration in the past 12 years. Both Shell and Amoco came up dry in exploring for oil in western Romania between 1992 and 1997, but several smaller oil companies currently are active in the region. In June 1999, U.S.-based Castle Energy exercised options to acquire a 50% interest in three oil and natural gas concessions in Romania for $385,000, while in September 2000, Sterling Resources (Canada) concluded a multi-million dollar deal to test for oil and natural gas in a 1.5-million acre block near Craiova in southwestern Romania. Sterling has committed to making at least $7 million in investments in Romania, while Castle Energy, whose concessions total 3.1 million acres, has plans to spend about $3 million on exploratory drilling. In addition, Forest Oil (U.S.) has two agreements in place with Romania and is awaiting approval of a third license in the Carpathian mountains.

Currently, around 10% of Romania's crude oil comes from offshore wells in the Romanian sector of the Black Sea, but Romania is seeking to increase that percentage. In 1998, French-Belgian oil company TotalFinaElf signed a 30-year exploration and drilling agreement with SNP Petrom. The companies agreed to explore an area of 4,000 square miles in the offshore Neptun oil block of the Black Sea, with TotalFinaElf paying $10 million upfront and the option to pay up to $500 million to develop the block if oil is discovered.



Ukraine's recent discovery of commercially exploitable oil and gas deposits in a disputed area of the Black Sea has led to Romanian protests. In July 2001, the Cernomorneftegaz Company, in

partnership with British-based JKX Oil & Gas, announced it had discovered approximately 73 million barrels of oil and 353 Bcf of natural gas near Zmiyinyy Island, object of a territorial dispute between Romania and Ukraine. Romania, which calls the island *Insula Serpilor* (Serpents' Island), says that Ukraine has no right to conduct economic activities in the region while negotiations are in progress, while Ukraine has argued that Cernomorneftegaz's work is just for exploration purposes, which is not prohibited by bilateral agreements currently in force. Romania already is exploiting an oil deposit to the west of the island and pumping the fuel through a pipeline to its port of Constanta.

Downstream/Refining

With 10 refineries and an overall refining capacity of approximately 522,000 bbl/d, Romania has the largest refining industry in the region. Romania's refining capacity far exceeds domestic demand for refined petroleum products, allowing the country to export a wide range of oil products and petrochemicals, such as lubricants, bitumen, and fertilizers, throughout the region. However, nearly all Romanian refineries are underutilized because of a lack of crude oil supplies, and the majority remain in the government's hands, running at 50% of capacity or less and needing repair. Years of low investment have left the country's refining industry in poor health, requiring massive amounts of capital to modernize and improve efficiency.

Several refineries have been privatized, injecting some much needed capital for maintenance and upgrades. In early 1998, Russia's Lukoil paid $300 million for a 51% stake in the Petrotel refinery in Ploiesti, and on November 1, 2000, the Romanian State Property Fund agreed to sell the Dutch-led Rompetrol Group BV a 70% stake in the Petromidia Navodari refinery, Romania's largest, for $50.5 million. The Dutch-Swiss company agreed to take over the refinery's $340-million debt and promised to invest $225 million over the next five years to modernize it, streamlining capacity at 54,000 bbl/d. In a cost-saving measure, Romanian authorities had shut down the Petromidia refinery in 1999, but under its new management, the refinery resumed operations in February 2001, processing an average of 5,600 bbl/d. In addition, SNP Petrom is planning to pump $236 million into upgrading its two refineries, Arpechim and Petrobrazi, over the next two years.

Natural Gas

Since 1983, when Romania's natural gas production peaked at 1.4 Tcf, the country's natural gas output has declined nearly 65%, dropping to 501.5 Bcf in 1999. In its difficult transition to a market economy, Romania's natural gas demand has decreased precipitously as well, with consumption decreasing 55% from 1989 to 1999, from 1.4 Tcf to 621.5 Bcf. Romania has proven natural gas reserves of 13.2 Tcf, but additional exploration has been discouraged by the country's economic woes and the poor investment climate. Also, the slow pace of reform has prevented potential investors from entering the Romanian natural gas market to help boost current levels of production.As a result, Romania is reliant on imports to meet its natural gas consumption needs.

Russia is Romania's main source of natural gas, but Romania has attempted to diversify its supply sources by concluding contracts with companies such as Germany's Ruhrgas and the Netherlands' Gasunie. Russia remains Romania's major supplier, and better connections with the Ukrainian pipeline system have allowed Romania to access additional Russian natural gas via Ukraine. In December 1999, a 12-mile pipeline link between the Ukrainian city of Khust and Satu Mare in northeastern Romania was completed, giving the country access to the *Soyuz* export pipeline and allowing Romania to import up to 13 Bcf per year of additional Russian natural gas. In the future, the Khust-Satu Mare pipeline may allow Romania to receive natural gas from as far away as Central Asia.

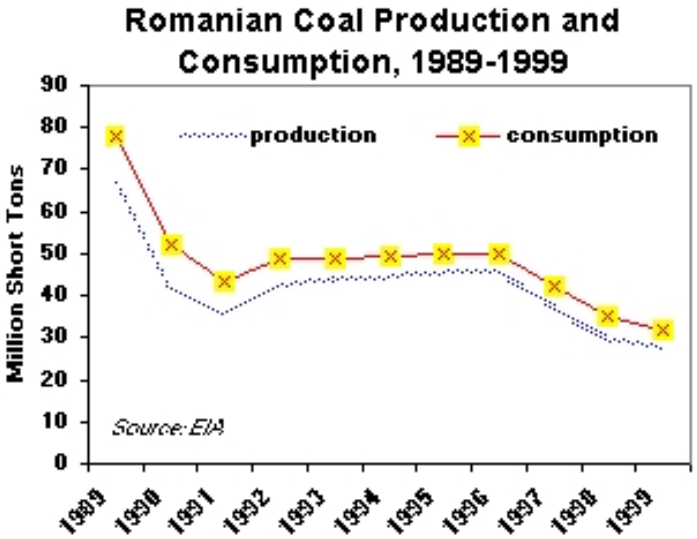
In addition, Romania has been developing contacts to import more Russian natural gas via Moldova to supply customers in Romania's northeast. In April 2001, Russian natural gas trader Itera, along with Romanian and Moldovan natural gas companies, confirmed its plans to build a 72-mile pipeline connecting the Moldovan cities of Dorchia and Ungheni with the Romanian town of Iasi. The $60-million pipeline, with an annual capacity of 141 billion cubic feet (Bcf) of natural gas per year, is expected to be completed in 2002.

In order for these potential imports to reach Romanian households, the country is restructuring Romgaz, the state-run natural gas utility, and starting to modernize its aging natural gas distribution system. In June 2000, the Romanian government approved the reorganization of Romgaz, restructuring it into four business units: Transgaz, for transport; Depogaz, for underground storage of natural gas; Exprogaz, to make and trade in oil products and carry out hydrocarbon exploration; and a distribution company with two subsidiaries. Romania also has begun to upgrade the country's 9,000-mile pipeline network, attempting to cut down on natural gas leakage and modernizing measuring stations to make gas consumption more efficient. Corroded steel pipelines are being replaced with polyethylene pipelines, and underground storage capacity is being increased from the present 39 Bcf to 162 Bcf by 2010. In addition, in July 2001 Germany's Ruhrgas became the first foreign company to invest in Romania's natural gas distribution network.

Coal

Romania's ailing coal industry is in dire need of major restructuring. Since the revolution of 1989, when Romanian coal production peaked at 66.4 million short tons (Mmst), the country's production has dropped nearly 60%. Romania's severe economic problems, combined with a parallel drop in coal demand and a lack of reform, have crippled the country's coal mining industry. After leveling off in the mid-1990s, the decline in Romania's coal production has accelerated in the past four years as pits began to be shut down and miners periodically have gone on strike to protest poor working conditions and to demand payment of wage arrears owed to them by the government.

Most of Romania's estimated 3,980 Mmst of coal reserves is lignite and sub-bituminous coal, and much of that is located in the Jiu Valley. The coal-rich region region, has been hit particularly badly by problems in the coal sector, with 18,000 miners losing their jobs in 1997 alone. Around 70,000 jobs in Romania's coal sector have been cut in the last four years, and World Bank officials have stated that Romania must shut 29 pits in the Jiu Valley, out of a total of 230 across the country, over the next three years. Starvation caused by the 1997-1998 job severance program led to bloody clashes, suicides and mass hunger strikes by Romanian miners, and in 1999, miners protesting the shutdowns and unhappy about wage arrears clashed with government forces as they marched to Bucharest to voice their concerns. Former Prime Minister Radu Vasile was forced to bargain with striking miners to negotiate a settlement to the confrontation before further violence erupted.



Miners' unions have warned of difficult conditions, including poor ventilation and obsolete equipment, in Romanian coal mines. On August 7, 2001, 14 miners were killed in an explosion in the Vulcan coal mine in the Jiu Valley, the latest in a pattern of deadly accidents in the region. A Romanian government investigation found that the explosion was caused by a violation of operation regulations while handling explosives, and as a result, eight officials held responsible for the blast were dismissed from their jobs.

Despite the industry's problems, Romania is making plans to increase coal production levels in the next decade. With reservoirs at the country's hydropower stations drained to less than 40% of capacity by a severe drought in the summer of 2000, Romania's plans to make up for reduced hydropower generation by boosting coal production is a major relief for domestic coal producers. In the first two months of 2001 alone, coal-mining productivity in Romania rose 15% year-on-year. However, Romania's attempts to revive its coal-mining industry by squeezing out as much coal as possible from existing mines as a cheaper alternative to other fossil fuel imports could slow the pace of restructuring. The government's strategy also could delay, if not cancel, plans by the World Bank to co-finance several coal projects in the country.

Electricity

Romania has installed electric-generating capacity of 22.2 gigawatts (GW), but in 1999 the country produced just 49 Bkwh of electricity, continuing a downward trend that has seen Romania's power generation drop 32% since 1989. Of the 49 Bkwh produced, 54% came from thermal-fired (oil, natural gas, and coal) power plants and 36% from the country's hydropower plants, with the remainder from Romania's sole nuclear power plant. Nevertheless, plummeting domestic electricity consumption, largely due to the Romania's economic woes and the collapse of industrial demand, has assured Romania's status as a net electricity exporter. In 1999, Romania consumed 44.8 Bkwh, a 40% decrease from the country's 1989 level of 74.7 Bkwh.

Approximately 60% of Romania's existing power capacity is more than 20 years old, and about 8 GW will need to be rehabilitated or replaced by 2010. According to the government's medium-term energy strategy, Romania is planning to rehabilitate 10 thermal power stations, with a combined capacity of 1.36 GW, between 2000 and 2005. Rehabilitation of these units will cost an estimated $460 million, while power-generating units with a total capacity of 5.9 GW are planned to be shut down. In addition, technical losses in Romania's inefficient power transmission and distribution system means that an estimated 13% of all electricity dispatched is lost before it reaches any customers.

Romania recently has begun to take steps to reform the country's power sector in order to bring in much needed investment for maintenance and upgrades. Romania removed price ceilings in 1997, but at less than 70% of the average prices in EU member states, the country's electricity prices are currently the lowest in Europe. In 2000, the Romanian government split up Conel, the state-owned electricity company that accounted for nearly 98% of all power produced in the countrya, and created independent companies to handle the country's power generation, transmission, and distribution. Electrica, the state-run electricity distributor, is undergoing further restructuring to divide the company into eight divisions prior to its planned privatization. The first of the eight distribution networks, Constanta and Timisoara, originally were planned to be sold off by the end of 2001, but Electrica General Manager Lucian Boghiu has stated that privatization is unlikely to happen this year.

In addition to restructuring efforts, Romania is opening its power market in line with the EU's electricity directive. In May 2001, Romania's Ministry of Industry and Resources announced that electricity prices will be marked up by 6.2%, the latest in a series of tariff increases. Earlier in 2001, Transelectrica, which was established to handle Romania's transmission system, received a $51.5-million loan from the European Bank for Reconstruction and Development (EBRD) to help upgrade its transmission system and to integrate the Romanian grid into the western European power network, the Union for the Coordination of Transmission of Electricity (UCTE). ANRE, Romania's power market regulator, has granted licenses to a number of large energy consumers, accounting for 15% of Romania's total power consumption, allowing them to select their own electricity suppliers. ANRE has licensed 11 independent electricity producers and is planning to open the energy market to 45% in the next few years.

With the government demonstrating its commitment to reform, investment in Romania's power sector is increasing, especially in the country's hydropower plants. In 1999, Switzerland's Sulzer Hydro won a $154-million contract from Hidroelectrica, Romania's hydropower producer, to refurbish six turbines at the Portile de Fier I (Iron Gates I) power plant on the Danube River. The Portile de Fier I plant has 12 Kaplan turbines, of which six are operated by Romania while the remaining six are operated by neighboring Serbia. Under the project, which is expected to be completed by 2005, the six Romanian turbines' total capacity is to be boosted to 1,290 MW from the present 1,070 MW. In addition, a joint venture between Hidroelectrica and Harza (U.S.) has been working on the Siriu-Surduc-Nehoiasu hydropower system on the Buzau river in eastern Romania. Hidroelectrica is seeking partners for 14 other hydropower projects (including completion of works, upgrading, and management) with a total capacity of 780 MW.

Nuclear

Romania has one nuclear power plant, at Cernavoda on the Danube River. Romania's former dictator, Nicolae Ceausescu, had planned to build five reactors at Cernavoda, but construction was halted after his overthrow in 1989. With the help of international investors, work resumed on the plant in the mid-1990s. The first reactor at Cernavoda, with a capacity of 750 MW, came online in December 1996 and now accounts for approximately 10% of the country's power generation.

In April 2001, Nuclearelectrica, which operates the Cernavoda plant, announced that it was close to concluding a $700-million deal with Italy's Ansaldo and Atomic Energy of Canada Limited (AECL) to finance completion of the 700-MW second reactor at Cernavoda. The two companies helped to build and commission the first reactor in 1996. Romania's share of the costs for the completion of the second reactor, which is approximately 40% complete, is estimated at $400 million. With construction to set to resume in 2002, Nuclearelectrica envisages completion and test operations at the reactor sometime around 2005. The remaining three reactors, whose construction is far behind, could become the object of international tenders to build and operate.

Environment

Romania is attempting to change its post-Cold War polluter image by paying greater attention to the environmental issues facing the country. While Romania is incorporating European Union environmental legislation in an attempt to join the EU, the country's environmental record suffered another blow in January 2000 when a devastating cyanide spill from a Romanian gold mine killed thousands of fish and wildlife in the Tisza River in Hungary.

Localized air pollution from leaded gas and industrial emissions represents a major threat to the environment in Romania. Although the country's energy consumption has decreased in the past 10 years as factories have cut back on production or closed down altogether, Romania's slow progress in restructuring its energy sector has provided a disincentive for energy saving in the long term. Thus, while the country's carbon emissions have dropped since 1990, Romania's energy and carbon intensity remain high, and the country's ability to maintain its reduction in carbon emissions and meet its Kyoto Protocol obligations in the 21st century is in question.

BULGARIA

Bulgaria has been slow to implement economic and political reform since the country's 1989 revolution removed Communist Party leader Todor Zhivkov. After a decade of stagnating economic growth and halting political reform, in June 2001, Bulgaria became the first country in post-communist eastern Europe to return a former monarch to power, as Bulgarians voted the National Movement for Simeon II into power in a general election. Simeon II, a successful businessman in Spain who was ousted from power by the Communists in a rigged election in 1946, returned to Bulgaria and formed his movement of radical young reformers and supporters of European integration only in April 2001 after the Constitutional Court banned him from running for president.

In July 2001, Simeon Saxe-Coburg was approved as the country's new prime minister, saying his priorities would be to bring Bulgaria into the European Union and NATO, to fight corruption, and to secure fast and stable economic growth. Saxe-Coburg's government, a coalition with includes a party of ethnic Turks, has pledged to improve people's lives in 800 days, speed up reforms, cut taxes, attract foreign investors, and boost the fledgling capital market. Bulgaria began EU membership talks in 2000 and hopes to join the union between 2004 and 2007.

Oil

Bulgaria has small indigenous oil reserves and produced only 1,000 bbl/d of oil in 2000. With the transition to a market economy and the end of favorable Eastern bloc prices for Soviet oil, Bulgarian oil consumption decreased by more than 50% from 1989, when Bulgaria consumed 235,200 bbl/d of oil, to 1997, when the country consumed just 106,800 bbl/d. Domestic demand has picked up in the past four years, with Bulgaria's consumption rising to 117,000 bbl/d in 2000 and projected consumption increasing to 121,000 bbl/d in 2001.

In October 1999, Russian oil major Lukoil bought a 58% stake in Bulgaria's largest refinery, the 134,000-bbl/d Neftochim refinery. Lukoil, which paid $101 million for the stake, pledged to invest $408.3 million by 2005 to upgrade the refinery to expand production lines and to meet environmental standards. Neftochim has an 85% share of the domestic market for refined products.

Natural Gas

Bulgaria has minimal natural gas reserves, forcing it to rely on imports for almost all of its natural gas consumption. Bulgaria's gas production increased from 0.4 Bcf in 1989 to 2.5 Bcf in 1993, but has since slipped to 0.7 Bcf in 1999. In May 2001, Bulgaria signed its first natural gas concession to a foreign firm, allowing British energy company Petreco to extract natural gas from Bulgaria's sector of the Black Sea. Under the 25-year contract, Petreco will be able to extract gas from the offshore Galata deposit, which has estimated reserves of 53 Bcf. Petreco has announced plans to extract 14 Bcf of gas per year, starting in 2002.

Bulgaria's natural gas consumption, meanwhile, has dropped from 222.8 Bcf in 1989 to a low of 119.0 Bcf in 1999, driven mainly by a decrease in demand from the industrial sector. State-owned Bulgargas is the country's only gas importer and the owner of the 1,380-mile pipeline network, and government officials have ruled out breaking up the monopoly in the near future. However, in June 2001, the Bulgarian government approved draft amendments to the country's energy act in a partial liberalization of the gas market. In line with an EU directive, as of January 2002, the government will allow large industrial gas consumers and gas distributors to negotiate imports of gas directly from external suppliers, circumventing Bulgargas.

Coal

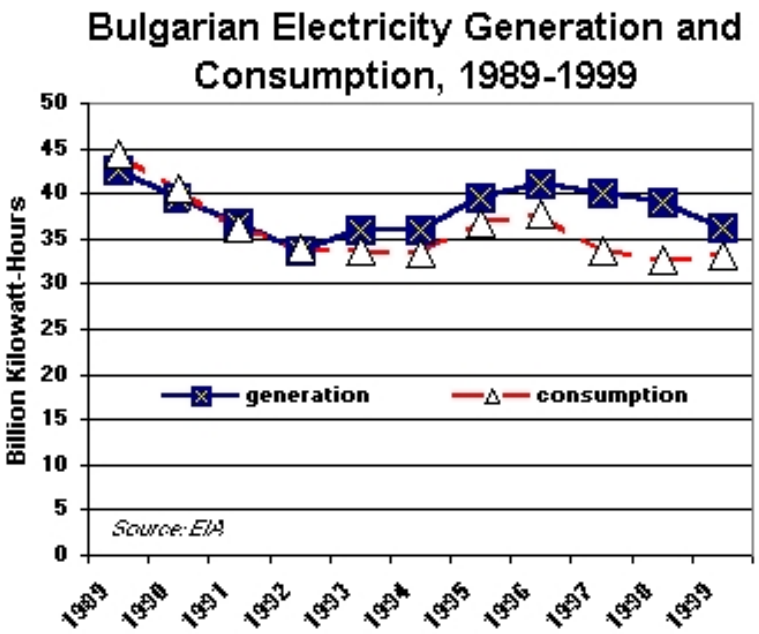
Coal is Bulgaria's most significant natural resource, with reserves estimated at 2.9 billion short tons, almost all of which is lignite or sub-bituminous coal. The country's biggest coal deposit, with estimated lignite reserves of 2 billion short tons, is the Maritsa Iztok coal basin, located in the southeast of the country. The Maritsa coal fields produce low-quality lignite coal with high ash and high sulfur content, but the adjacent Maritsa Iztok power plants are designed to work with this coal. Of the 27 Mmst of coal mined in Bulgaria in 2000, 22 Mmst was mined at Maritsa Iztok, while Bobov Dol, the second largest coalfield, produced approximately 2 Mmst.

In 1997, the Bulgarian government adopted an energy strategy that placed considerable emphasis on developing the country's coal sector, with total investment estimated at $362 million up to 2010. The strategy aims to increase output at the Maritsa Iztok mines to the pre-1989 level of 41 Mmst between 2005 and 2010 by developing the Troyanovo-1, Troyanovo-2, and Troyanovo-3 mines at the Maritsa Iztok basin. However, the mines have seen almost no investments over the past 10 years, and their ability to boost output will depend heavily on the rehabilitation of two of the adjacent power plants, as well as the construction of a new power plant to replace a third plant that is scheduled to be decommissioned.

Bulgaria slightly revised its coal sector strategy in 2000, calling for the closure of non-viable mines and the privatization of those that have attracted investor interest. In 2000, Bulgaria had 26 operating mines, 13 of which the government considered to be commercially viable. Privatization procedures have been started for 11 of the coal-mining companies.

Electricity

Bulgaria's installed electric capacity in 1999 was 12.5 GW, made up of 5.8 GW of thermal power (all coal), 3.8 GW of nuclear power, and 2.9 MW of hydropower. With domestic electricity consumption of 33.2 Bkwh in 1999, Bulgaria has significant spare capacity, even with nearly 2.6 MW of installed capacity currently inoperable. In 2000, Bulgaria produced 41 Bkwh of electricity, with coal-fired power plants generating 19.8 Bkwh, the Kozloduy nuclear plant accounting for 18 Bkwh, and hydropower supplying the remaining 3.2 Bkwh. The Maritsa Iztok complex, made up of three coal-fired power plants with combined capacity of 2,950 MW, accounted for nearly two-thirds of the power generated by coal-fired plants.



In 1998, the Bulgarian parliament began to liberalize the country's power sector by unbundling the generation, transmission, and distribution activities of the national electricity company, NEK. In the summer of 2000, the largest power plants and distribution networks, including the country's Kozloduy nuclear power plant, were separated from NEK, creating seven generation and seven distribution companies. Six of the seven independent power generators registered a profit in 2000, and some of them (but not Kozloduy) will be eligible for privatization.

NEK retains responsibility for central power trading (as the single buyer and seller of electricity), system operation, transmission network management, and system planning, as well as control over the the country's biggest hydropower plants. Introduction of open access is scheduled for 2002, and in September 2001, Milko Kovach, Bulgaria's new head of the State Agency on Energy and Energy Resources, announced that the country plans to start liberalizing its energy market in line with EU accession requirements and IMF recommendations next year.

Bulgaria is eager to attract investment to its aging power sector in order to make necessary upgrades and to maintain its status as the leading electricity exporter in the Balkans. With approximately 40% of Bulgaria's generating capacity scheduled to be retired by 2010, Bulgaria needs investment in the power sector, especially in the Maritsa Iztok coal-fired complex, which is the only Bulgarian facility fueled by local low-quality lignite fuel. Losing that capacity would force Bulgaria to become almost entirely dependent on higher-quality coal imports, most of which currently come from Russia.

In June 2001, Bulgaria sealed two investment deals for the Maritsa Iztok complex. Under a $470-million deal with Entergy (U.S.), four generation facilities at the Maritsa Iztok III power plant, which has a combined capacity of 840 MW, will be rehabilitated and retrofitted with equipment to treat sulfuric emissions. The project, which is expected to take approximately three and a half years to complete, will extend the operating life of the plant by up to 20 years. A $930-million deal with AES Corp. (U.S.) will build a new, 670-MW coal-fired plant at the Maritsa Iztok I plant, replacing an older unit. Construction of the new plant is expected to start by the end of 2001 or in early 2002. At a combined $1.4 billion, the deals represent the largest foreign investments in Bulgaria to date.

Rheinbraun (Germany) also is interested in investing in the 1,440-MW Maritsa Iztok II power station. However, Rheinbraun has stated that it is only interested in rehabilitating the four newest 210-MW units since it considers the four older 150-MW units to be inefficient. Although this would reduce the plant's capacity to 840 MW, the loss of output would not be noticeable since the four 150-MW units currently operate at an efficiency level of 22%. In addition, Bulgaria and Turkey have been attempting to re-launch the stalled $300-million, 170-MW Gorna Arda hydro project, which would rehabilitate the existing dams at the complex and build and operate a new water cascade of three hydropower stations. Bulgaria also is seeking investors for the $72-million Jadenitsa hydropower project and for the $50-million Tsankov Kamak hydropower station.

Nuclear
Bulgaria has one nuclear power plant, the 3,760-MW, Soviet-designed Kozloduy plant located 120 miles north of Sofia. The plant's six reactors include four 440-MW pressurized water reactors without safety encasement (similar to Chernobyl), which were installed between 1974 and 1982, and two more modern, 1,000-MW reactors that have safety enhancements. Although the Kozloduy plant generated 44% of the country's electricity in 2000, Bulgaria bowed to EU safety concerns in 1999 and agreed to close down two of the older 440-MW reactors (units 1 and 2) by 2003, earlier than Bulgaria had wanted. Liberalization of the country's energy market and rising electricity prices should allow Bulgaria to shut down the two reactors without hurting the country's power generation capacity.

The EU is pressing Bulgaria to close down the other two 440-MW reactors (units 3 and 4) as part of accession talks. The EU has called for closure by 2006, but Bulgaria has insisted that the reactors will be permanently closed only after 2008. The operational lifespan of the two units expires in 2010-2012. Bulgaria already has spent more than $100 million on upgrading work at Kozloduy, and in February 2001 the country signed a $76-million contract with Westinghouse to upgrade the two 1,000-MW units.

MOLDOVA
Moldova* became independent in 1991 with the collapse of the Soviet Union, but in the decade since then, the country has been beset by political and economic turmoil. The Trans-Dnistria region, home to the Russian Red Army 14th Division during the Soviet era, declared its independence from Moldova and proclaimed the Trans-Dnistrian Republic, leading to a brutal civil war in the mid 1990s. Fighting stalemated, leaving the region with de facto independence but there has been no formal resolution to the conflict.

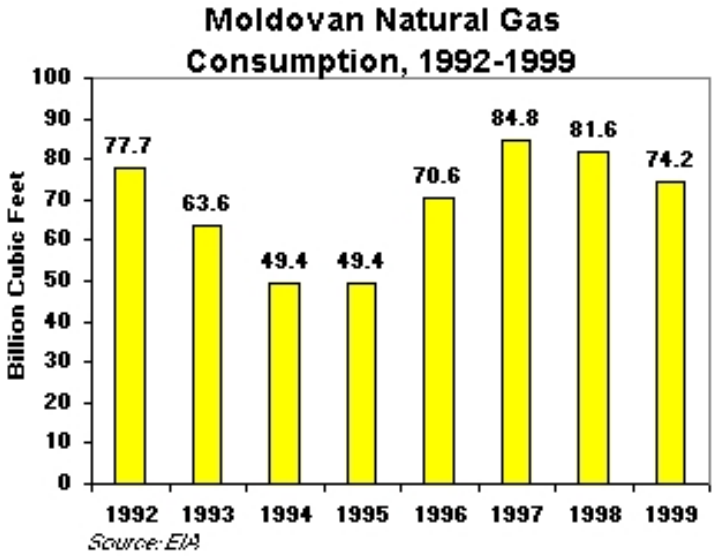
Moldova's economy has contracted severely during the last 10 years, and reform has been slow. The country's economic downturn has resulted in widespread disaffection, which the Communist Party capitalized on in winning an absolute majority in the February 2001 parliamentary elections. In the energy sphere, Moldova relies almost entirely on Russian and Romanian imports to meet domestic demand.

Oil
Moldova has minimal proven oil reserves, and the country currently does not produce any oil, although a plan to develop the Valenskoye field in the southern region of the country could yield up to 2,000 bbl/d. Since Moldova does not have any refineries, the country must rely on imported petroleum products to meet domestic demand. Following the breakup of the Soviet Union, Moldova's oil consumption plummeted by 71%, from 56,900 bbl/d in 1992 to just 16,700 bbl/d in 1996, as the country's economy contracted and fighting broke out in the separatist Trans-Dnistria region. Consumption has rebounded slightly and leveled off at around 20,000 bbl/d, with 2001 consumption projected to reach 21,000 bbl/d.

Just four years ago, Moldova imported the majority of its oil products from Russia, but currently Romania and Ukraine supply Moldova with nearly 99% of its oil demand. Oil products account for over 40% of Moldova's energy imports, which make up nearly one-third of the country's total imports.

Natural Gas

Moldova has estimated natural gas reserves of 882 Bcf, almost all of which are in the Viktorovskoye field. Moldova plans to develop this field in partnership with foreign investors, but production at the field--which would be around 0.1 Bcf per year--has not yet begun, leaving Moldova entirely dependent on Russia for its natural gas supplies. Since Moldova became independent in 1992, the country's natural gas consumption has been wildly inconsistent, with consumption falling to just 49.4 Bcf in 1994 and jumping to 84.8 Bcf in 1997 before dropping to 74.2 Bcf in 1999. This pattern reflects the economic contraction and rise in fighting between Moldova and the breakaway Trans-Dnistrian Republic in the mid-1990s, followed by the relative stability later in the decade as the fighting stalemated and gave way to negotiations.



Moldova's natural gas consumption has begun to decline again as Russian suppliers--including Gazprom and Itera--have reduced supplies to the country due to its increasing debts. According to Mihai Lesnic, chairman of the state natural gas distribution company Moldovagaz, Moldova has run up a gas debt of approximately $420 million to Russia, with the Trans-Dnistrian region, which consumes 40% of the gas imports, responsible for nearly $360 million of that debt. Currently, Moldova buys part of its gas supplies from from Gazprom for $80 per 1,000 cubic meters. Moldova also purchases natural gas from Itera for $65 per 1,000 cubic meters, but on tougher terms of payment.

Moldovan Prime Minister Vasile Tarlev has complained that $80 per 1,000 cubic meters of natural gas is an unbearable burden for most Moldovan businesses and individual consumers, resulting in non-payment and contributing to Moldova's mounting debt. In October 2001, Tarlev and Gazprom Chairman Alexei Miller initialed a preliminary agreement to reduce the burden, with natural gas supplies to be paid in cash at $60, and the remainder in the form of crops and other commodities from Moldova at $20. In addition, Russia and Moldova are attempting to negotiate a settlement to Moldova's natural gas debts, with one option allowing Russia to take part in the privatization of a number of Moldovan businesses. Russia restructured Moldova's natural gas debts in 2000, but the measure proved insignificant, forcing Moldova to ask for a further reduction of the debt.

Coal

Moldova has a small coal industry, with reserves estimated of approximately 10 Mmst and production of 35,000 short tons in 1999. This represented a sharp decline from the peak of around 290,000 tons produced in the late 1980s, when Moldovan coal enjoyed a higher level of demand in the combined markets of the Soviet Union. However, most Moldovan coal production is low-grade bituminous coal, used in construction rather than power generation. For energy purposes, Moldova imports approximately 620,000 tons of hard coal per year. Moldova's coal consumption, like its production, has dropped significantly in the past decade, from 2.96 Mmst in 1992 to just 64,000 short tons in 1999.

Electricity

Since receiving its independence in 1992, Moldova has gone from being a net power exporter to a net importer as power-generating capacity has been reduced due to under investment, warfare, and the country's economic contraction. Moldova's current 1-GW power-generating capacity is less than one-third of the country's 3.1-GW capacity in 1992. The country's power generation has been reduced from 10.6 Bkwh in 1992 to 4.2 Bkwh in 1999, while Moldova's domestic electricity consumption has dropped from 9.8 Bkwh in 1992 to 5.8 Bkwh in 1999.

As a result, Moldova is now dependent on imports for nearly 15% of its electricity consumption. Most of these supplies come from Romania and Ukraine. As of July 2001, Ukraine was exporting about 100 million kilowatt-hours of electricity per month to Moldova, with technical capacity to increase supplies to 250 million kilowatt-hours per month. Romania periodically has cut off supplies to the Moldovan grid due to non-payment of bills, and Moldova's debt for Ukrainian

electricity is approximately $30 million. Russia is eager to export its electricity to Moldova as well, and in August 2001, Russia and Ukraine re-connected their electricity grids and agreed on joint exports of electricity to Moldova.

Moldova's power sector continues to suffer from consumer non-payment of bills, leaving the countries' power-generating facilities short of cash for investment and leading to an energy crisis in northern Moldova earlier in 2001. In parts of northern Moldova served by the northern and north-western energy distribution grids, electricity was out for 12 or more hours per day. In April 2001, Moldova passed several urgent measures to resolve the crisis, including finally allowing electricity suppliers to cut off indebted customers. Itera and Spanish utilities company Union Fenosa have expressed interest in obtaining Moldova's northern and north-western electricity distribution networks, both of which are in bad financial condition.

In August 1999, Union Fenosa purchased three of Moldova's regional energy distribution networks, including the network supplying Chisinau. Under the $25-million sale agreement, Union Fenosa is committed to making further investments of $60 million over five years to upgrade and modernize energy infrastructure. In August 2001, Union Fenosa signed a $267-million, 10-Bkwh, 5-year power supply agreement with the Cuciurgan power station, which is controlled by the secessionist Trans-Dnistrian Republic. The agreement is expected to cover 70%-80% of the needs of the three power distribution grids.

In an effort to raise much needed capital, in November 2000, Moldova sought to sell 70% stakes in three gas-fired power plants with combined capacity of 318 MW. However, Moldova's offer to sell the CET1 and CET2 plants near Chisinau and the 240-MW Balti plant in the north failed to attract any bids. A second tender was launched in March 2001.

* *All Moldova figures include Moldova proper and the Trans-Dnistrian Republic.*

Table 1. Economic and Demographic Indicators for Southeastern Europe

Country	Gross Domestic Product (GDP), 2000E (Billions of U.S. $)	Real GDP Growth Rate, 2000 Estimate	Real GDP Growth Rate, 2001 Projection	Per Capita GDP, 2000E	Population 2000E (Millions)
Bulgaria	$12.0	5.8%	3.9%	$1,468	8.2
Moldova	$1.3	1.9%	3.5%	$300	4.3
Romania	$36.7	1.6%	5.2%	$1,647	22.3
Total/weighted average	$50.0	2.6%	4.8%	$1,438	34.8

Source: WEFA

Table 2. Energy Consumption and Carbon Dioxide Emissions in Southeastern Europe, 1999

Country	Total Energy Consumption (Quadrillion Btu)	Petroleum	Natural Gas	Coal	Nuclear	Hydroelectric	Other Electricity	Net Electricity Imports	Carbon Dioxide Emissions (Million metric tons of carbon)
Bulgaria	0.84	27.1%	14.0%	36.7%	19.1%	3.8%	0%	-0.6%	13.5
Moldova	0.15	22.7%	54.4%	7.3%	0%	1.9%	0%	13.7%	2.0
Romania	1.64	30.3%	37.8%	17.6%	3.5%	11.2%	0%	-0.5%	25.7
Total/weighted average	2.63	28.8%	31.1%	23.1%	8.3%	8.3%	0%	--	41.2

Source: Energy Information Administration
Note: percentages may not add up to 100% due to rounding.

Table 3. Energy Supply Indicators, Southeastern Europe

Country	Crude Oil Reserves, 1/1/01 (Million Barrels)	Natural Gas Reserves, 1/1/01 (Trillion Cubic Feet)	Coal Reserves, 1/1/01 (Million Short Tons)	Petroleum Production, 2000 (Thousand Barrels Per Day)	Natural Gas Production, 1999 (Billion Cubic Feet)	Coal Production, 1999 (Million Short Tons)	Electric Generating Capacity, 1999 (Gigawatts)	Crude Oil Refining Capacity, 1/1/01 (Thousand Barrels Per Day)
Bulgaria	1-15	0.2	2,988	1	0.7	28.7	12.4	134
Moldova	Minimal	Minimal	Minimal	0	0	0.04	1.0	0
Romania	1,200-1,400	4.0-13.2	3,980	127.4	501.5	27.6	22.2	522
Total	1,201-1,415	4.2-13.4	6,968	128.4	502.2	56.3	35.6	656

Source: Energy Information Administration

Sources for this report include: CIA World Factbook, U.S. Department of Commerce's Business Information Services for the Newly Independent States, the U.S. Energy Information Administration, PlanEcon, Radio Free Europe/Radio Liberty, U.S. Department of State, WEFA Eurasian Economic Outlook, as well as Eastern Bloc research and news reports.

For more information from EIA on Romania, Bulgaria, and Moldova, please see:

EIA: Country Information on Romania
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Links to other U.S. government sites:
U.S. Agency for International Development
CIA World Factbook 2000
U.S. Department of Commerce, Business Information Service for the Newly Independent States (BISNIS): Moldova
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Germany

Germany is one of the world's largest energy consumers. Because it has limited indigenous energy resources (except for coal), Germany imports most of its energy. Although the country is a major coal producer, it is a net coal importer.

The information contained in this report is the best available as of November 2001 and is subject to change.

GENERAL BACKGROUND

Germany is one of the world's largest economies, a founding member of the European Union (EU), a North Atlantic Treaty Alliance (NATO) member, and a member of the Group of Seven (G-7) industrialized nations. It joined the common European currency, the euro, on January 1, 1999, and Frankfurt is the seat of the European Central Bank. The German mark, which still exists as cash and coin will disappear in the first six months of 2002 as people trade in their marks for the new euro coins and currency.

The ruling Social Democrat (SPD) government, led by Chancellor Gerhard Schroeder, was voted into power on September 27, 1998. This election marked an important change in German politics, as Schroeder's predecessor, Helmut Kohl of the more conservative Christian Democrats (CDU), had held power for 16 years. The lower house of the German Parliament (Bundestag) gave Schroeder a vote of confidence on November 16, 2001, when he tied approval for military deployment to Afghanistan to a vote of confidence. The vote allows Germany to send 3,900 troops, including special forces, to support to the United States-led coalition against terrorism.

Germany experienced slower economic growth during 2001 as compared to 2000, and may be on the verge of a slight contraction, according to a report published in October 2001, by Germany's top six economic research

institutes. The events of September 11 had a negative effective on the entire world economy, and recent German government estimates are that growth in 2001 may be just 0.75%. In September, business confidence in Germany fell to its lowest level since 1993, and has continued to fall slightly since then. In addition, the growth generated by increasing exports because of the relatively weak euro and other factors up to August 2001, has been diminished as the global economy, and that of the United States in particular, looses momentum. Unemployment, a major issue in German politics in recent years, has decreased slightly since its high in 1998. However, the economic slowdown indicates that unemployment will likely not fall any further in the next 12 months.

Energy in Germany

German has very limited domestic energy sources and is heavily import-reliant to meet its energy needs. Coal accounted for 47% of domestic energy production in 1999, nuclear power 30%, natural gas 14%, renewable sources (including hydro) 6%, and oil 2%. However, oil accounted for 41% of consumption.

The SPD now rules in alliance with the Greens, the environmental party. The SPD-Green coalition government's energy policy has focussed on levying eco-taxes to reduce carbon emissions, ending the use of nuclear power, and supporting renewable energy. Schroeder's government came under harsh criticism and saw its popularity falter during September 2000 oil price demonstrations that swept across western Europe. Higher world oil prices and a weak euro caused Germany's oil import costs for the first half of 2000 to increase 140% over the same period in 1999, according to Germany's federal statistics office. Demonstrators, opposition CDU politicians, and others joined in demanding relief from eco-taxes (taxes now make up about 70% of the pump price for gasoline in Germany). Despite demonstrations resulting in the temporary paralysis of Berlin, Schroeder refused to roll back the taxes, instead offering some new tax rebates. Among these is a flat-rate travel-to-work benefit for all employees. However, in late October 2001, the

Chancellor's chief economic advisor indicated that these ecological taxes may be suspended for a year or two as a way to provide a stimulus to economy.

Energy policy in Germany is influenced heavily by EU regulations. The EU requires privatization and competition in member countries' energy markets, and Germany has been a leader in developing competitive energy markets.

Following reunification of the country in 1990, the major task of German energy policy was to merge successfully the radically different energy sectors of the East and West. West Germany had a diversified and mainly privately-owned system of energy supply with a high standard of energy efficiency and a commitment to environmental protection. In contrast, East Germany's energy sector was highly centralized, predominantly state-owned, and mainly dependent upon relatively "dirty" lignite (brown coal) as its primary fuel. To date, a great deal of progress has been made in conforming the former East Germany's energy sector to the standards of the West in the areas of privatization and environmental regulation.

OIL

Germany consumed about 2.8 million barrels per day (bbl/d) of oil in 2000, nearly all of which it imported, making Germany the third-largest oil importer in the world. German oil imports come primarily from (year 2000 percentages) Russia (29%), Norway (18%), United Kingdom (13%), and the Libya (11%). German imports from Russia have remained unchanged in recent years. However, OPEC's share of German imports has decreased, while the share of North Sea oil from Norway and the United Kingdom has increased. Despite the level of imports being about the same, import costs increased by about 85% in 2000. Imports from the North Sea fell 7%, made up by a 7% rise in imports from the countries that made up the former Soviet Union. OPEC's exports to Germany overall were essentially unchanged, with Libyan and Venezuelan imports declining and Nigerian and Algerian imports rising. Into the first six months of 2001, preliminary estimates show Russian crude oil maintaining the same level as 2000, but imports from OPEC declining from 26% to 22% of total imports into Germany.

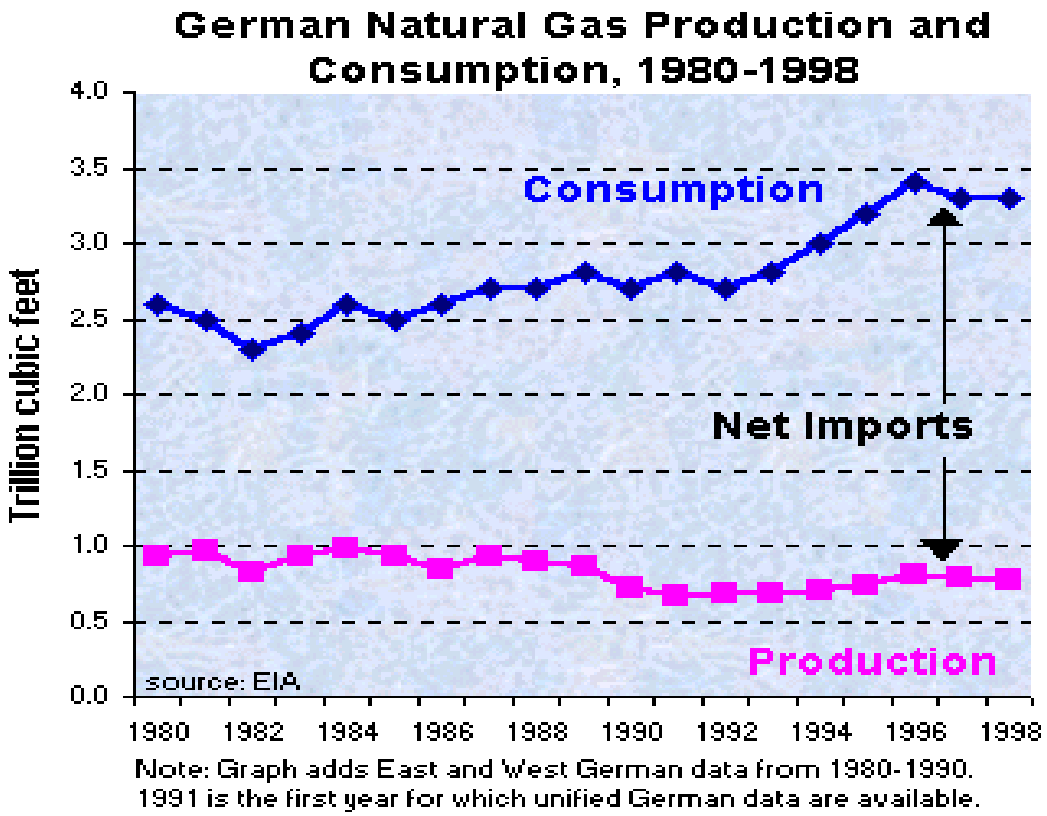
Germany produced around 139,000 bbl/d of oil in 2000, including 64,000 bbl/d of crude oil, 16,000 bbl/d of which came from the German North Sea. Higher world oil prices in 2000 spurred a small increase in domestic crude oil production.

Germany's oil consumption was essentially unchanged in 2000 as compared to 1999. With the aid of hefty federal taxes on gasoline consumption, Germany had decreased its oil consumption in recent years, with lower consumption in 1999 than any year since unification. Germans pay about four times more at the pump than Americans, despite having the most competative retail gasoline market in Europe. German refinery throughput increased 1% in 2000, and refinery capacity utilization was at 95%.

The German downstream sector is in the process of completing two large mergers. In April 2001, Royal Dutch Shell and one of Germany's largest energy companies, RWE, agreed to form a new 50:50 venture called Shell & Dea Oil. The new company is managed by Shell, and will

NATURAL GAS

Germany produces very little natural gas and satisfies most of its demand through imports. In 1998, the country produced 0.8 trillion cubic feet (Tcf) of natural gas from proven reserves of 12.0 Tcf, while consuming 3.3 Tcf. Almost one-third of Germany's gas imports come from Russia. The other main sources of imports are the Netherlands (about 24%) and Norway (about 20%). Gas consumption accounted for about 21% of total energy consumption in Germany in 1998. This share is expected to rise over the next decade, especially for electric power generation as nuclear power is phased out. Gas currently fuels about 10% of German electricity.



Ruhrgas remains Germany's dominant natural gas transmission company. Years of Ruhrgas's monopolistic control of Germany's gas market have left Germany with a highly developed gas infrastructure. Ruhrgas is currently involved in laying pipes to connect Poland to the German system in order to increase imports of Russian gas via Poland, a project that could be completed in late 2001. Ruhrgas has also bought stock in Russia's Gazprom, in an effort to facilitate closer relations between the two companies in anticipation of future increases in German demand for gas.

Competition in the market has developed slowly. Ruhrgas's main competitor, Wingas, was formed in 1993 by a joint venture between BASF's Wintershall and Russia's Gazprom. Now, with its own domestic pipelines and links to export supply lines, Wingas has gained market share, while Ruhrgas's share has decreased. Wingas is nearing completion on a pipeline construction project that will connect Russia's Yamal Peninsula to the German network, which is expected to increase further the Wingas market share.

Although Germany has one of the most liberalized energy sectors in the EU, full liberalization of German gas market has not emerged as expected. According to EU law, member countries' gas transmission systems had to be open to third party access as of August 2000. While a German law was in place confirming a legal right for third party access, in practicality, new

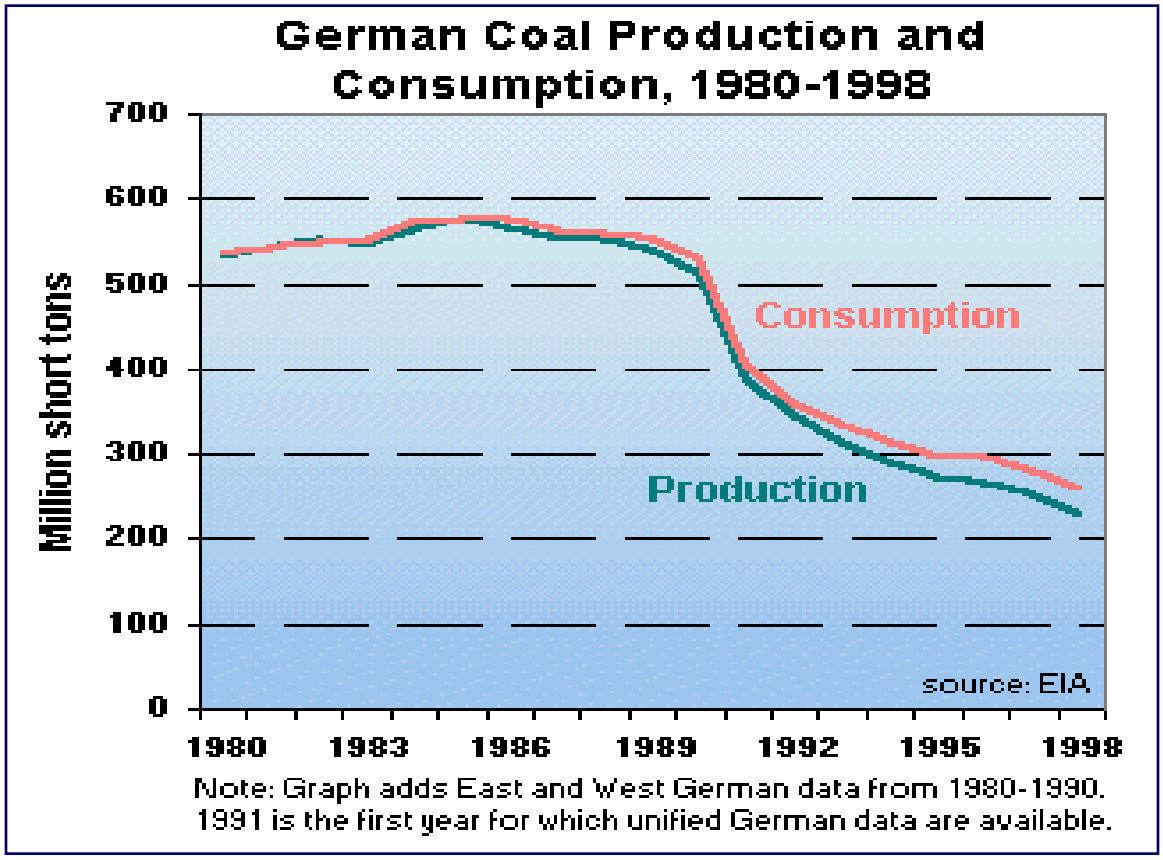
entrants have had difficulty gaining access. In response to a threat of legal action made by the European Commission (EC, the executive body of the EU), new legislation will be introduced to further promote open access.

In September 2000, the *Deutsches Nordseekonsortium* (German North Sea Consortium), which is made up of Wintershall (40%, operator), BEB Erdgas und Erdoel (40%), BASF (12%), and RWE-DEA (7%), began production. The first offshore natural gas project in the German North Sea, the field is located about 190 miles from the German coast. New pipelines will transmit the anticipated 3.3 million cubic meters (116.5 million cubic feet) per day of production. The field is expected to produce for 16 years.

COAL

Coal is Germany's only major domestic fuel source. Over 75% of German coal production is used for electricity generation, and coal accounts for over 50% of electricity generation. Hard coal production is expensive in Germany, relative to production costs in other major coal producers, because German coal is located deep underground. Hard coal production has remained a viable industry only through heavy subsidization, which now is coming to an end. Lignite, or "brown coal," production, however, is inexpensive in Germany. Germany is the world's largest lignite producer, with about one-fifth of global output.

In March 1997, the German government, the mining industry, and the unions reached an agreement on the future structure of subsidies to the German hard coal industry. Subsidies to the industry are to be reduced from over DM10 billion ($5.5 billion) in 1997 to DM5.5 billion ($3 billion) by 2005. The agreement called for closure of 7-8 of Germany's 19 hard coal mines, resulting in an estimated decline in employment from 76,000 miners in 1997 to 36,000 by 2005.



In October 2000, the EC energy commissioner demanded that Germany rework this subsidization scheme or risk legal action. According to the 1997 agreement, 2000 subsidies will total DM8.5 billion. The EC claims that too much of that amount will be spent on subsidizing continuing production, and not enough devoted to ending production. The EC is expected to take further steps, beginning with a formal letter to the German government, in early November 2000. The German Economy Minister stands by the subsidies as delineated in the 1997 agreement, despite impending legal action.

Decreasing coal production has brought about changes in the industry's organization. Two major producers, Saarbergen and Ruhrkohle Bergbau, merged to form Deutsche Steinkohle (DSK), which accounts for 96% of German production. DSK is part of the larger RAG group, which intends to diversify its holdings and focus less on coal as the sector shrinks in coming years.

As domestic production declines, Germany is emerging as a significant coal importer. Germany imported 10% of its coal consumption in 1997, and 12% in 1998. The largest supplier is Poland, followed by Australia, South Africa, and Colombia. The Federation of German Coal Importers expects German coal imports to double over the next 20 years, as nuclear power is phased out

and domestic production declines.

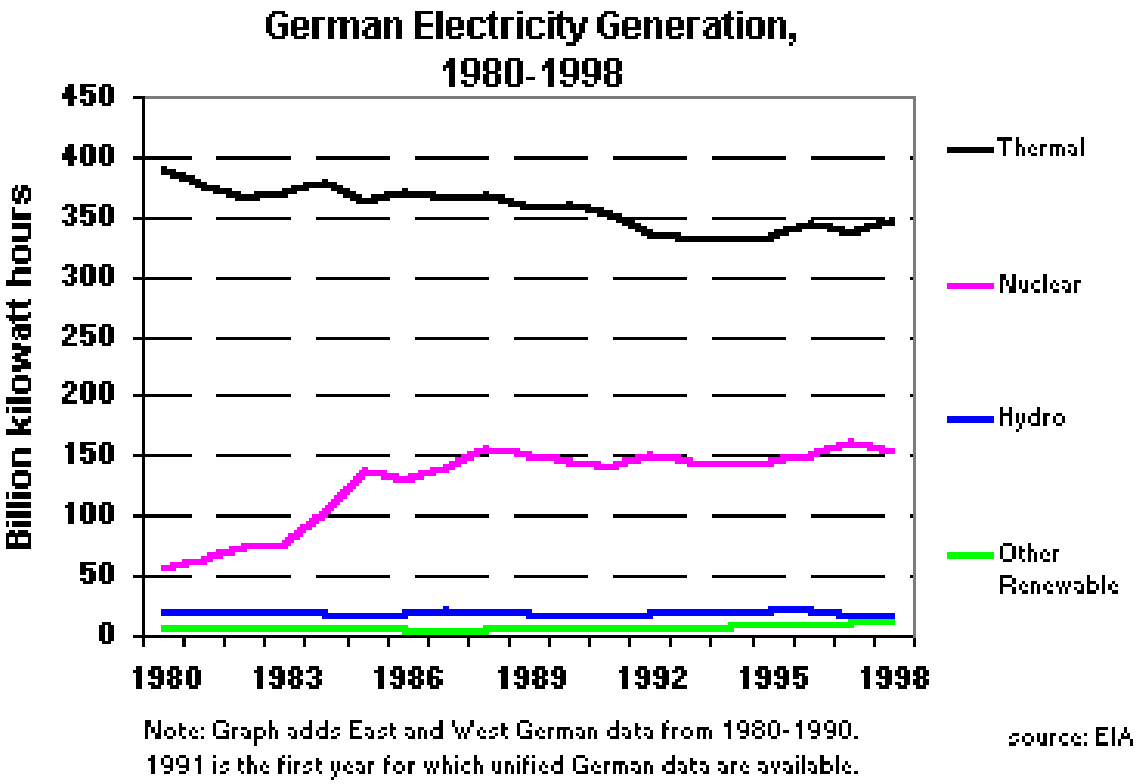
Germany's lignite production is separate from hard coal production. Lignite was the most important fuel in the former East Germany, and East Germany had been producing about three times as much lignite as West Germany in the years prior to unification. Since reunification, wasteful and environmentally damaging mining methods practiced during Communist rule have been reformed. The industry also has been privatized. Lignite production in Germany fell from 308 Mmst in 1991 to 183 Mmst in 1998. Rheinbraun, a subsidiary of RWE, is responsible for most of German lignite production, and most of its lignite is used to produce electricity in RWE's power generation plants.

ELECTRICITY

Germany has Europe's largest electricity market. In 1998, Germany generated 525.4 billion kilowatt hours (bkwh) of electricity, two-thirds of which came from fossil fuels (mostly coal), with the other other third coming mostly from nuclear power along with small amounts of hydropower and other renewable sources. The country was a net electricity exporter, consuming only 488.0 bkwh. Germany has about 2,800 power plants and considerable excess generation capacity. The International Energy Agency predicts slow demand growth in coming years. Major electricity companies recently have announced intentions to decrease generation capacity and output, and new power plant construction is at record lows.

The industry is undergoing dramatic changes in fuel mix and in organization. Efforts continue to phase out nuclear power and to increase reliance on renewable energy sources, most notably wind power. The German power market was liberalized in April 1998, and the ramifications of this change are still developing.

Sector Organization



In step with EU legislation, the German power market has become one of the most competitive in Europe. Liberalization of the electricity sector has progressed via agreements among major participants in the market and is not overseen by any regulatory body (like the natural gas sector). Liberalization has resulted in lower consumer prices, decreased employment in the industry, and is now sparking a wave of consolidation.

Six major electricity generation companies have dominated the German market in recent years, accounting for about 80% of generation. Major mergers are re-shaping the industry, potentially reducing the number of major players from six to three in the near future. RWE, the largest energy company in Germany, has acquired VEW, the country's six-largest electricity producer. Veba, Germany's second-largest power company, merged in June 2000 with Viag, the third-largest, to create Eon. The newly merged companies will be Europe's third- (RWE) and fourth-largest (Eon) electricity companies, behind the French state company EdF and Italy's ENEL.

In efforts to meet antitrust regulation, the four merging companies will sell their combined 81% share of Veag, which had been the fifth-largest electric company. U.S.-based NRG Energy, which mines lignite in Germany, and Germany's former fourth-largest company, EnBW, will bid jointly for control

of Veag. The closing dates for bids is November 15, 2000. The merger activity also cleared the way for EdF to acquire a 25.01% stake in EnBW. The EU is not expected to issue a decision regarding approval of the sale to EdF until early 2001.

The utility market is highly fragmented in Germany, with about 70 regional utilities and 900 municipal utilities, which together account for about 20% of power generation and about two-thirds of distribution. Merger and acquisition activity also is re-shaping these utilities, with a reported 15 mergers among 40 companies in 1999. Foreign company involvement in the sector became controversial in 2000, with a German court blocking the sale of Bewag of Berlin to HEW, a Hamburg utility owned by Sweden's Vattenfall. Sempra Energy of the United States was the main rival for the sale. Vattenfall and HEW had been hoping to complete the purchase of Bewag in time to launch a joint bid with U.S.-based Southern company for Veag.

Despite the overall success of liberalization, third party access to transmission networks remains a contentious issue. The *Verbandervereinbarung* that determines access to the grid system was first agreed in May 1998 and left transmission control mostly in the hands of the six major companies. After much criticism, a new Verbandervereinbarung was agreed in December 1999. This agreement has encountered even more criticism than its predecessor, and EU competition authorities have expressed concern. The most criticized aspects of the agreement include a lack of price transparency and the division of the German market into two distinct trading zones.

The German government has been critical of member EU governments that have not taken steps to open their power sectors in accordance with EU law. Currently, German electricity companies do have the right to block electricity imports from countries that deny access to foreign companies. The Minister of Economics, Werner Mueller, has proposed that German energy law be amended to extend the right to invoke bans, known as "reciprocity clauses", to the government.

Nuclear Power

Currently, Germany ranks fourth worldwide in installed nuclear capacity, behind the United States, France, and Japan. Germany's nuclear plants comprise about 30% of Germany's electric generation capacity, and about 29% of actual generation. Eon, RWE, and EnBW own nuclear generation capacity, with Eon holding stakes in 11 of Germany's 19 nuclear power reactors.

Nuclear power has become controversial since the September 1998 elections. The Greens, the environmental party that is part of the ruling alliance, are staunchly opposed to the continued use of nuclear power. Chancellor Schroeder had decided to close all 19 nuclear reactors in 2005, but he has since rescinded his position. The government agreed with utility companies in June 2000 to gradually phase out nuclear power. Each nuclear plant is allowed to produce a finite amount of electricity, and plants will have a life span of 32 years. The deal could see the total elimination of nuclear power by 2021, as the newest nuclear plant opened in 1989. Generation volumes are transferable; if an older plant closes before reaching its production ceiling, its remaining allowable production can be transferred to a new plant.

There are few economically viable alternatives to quickly replace such a significant portion of the fuel mix, especially in the wake of the liberalization of the industry. As European markets become more liberalized and more price-sensitive, replacing the mostly amortized plants will prove difficult. Over the longer term, however, high costs (high fixed costs, long depreciation periods and long annual operating times) associated with nuclear generation could work to decrease nuclear generation's role in Germany's power sector. Nuclear installations currently are initiating programs to reduce production costs and waste disposal costs in order to become more price-competitive. In October 2000, Eon and RWE announced intentions to close a number of their less competitive (in terms of price) nuclear power plants.

ENVIRONMENT

Germany has a strong commitment to protecting its environment. It has actively promoted the use of renewable energy, both under the Kohl government with the Electricity Feed Law, and now under Schroeder's government with eco-taxes. In Germany's eco-tax regime, energy tax (energy taxes are slated to increase 10% over the next three years) revenue is used to fund renewable projects.

In 1998, Germany emitted 227.5 million metric tons of carbon from the consumption of fossil fuels. Germany ranks third in total carbon emissions within the G-7, after the United States and Japan. Germany signed the Framework Convention on Climate Change in Rio de Janeiro in June 1992 and ratified it on December 9, 1993. Signers of the agreement pledged to stabilize per capita CO_2 emissions in the year 2000 and beyond at 1990 levels. Under the Kyoto Protocol of December, 1997, Germany would have to go even further by reducing carbon emissions 8% by 2008-2012. This will be made more achievable given the sharp drop in total German carbon emissions since 1990, due mainly to decreased consumption of energy overall (and in particular lignite) in the former East Germany.

Sources for this report include: CIA World Factbook; Dow Jones; Economist Intelligence Unit ViewsWire; Petroleum Intelligence Weekly; Financial Times; Economist; Petroleum Economist; U.S. Energy Information Administration; WEFA World Economic Outlook.

COUNTRY OVERVIEW

President: Johannes Rau (elected May 1999)
Chancellor: Gerhard Schroeder (elected September 1998)
Independence: January 18, 1871 (reunification of West and East Germany took place on October 3, 1990)
Population (2001E): 83 million
Location/Size: Central Europe, bordering the Baltic Sea and the North Sea, between the Netherlands and Poland, south of Denmark/137,821 square miles (slightly smaller than Montana)

Major Cities: Berlin (national capital since 10/3/90), Hamburg, Munich, Cologne, Frankfurt, Essen, Dortmund, Stuttgart
Language: German
Ethnic Groups: German 91.5%, Turkish 2.4%, other 6.1% (made up largely of Serbo-Croatian, Italian, Russian, Greek, Polish, Spanish)
Religions: Protestant 38%, Roman Catholic 34%, Muslim 1.7%, unaffiliated or other 26.3%
Defense (8/98): Army, 230,600; Navy, 26,700; Air Force, 76,200 (including conscripts)

ECONOMIC OVERVIEW

Finance Minister: Hans Eichel
Currency: Deutsch Mark (DM)
Exchange Rate (11/09/00): 1 US Dollar = 2.2861 DM
Gross Domestic Product (GDP, nominal, 2000E): $1.87 trillion **(2001E):**
Real GDP Growth Rate (2000E): 3.0% **(2001E):** 1.1%
Inflation Rate (consumer prices, 2000E): 1.9% **(2001E):** 2.7%
Unemployment Rate (2000E): 9.6% **(2001E):** 9.5%
Exports of Goods (2000E): $549 billion
Imports of Goods (2000E): $492 billion
Major Trading Partners (2000): France, U.S., U.K., Italy, Netherlands
Major Export Products (2000): Machinery and transport equipment, manufactured goods, chemicals
Major Import Products (2000): Machinery and transport equipment, manufactured goods, other finished goods, fuels

ENERGY OVERVIEW

Minister of Economics: Werner Mueller
Proven Oil Reserves (1/1/01): 380 million barrels
Oil Production (2000E): 139,000 barrels per day (bbl/d), of which 64,000 bbl/d was crude oil
Oil Consumption (2000E): 2.76 million bbl/d
Net Oil Imports (1999E): 2.7 million bbl/d
Natural Gas Reserves (1/1/01): 11.5 trillion cubic feet (Tcf)

Natural Gas Production (1999E): 0.82 Tcf
Natural Gas Consumption (1999E): 3.0 Tcf
Coal Reserves (12/31/96E): 73.9 billion short tons
Coal Production (1999E): 226 million short tons (Mmst)
Coal Consumption (1999E): 258 Mmst
Net Coal Imports: 32 Mmst
Electric Generation Capacity (1/1/99): 108 gigawatts
Electricity Production (1999E): 531.4 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Minister for Environment: Juergen Trittin
Total Energy Consumption (1999E): 13.9 quadrillion Btu* (3.6% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 229.9 million metric tons of carbon (3.7% of world total carbon emissions)
Per Capita Energy Consumption (1999E): 170.4 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.8 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 7,280 Btu/ $1990 (vs U.S. value of 12,638 Btu/ $1990)**
Carbon Intensity (1999E): 0.12 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (41.9%), Residential (24.2%), Transportation (21.5%), Commercial (12.3%)
Sectoral Share of Carbon Emissions (1998E): Industrial (37.4%), Transportation (25.6%), Residential (24.5%), Commercial (12.5%)
Fuel Share of Energy Consumption (1999E): Oil (41.4%), Coal (23.2%), Natural Gas (21.2%)
Fuel Share of Carbon Emissions (1999E): Oil (45.1%), Coal (36.3%), Natural Gas (18.6%)
Renewable Energy Consumption (1998E): 395 trillion Btu* (5% increase from 1997)

Number of People per Motor Vehicle (1998): 1.9 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 9th, 1993). Under the negotiated Kyoto Protocol (signed on April 29th, 1998, but not yet ratified), Germany, as a member of the European Union, has agreed to reduce greenhouse gases 8% below 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: Emissions from coal-burning utilities and industries and lead emissions from vehicle exhausts (the result of continued use of leaded fuels) contribute to air pollution; acid rain, resulting from sulfur dioxide emissions, is damaging forests; heavy pollution in the Baltic Sea from raw sewage and industrial effluents from rivers in eastern Germany; hazardous waste disposal.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling . Has signed, but not ratified, Air Pollution-Persistent Organic Pollutants.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

ENERGY INDUSTRIES

Major Energy Companies: *Oil:* Deutsche Shell, Esso, Ruhr Oel; *Natural*

Gas: Ruhrgas, Wintershall/Wingas; *Coal:* DSK, RAG; *Electricity:* RWE, Viag, Veba
Major Refineries (crude capacity, bbl/d): Karlsruhe (285,800), Bayernoil (258,000), Schwedt (230,000), Gelsenkirchen (227,000), Leuna (214,000), Wilhelmshaven (225,000), Godorf (170,000), Wesseling (140,000), Esso Ingolstadt (105,000)

LINKS

For more information from EIA on Germany, please see:
EIA - Country Information on Germany

Links to other U.S. Government sites:
CIA World Factbook - Germany
U.S. Department of Energy's Office of Fossil Energy's International section - Germany
U.S. Department of Energy on German Nuclear Sector
U.S. State Department's Consular Information Sheet - Germany
U.S. State Department's Country Commercial Guide - Germany
U.S. State Department Background Notes on Germany
U.S. Embassy in Germany

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German Embassy in the United States
Germany's Nuclear Energy Policy Briefing Paper
European Commission Directorate General XVII (Energy)
International Energy Agency's Germany 1998 Review

Wingas
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Russia

Printer Friendly Version, PDF Version, PDA Version

April 2002

Russia

Russia is important to world energy markets because it holds the world's largest natural gas reserves, the second largest coal reserves, and the eighth largest oil reserves. Russia is also the world's largest exporter of natural gas, one of the largest oil exporters, and the third largest energy consumer.

Note: Information contained in this report is the best available as of April 2002 and is subject to change.

GENERAL BACKGROUND

After a banner year in 2000, when Russia's real gross domestic product (GDP) grew by 8.3%, Russia's economic growth slowed in 2001. Nevertheless, Russia's economy grew by a healthy 5.1%, and the country's economy is in the best shape it has been in since the breakup of the Soviet Union in 1991. Russia's rate of inflation slowed from 20.2% in 2000 to 18.5% in 2001, and Russia's currency, the ruble, continued to strengthen in 2001, prolonging its remarkable rebound from the country's August 1998 financial crisis and devaluation.

Since energy accounts for approximately 40% of Russia's exports and 13% of the country's real GDP, Russia's economy is extremely sensitive to global energy price fluctuations. As a result, the decline in world oil prices in 2001 put the brakes on Russia's economic recovery, which was fueled by high world oil prices in 1999-2000 and the increased competitiveness of Russian exports in the aftermath of the 1998 financial crisis. Although the windfall in oil export revenues in 1999-2000 stimulated increases in other industrial sectors and helped the Russian government pay down some of its $154 billion foreign debt, structural reforms slowed in the euphoria of the oil revenues.

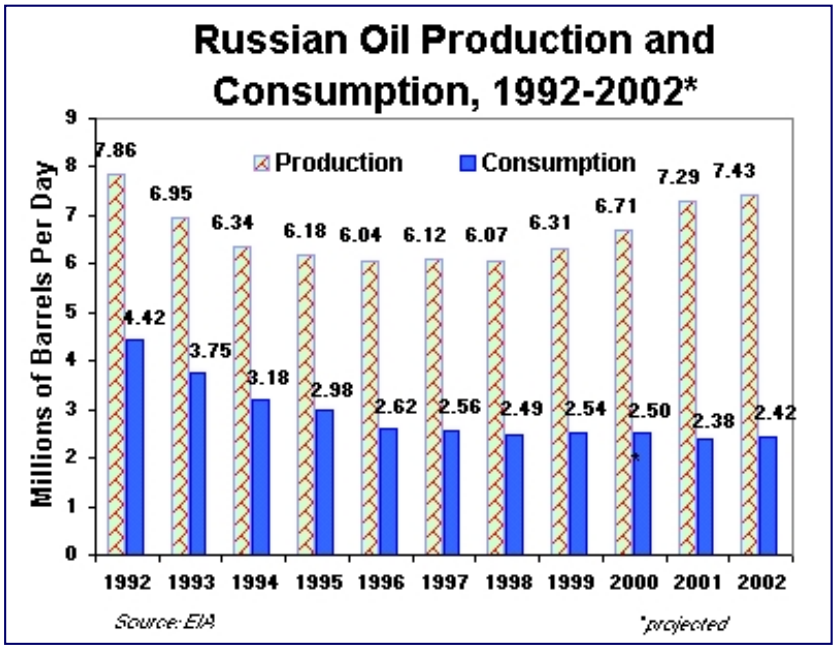
The drop in world oil prices after September 11, 2001, resulted in members of the Organization of Petroleum Exporting Countries (OPEC) requesting Russia and other non-OPEC members to cut their oil exports in order to boost prices. Russia agreed with OPEC in December 2001 to cut its oil exports by 150,000 bbl/d during the first quarter of 2002. Despite heavy lobbying by Russian oil companies to end the cut and to increase exports, Russia, whose state budget for 2002 is based on an average oil price of $23 per barrel and a minimum price of $18 per barrel, decided in March 2002 to continue its self-imposed cuts by 150,000 bbl/d through June 2002.

Although reforms have been slow in coming, restructuring and liberalizing the energy sector and making the Russian economy less dependent on oil and natural gas exports is a stated priority for Russian President

Vladimir Putin and the Russian government. Plans to break up the monopoly positions of both Gazprom and Unified Energy Systems, the Russian natural gas and electricity monopolies, have been approved. Similarly, the Russian government has pledged to improve the investment climate in Russia, but Russia's unstable tax and legal codes have kept many foreign energy companies from investing in Russia's energy sector. Russia has plans for a number of new oil and natural gas pipelines, and massive infrastructure investments will be needed to develop several planned international oil and gas projects.

OIL

After several years of production declines following the collapse of the Soviet Union, Russia's oil industry has bounced back over the past few years, posting strong profits and healthy increases in production. Russia is one of the world's biggest oil producers, but from 1992 to 1998, the country's oil production plummeted 23% due to decreased domestic industrial demand and a decline in drilling and capital investment.



Buoyed by high world oil prices in 1999-2000, Russian oil companies reinvested much of their generous profits into ramping up crude production. Since 1998, when production bottomed out at 6.07 million bbl/d, Russia's oil production, including condensates, has increased 20%, with overall production of 7.29 million bbl/d in 2001.

Despite Russia's pledge to OPEC to shave 150,000 bbl/d off its oil exports in the first half of 2002, Russian oil production is still forecast to post a 1.9% year-on-year increase--reaching 7.43 million bbl/d--in 2002. Russian oil production actually increased in the first few months of 2002, with average oil production of 7.49 million bbl/d in February 2002. Although Russian government officials have attempted to limit the country's oil exports, new export channels, such as the Baltic Pipeline System, have provided a powerful disincentive to Russian oil producers to reduce their output. As a result of Saudi Arabia's OPEC-mandated production cut (and that country's better compliance with its pledged cuts), Russia's oil production surpassed Saudi Arabia's in February 2002 for the first time since the Soviet era, making Russia the world's leading oil producer, if only temporarily.

Russia has proven oil reserves of 48.6 billion barrels, but aging equipment and poorly developed fields are making it difficult to develop these reserves. In addition, Russia's rate of oil production is exceeding its rate of discovery of new reserves by a significant margin. The Russian oil industry faces the depletion of existing oilfields, deterioration in transport infrastructure, and an acute shortage of investment due to the confusing tax and legal environment. In order to sustain and to increase Russia's oil production from current levels, large amounts of capital will be needed to develop new fields and to extend the life of existing oilfields with exhausted and low-yield reserves.

However, the sharp rise in oil prices during 1999-2000 provided Russian oil companies with a windfall in revenues, and many have begun to upgrade decaying oil infrastructure and to undertake new exploratory drilling. In addition to further development of the West Siberia region, where most of Russia's oil comes from currently, Russian oil producers are conducting more exploration in the Russian sector of the Caspian Sea, and teaming up with foreign oil producers to develop oil projects in the Arctic region, Eastern Siberia, and Sakhalin Island in Russia's Far East. Russia's future level of oil production will be defined by the

ability of oil companies to develop these new deposits, which will require a massive amount of infrastructure investment (including new export pipelines) in order to deliver this oil to customers.

Oil Sector Reform

Russia reorganized its state-run oil industry into a number of vertically-integrated oil companies in the early 1990s, and the state has divested itself of large stakes in most of these companies. Nonetheless, foreign investment in the industry has been minimal due to economic and political instability, a poor record of corporate governance, and the unstable legislative framework.

In order to create a more stable investment climate, potential investors have called upon the Russian government to undertake further reform, including the establishment of cohesive production-sharing agreement (PSA) framework legislation. Although the political and economic situation has stabilized since the August 1998 financial crisis, and high world oil prices in 1999-2000 enticed some investors into Russia, others are still awaiting the passage of a new Russian PSA regime and tax code.

Oil Exports

Despite problems surrounding the transition to a market economy and the lack of foreign investment in its oil sector, Russia remains one of the world's top oil exporters. After Russian oil exports slumped in the mid-1990s, exports rebounded after the ruble devaluation of August 1998 reduced production costs sharply for Russian oil producers, and the climb in world oil prices in 1999-2000 made exports even more profitable for Russian oil companies. With domestic consumption of 2.38 million bbl/d in 2001, Russia's increased its net oil exports in 2001 to 4.91 million bbl/d, making Russia the world's second largest oil exporter, behind only Saudi Arabia.

Russia is not a member of OPEC, but in recent years it has frequently attempted to coordinate its export strategy with OPEC. Although Russia agreed to reduce its oil exports by 150,000 bbl/d in the first quarter of 2002, Russian oil companies' compliance with these export cuts has been questionable at best, with preliminary data showing that Russian crude oil exports actually increased during the first quarter of 2002. Russian government officials levied higher export tariffs and set crude oil export quotas in order to limit the country's oil exports, but Russian oil companies increased their oil product exports instead. For 2002 as a whole, Russia's net oil exports are projected to increase to 5.01 million bb/d.

Oil Pipelines

Russia's oil exports could be even higher if they were not restricted by a lack of spare capacity in existing export pipelines. Despite Russia's pledged export cuts, the country's main export pipeline, the 1.2-million-bbl/d-capacity Druzhba pipeline, still is operating close to its highest capacity in years. In addition, many of the country's oil pipelines are in a state of disrepair, and Russian Energy Ministry figures indicate that almost 5% of crude oil produced in Russia is lost through illegal tapping of Russia's pipelines.

With a windfall in oil export tariffs in the past several years, Transneft, the state oil transport monopoly, has taken steps to upgrade the country's pipeline system, with an emphasis on building new export pipelines to increase and diversify export routes for oil exporters. In addition to constructing the Baltic Pipeline System and a possible pipeline to China, Transneft is seeking to lure additional transit oil from Azerbaijan, Kazakhstan, and Turkmenistan.

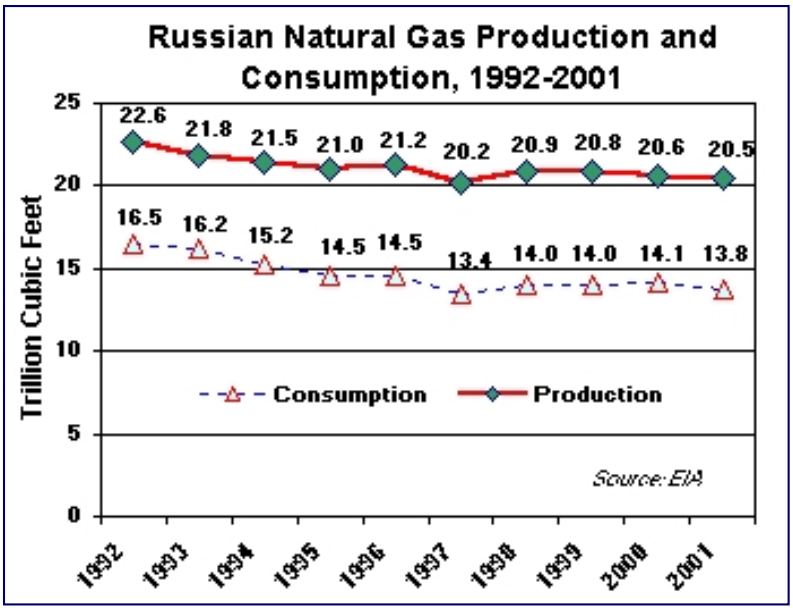
Downstream/Refining

Russia has 42 oil refineries--many of which are inefficient, aging, and in need of modernization--with a total processing capacity of 6.9 million bbl/d. With Russian domestic demand of 2.38 million bbl/d in 2001, refining capacity far outstrips demand for refined products. In addition, because a barrel of crude oil on the Russian market typically sells for just over half the world crude oil price, many Russian oil companies prefer to export their crude oil rather than to refine it in Russia. When Russian oil producers do not export their crude oil--often because of the constraints of Russia's pipeline system or the government's limits on each company's exports--many choose to supply their own refineries rather than sell the oil on the open market.

Russia's decision to go along with OPEC oil supply cuts in the winter of 2001-2002 has led to a glut of oil on the Russian market. As a result, Russian oil companies have channeled more oil into domestic refineries, and with refineries awash in crude, the domestic crude price collapsed, falling from about $13.70 per barrel at the wellhead in November 2001 to just $4.48 per barrel in January 2002. With many Russian refineries undergoing renovations or efficiency upgrades, Russia's refineries have not been able to handle so much crude oil at once. Preliminary data indicates that Russia's exports of refined products increased in the first quarter of 2002, and surplus refined products such as fuel oil, gasoline, and kerosene went into storage.

NATURAL GAS

Russia contains over 1,700 trillion cubic feet (Tcf) in proven reserves of natural gas, the world's largest. Gazprom, the state-run natural gas monopoly, produces nearly 94% of Russia's natural gas, operates the country's 90,000-mile natural gas pipeline grid and 43 compressor stations, and holds nearly one-third of the world's natural gas reserves while employing approximately 38,000 people. Often referred to as a "state within a state," Gazprom also is Russia's largest earner of hard currency, and the company's tax payments account for around 25% of federal government tax revenues.



Russia's natural gas production also is the largest in the world. Natural gas also accounts for over 54% of Russia's energy consumption, but the country still has plenty of natural gas available for export. According to Russia's State Statistics Committee, in 2001 Russia consumed 13.8 Tcf of natural gas while it produced 20.5 Tcf. With 6.7 Tcf in net natural gas exports, Russia is the world's largest natural gas exporter. In 2002, Russia is planning to increase natural gas production to 21.2 Tcf, while the country projects domestic natural gas consumption to increase to 14.6 Tcf.

In addition to its main producing areas in the Yamal-Nenets region of northern West Siberia at the Urengoy and Yamburg fields, Gazprom is responsible for future development of giant Bovanenkovskoye field on the Yamal Peninsula and other fields in the Yamal-Nenets region, including the the giant Pestsovoye and Zapolyarnoye fields to the north in the Ob-Taz Gulf area. Through its subsidiary Rosshelf, Gazprom also is responsible for development of the Shtokmanskoye field in the Barents Sea and other fields in the North Caucasus, Precaspian, Timan-Pechora, and the Volga-Urals.

Many analysts doubt Russia's ability to raise its natural gas production in the face of Gazprom's declining budget and the low levels of investment to the sector in recent years. Although Russia's natural gas sector has not been as hard hit as other sectors of the energy industry during the transition to a market economy (production is down just 9% since 1992), low investment in the sector has raised concerns about future production levels. Production in the Urengoy and Yamburg natural gas fields is declining, while the planned development of new fields continues to be delayed as a result of lack of investment resources. In February 2002, Gazprom scaled back its 2002 investment program for field exploration to $453 million from the $499 million invested in 2001.

Sectoral Problems

According to the Russian Gas Law of 1999, Gazprom must supply the Russian natural gas market, regardless of profitability, at regulated prices. Thus, the company is forced by the Russian government to

sell natural gas to domestic users for approximately $16 per 1,000 cubic meters (35,300 cubic feet)--less than it costs the company to produce, and only about one-tenth of the export price of $140-$150 per 1,000 cubic meters.

In addition, Gazprom continues to be hurt by chronic non-payments by consumers (although this situation has improved recently). In 1999, Russian consumers paid only 39% of their bills for natural gas in cash, but by 2001, Gazprom was paid in cash for 83% of the natural gas it sold domestically. Still, only 29 of Russia's 89 regions are up to date with their natural gas payments, and the multi-billion dollar debt of domestic natural gas consumers has hindered Gazprom's ability to invest adequately in new fields, many of which need major infrastructure investments.

The only investment in new natural gas production that Gazprom has made recently is the development of Zapolyarnoye, which was brought onstream in October 2001 to offset the decline in the company's production. Although Gazprom has enough undeveloped natural gas reserves in its portfolio to ensure future supplies, Zapolyarnoye is the last of the so-called "easy-to-develop" giant fields. Development of future fields, most of which are located in the more remote regions that lack infrastructure to deliver the natural gas to consumers, will require much higher levels of investment. Developments like Prirazlomnoye and Shtokmanskoye are provisionally budgeted to cost $1 billion and $15 billion to $20 billion, respectively.

Restructuring the Natural Gas Sector

While Gazprom is looking to establish partnerships with foreign investors to develop several natural gas production projects, restrictions on foreign investment in the company, along with allegations of asset stripping by senior managers of Gazprom, has limited Russia's investments in new natural gas developments. In addition, Gazprom's control over Russia's natural gas trunk-line system, forcing other producers to sell their natural gas to Gazprom on its terms, has proven a disincentive to increased natural gas production. The lack of access to Russia's natural gas pipelines has meant that Russian oil companies prefer to flare their associated natural gas instead of treating it and selling it to Gazprom.

In an attempt to spur increased investment in the industry and to raise production levels, President Putin is taking steps to end Gazprom's monopoly position and to restructure the natural gas sector. On November 9, 2000, the government ordered Gazprom to give other companies the right to use up to 15% of its pipeline capacity, and in May 2001, Gazprom's Board of Directors ousted long-time chief Rem Vyakhirev and replaced him with Aleksei Miller, an ally of Putin.

A restructuring plan currently under consideration would break Gazprom's upstream operations into separate producing companies in order to foster competition on the Russian domestic market, while the government would take control of Gazprom's transmission pipelines, offering equal access to all natural gas producers, thereby giving incentive to Russia's oil companies to treat the associated natural gas they develop. In addition, the Russian government is paying heed to Gazprom's minority shareholders, curtailing Gazprom's mysterious relationship with natural gas trader Itera and attempting to loosen restrictions on the purchasing of Gazprom shares by foreign investors.

Natural Gas Exports

The Russian government's determination to keep domestic natural gas prices artificially low means that the country's natural gas industry is heavily dependent on exports to finance its production. In 2001, Russia totaled 6.7 Tcf of net natural gas exports, the majority of which were piped to customers outside the Commonwealth of Independent States (CIS). Gazprom supplies Europe with 25% of its natural gas, and with several new export pipelines planned or already under construction, Russia hopes to increase this percentage in the next decade.

In order to offset its own declining production and maintain its export level, Gazprom, via natural gas trader Itera, contracted to buy 353 billion cubic feet (Bcf) of gas from Turkmenistan in 2002. As

Kazakhstan, Turkmenistan, and Uzbekistan continue to develop their natural gas industries and increase their production, senior Russian officials--including President Putin--have called for a Eurasian alliance to offset the impact of European natural gas market liberalization. According to Putin, the so-called "Gas OPEC," uniting Russia with the three big natural gas-producing countries in Central Asia, would "bring an element of stability into the transportation of natural gas on a long-term basis." Analysts have criticized the alliance proposal as a Russian attempt to exercise control over Central Asian natural gas exports.

Natural Gas Export Pipelines

In an effort to diversify its export routes and reach new markets, Russia is planning to build several new natural gas export pipelines. The Blue Stream pipeline to Turkey is the centerpiece of Russia's export diversification strategy. The pipeline, which will supply Turkey with 565 Bcf of natural gas via twin pipelines laid on the bottom of the Black Sea, is nearing completion, and should be operational by the fall of 2002. The December 2001 resolution of the dispute between Russia and Ukraine over Ukraine's unsanctioned removal of natural gas has caused Gazprom to drop plans to build a "Ukraine bypass" pipeline, but plans for the second branch of the Yamal-Europe pipeline--to Europe via Belarus--are in development. In addition, Russia is looking eastwards, with several potential natural gas pipelines to China currently under consideration.

COAL

With 173 billion short tons in proven coal reserves, Russia holds the world's second largest coal reserves, behind only the United States. However, years of poor management during the Soviet era, combined with a sharp decline in demand for coal during the early 1990s, significantly undermined the Russian coal sector's viability in the early 1990s. By 1993, Russian government subsidies to the coal sector became unsustainably high, exceeding 1% of the country's GDP, according to the World Bank. As production began to slump, Russia initiated a comprehensive restructuring of the coal sector in the mid-1990s.

As a result of the restructuring, the state coal company, RosUgol, has been phased out, production subsidies have ended, and mines with no economic future are being closed. With over $1.3 billion in financial assistance provided by the World Bank, the restructuring efforts are paying off, and the transition of Russia's coal sector from a massively-subsidized industry into a streamlined, profitable operation is almost complete. After years of decline, which saw Russian coal production decrease by 41%--from 406 million short tons (Mmst) in 1992 to 241 Mmst in 1998--in 1999, the reformed coal sector increased its production to 259 Mmst. EIA preliminary data for 2000 shows that Russia's coal production increased to 281 Mmst, and Russia's State Statistics Committee reports that the country's coal production rose again in 2001. Russia's Ministry of Energy has projected a 0.3% coal production increase in 2002.

Many of Russia's major coal basins are in West Siberia, and in 2001, the region's coal mines accounted for 48% of Russia's overall coal production. Kuzbassrazrezugol and Krasnoyarskugol, both located in West Siberia, were Russia's largest coal producers in 2001, with output of 36.3 Mmst and 35.3 Mmst, respectively. In addition, through the first seven months of 2001, Russia's State Statistics Committee reported that Russia's coal exports increased during the same time period by 30% year-on-year, including a 41.5% increase in exports to countries outside the CIS and Baltics.

With Russia's determination to increase its oil and natural gas exports, Russia's coal consumption is slated to rise. Although coal accounted for just 16% of Russia's domestic energy consumption in 1999, the government is committed to increase that percentage to as high as 28%. Russia consumed 298 Mmst of coal in 2000, but the country's energy strategy calls for coal production to climb to 335 Mmst in 2010, and then to 430 Mmst in 2020.

Nevertheless, the Russian Trade Union of Coal Miners complained in March 2002 of a lack of demand for Russian coal. Despite the sector's increased productivity, the Union's chairman, Ivan Mokhnachuk, said that coal deliveries to power-generation facilities fell by 4.4 Mmst in 2001, while coal stocks in depots increased by 33% over the previous year. At the same time, he noted, Russia imported 28.4 Mmst of coal

from Kazakhstan. The Russian Trade Union of Coal Miners has accused both Kazakhstan and China of dumping coal on the Russian market, reducing demand for Russian-produced coal.

ELECTRICITY

Russia's mammoth power sector, which includes over 440 thermal and hydropower plants, plus 29 nuclear reactors, has a total electric generation capacity of 203 gigawatts (GW). With 139 GW of production capacity, thermal power (oil-, gas-, and coal-fired plants) accounts for 68% of the country's power generation capacity, while hydropower plants account for an additional 44 GW (21.5% of total installed power capacity). Russia's electricity sector is dominated by Unified Energy Systems (UES), which is 52%-owned by the Russian government. UES, headed by former privatization minister Anatoly Chubais, controls approximately 70% of the country's distribution system and oversees Russia's 72 regional electricity companies, called *energos*.

Russia shut down several nuclear reactors during the 1990s, leading to a drop in the country's power-generating capacity during the last decade from 213 GW in 1992. Nonetheless, Russia still has sufficient power production potential to supply domestic consumers, as well as export power to other countries. In 1999, Russia's total electricity generation broke a decade-long downward trend by inching up from 788 billion kilowatt-hours (Bkwh) produced in 1998 to 801 Bkwh, followed by a jump to 836 Bkwh of electricity produced in 2000.

Similarly, the economic recovery after the August 1998 financial crisis resulted in an increase in the country's total electricity consumption, from 715 Bkwh in 1998 to 767 Bkwh in 2000. Increased industrial demand for electricity also has forced power stations to operate at higher capacity, straining power companies' ability to procure fuel supplies at a time when Gazprom is continuing to reduce natural gas supplies to UES. A lack of fuel supplies at power stations has already led to periodic power outages.

Electricity Sector Restructuring

Russia's aging power sector is in serious need of investment and reform. Much of the sector is obsolete by Western standards, and Russia lacks the money to pay for necessary maintenance. UES estimates that between $20 billion and $35 billion in investment will be needed over the next 10 years for maintenance and modernization efforts, but the company currently only has about $1 billion per year to invest. Analysts have estimated that if rates of investment stay at present levels, 32% of the current stock of electricity generating equipment will be out of commission by 2005, prompting a crisis in electricity production that may lead to widespread regional power shortages.

In an effort to entice foreign electricity companies to invest in Russia's power sector, numerous reform plans have been debated over the past decade, to no avail. However, the severe power outages in Russia's Far East during the winter of 2000-2001 made power sector restructuring a high priority, and in May 2001, the Russian government approved a blueprint for electricity sector restructuring. The restructuring plan will break the UES monopoly into separate generation and distribution units, then split up the generation assets further. Russian government officials hope this will pave the way for privatization of independent power-generating companies and thereby attract much needed investment to the sector.

Electricity Exports

UES has begun to focus on electricity exports in order to increase its cash flow to allow it to procure fuel supplies, as well as to invest in maintenance and modernization projects. In October 2000, UES began to supply electricity to Europe as part of an international project to create an "East-West energy bridge." UES is participating in the Baltrel program to create an energy ring with power companies in the Baltic states, and it has also signed contracts to export power to Turkey via Georgia. In addition, in August 2001 the Ukrainian and Russian electricity grids were re-connected, allowing Russia to export electricity via Ukraine to Moldova, as well as to access the Romanian, Bulgarian, and Balkan markets.

In March 2002, during a joint meeting of the CIS Electric Power Council and the Union of the Electric Industry (Eurelectric) in Warsaw, UES Chairman Anatoly Chubais appealed to European colleagues to

"destroy the iron curtain" between the energy systems of the East and the West. The first steps towards synchronization of energy systems have already been taken, as the Union for the Coordination of Transmission of Electricity (UCTE), of which 20 European countries are members, has entered into discussions with its eastern colleagues over the technological and operational aspects of amalgamating their systems.

Nuclear

With the opening of the 1,000-megawatt (MW) Rostov-1 reactor in March 2001, Russia now operates 30 nuclear reactors at 10 locations, all west of the Ural Mountains. The country has a total installed nuclear capacity of 22 GW, and in 1999 Russia's nuclear plants generated 111 Bkwh of power, accounting for 14% of the country's total electricity generation. However, Russia's nuclear power plants are aging, and the nuclear power industry has been hard hit by Russia's transition to a market economy. Russia already has shut down four reactors that were over 30 years old (the maximum prescribed service life for a reactor), but 15 of the country's 29 operating units are over 20 years old, and by 2005, seven of those reactors will have been in service for 30 years.

With Russia's plans to export additional natural gas to the West, the country's energy strategy is to increase its use of nuclear power over the next 20 years to meet domestic electricity needs. In order to do so, additional capacity will be needed, but the nuclear industry's lack of money has forced Minatom, the government agency responsible for overseeing the country's nuclear power plants, to focus on extending the service life of existing units instead of building new ones. Safety issues are an ongoing concern, especially with regard to the 16 relatively old reactors of the RBMK design used at Chernobyl. Older RBMK units at Kursk and St. Petersburg are scheduled to be overhauled and equipped with stopgap safety improvements to prolong their lives for another three decades.

Minatom is hoping to complete construction on five nuclear reactors that have been under construction since the 1980s, as well as to build 25 new reactors during the next 20 years. In February 2001, Russia's Deputy Minister of Atomic Energy, Bulat Nigmatulin, said the ministry would finance most of the $1.5 billion necessary to complete the construction of the five reactors by 2005. Although the Rostov-1 reactor is now operational, both the 1,000-MW Kalinin-3 reactor and the 1,000-MW Kursk-5 reactor are still under construction. In addition, Western nuclear experts have expressed serious doubts that Russia can finance the construction of 25 additional reactors on its own.

To increase its ability to finance domestic nuclear projects, in October 2000 Russia announced plans to market nuclear power plants to countries in Asia and Africa. The first of such plants, a $1.2-billion project for two 1,000-MW reactors, was sold to India, to be installed near Chennai by 2008. Russia also negotiated a similar deal with Iran to build the Bushehr nuclear power plant, and in November 2001, Russia delivered the first reactor body to Iran. According to the International Atomic Energy Agency, Russian-designed reactors would not be licensable in Western countries because they do not have all of the mandatory safety features, such as a containment dome.

ENVIRONMENT

After years of neglect under the Soviet Union, the environment has become a pertinent issue in today's Russia. Soviet policies that encouraged rapid industrialization and development left a legacy of air pollution and nuclear waste with which Russia now is struggling to contend. Although environmental awareness in Russia is rising, the cost of remediating the country's environmental hot spots is high, and the newly created Ministry of Natural Resources has a limited budget. As a result, cleanup has been slow, and environmental protection has not been a top priority for the Russian government.

The economic contraction in the aftermath of the Soviet Union's collapse caused a drop in industrial production, resulting in less energy consumption and a drop in Russia's carbon emissions. However, energy and carbon intensities in Russia remain high, and although per capita carbon emissions have fallen over the past 12 years, Russia will need to pursue more sustainable environmental policies in order to maintain this trend, especially with the rebound in industrial production since the August 1998 financial crisis. Russia

has abundant fossil fuel resources, but the country will need to pursue more renewable energy options and cleaner environmental technologies in order to preserve its natural wonders and protect its environment for future generations.

COUNTRY OVERVIEW
President: Vladimir Vladimirovich Putin (acting president since December 31, 1999; president since May 7, 2000)
Prime Minister: Mikhail Mikhaylovich Kasyanov (since May 7, 2000)
Independence: August 24, 1991 (from Soviet Union). National holiday: Independence Day, June 12, 1990
Population (7/01E): 145.5 million
Location: Eurasia
Size: 6,592,850 sq. mi., slightly more than 1.8 times the size of the United States
Major Cities: Moscow, St. Petersburg, Yekaterinburg, Irkutsk, Murmansk, Yakutsk, Vladivostok
Languages: Russian, others
Ethnic Groups: Russian 81.5%, Tatar 3.8%, Ukrainian 3%, Chuvash 1.2%, Bashkir 0.9%, Belorussian 0.8%, Moldovan 0.7%, other 8.1%
Religions: Russian Orthodox, Muslim, other

ECONOMIC OVERVIEW
Minister of Economic Development and Trade: German Oskarovich Gref
Minister of Finance: Aleksey Leonidovich Kudrin
Currency: Ruble
Market Exchange Rate (4/25/02): $1 = 31.19 rubles
Nominal Gross Domestic Product (GDP) (2001E): $301.5 billion; **(2002E):** $327 billion
Real GDP Growth Rate (2001E): 5.1%; **(2002E):** 3.2%
Inflation Rate (Change in Consumer Prices, Dec. 2000-Dec. 2001E): 18.5%; **(2002E):** 12.8%
Official Unemployment Rate (2001E): 8.8%; **(2002E):** 8.6%
Current Account Balance (2001E): $34.3 billion; **(2002E):** $27.1 billion
Major Trading Partners (1999): Germany, Ukraine, U.S., Belarus, Italy, Netherlands, Kazakhstan
Merchandise Exports (2001E): $102.7 billion; **(2002E):** $103.7 billion
Merchandise Imports (2001E): $53.1 billion; **(2002E):** $60.0 billion
Merchandise Trade Balance (2001E): $49.6 billion; **(2002E):** $43.7 billion
Major Exports: Petroleum and petroleum products, natural gas, wood and wood products, metals, chemicals, and a wide variety of civilian and military manufactures
Major Imports: Machinery and equipment, consumer goods, medicines, meat, grain, sugar, semifinished metal products
External Debt (2001E): $154 billion

ENERGY OVERVIEW
Deputy Prime Minister (for Energy Issues): Viktor Borisovich Khristenko
Minister of Energy: Igor Khanukovich Yusufov
Minster of Atomic Energy: Aleksandr Yuryevich Rumyantsev
Proven Oil Reserves (1/1/02E): 48.6 billion barrels
Oil Production (2001E): 7.29 million bb/d (of which 7.05 million bbl/d was crude); **(2002E):** 7.43 million bbl/d
Oil Consumption (2001E): 2.38 million bbl/d; **(2002E):** 2.42 million bbl/d
Net Oil Exports (2001E): 4.91 million bbl/d; (**2002E):** 5.01 million bbl/d
Major Oil Customers: Europe, Commonwealth of Independent States
Crude Refining Capacity (1/1/02E): 6.6 million bbl/d
Proven Natural Gas Reserves (1/1/02E): 1,700 trillion cubic feet (Tcf)
Natural Gas Production (2001E): 20.5 Tcf
Natural Gas Consumption (2001E): 13.8 Tcf
Net Natural Gas Exports (2001E): 6.7 Tcf
Coal Reserves (1/1/01E): 173 billion short tons
Coal Production (2000E): 281 million short tons (Mmst)

Coal Consumption (2000E): 298 Mmst
Electric Installed Capacity (2000E): 203 gigawatts (68% thermal, 21.5% hydro, 10.5% nuclear)
Electricity Generation (2000E): 836 billion kilowatt-hours (Bkwh)
Electricity Consumption (2000E): 767 Bkwh
Net Electricity Exports (2000E): 69 Bkwh

ENVIRONMENTAL OVERVIEW
Minister of Natural Resources: Vitaliy Grigoryevich Artyukhov
Total Energy Consumption (1999E): 26.0 quadrillion Btu* (6.8%) of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 400.1 million metric tons of carbon (6.5% of world carbon emissions)
Per Capita Energy Consumption (1999E): 176.7 million Btu (vs. U.S. value of 355.9 million Btu)
Per Capita Carbon Emissions (1999E): 2.7 metric tons of carbon (vs. U.S. value of 5.6 metric tons of carbon)
Energy Intensity (1999E): 72,133 Btu/$1990 (vs U.S. value of 12,638 Btu/$1990)**
Carbon Intensity (1999E): 1.1 metric tons of carbon/thousand $1990 (vs U.S. value of 0.20 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1997E): Industrial (64.3%), Residential (17.9%), Transportation (17.1%), Commercial (0.7%)
Sectoral Share of Carbon Emissions (1997E): Industrial (64.8%), Transportation (17.8%), Residential (17.4%)
Fuel Share of Energy Consumption (1999E): Natural Gas (54.3%), Oil (19.3%), Coal (16.0%)
Fuel Share of Carbon Emissions (1998E): Natural Gas (50.8%), Coal (26.2%), Oil (22.9%)
Renewable Energy Consumption (1997E): 2,482 trillion Btu* (1% increase from 1996)
Number of People per Motor Vehicle (1997): 6.5 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 28th, 1994). Under the negotiated Kyoto Protocol (signed on March 11th, 1999, but not yet ratified), Russia has agreed to stabilize greenhouse gases at 1990 levels by the 2008-2012 commitment period.
Major Environmental Issues: air pollution from heavy industry, emissions of coal-fired electric plants, and transportation in major cities; industrial, municipal, and agricultural pollution of inland waterways and sea coasts; deforestation; soil erosion; soil contamination from improper application of agricultural chemicals; scattered areas of sometimes intense radioactive contamination; ground water contamination from toxic waste.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Wetlands and Whaling. **Has signed, but not ratified:** Climate Change, Air Pollution-Sulphur 94.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar and wind electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP based on EIA International Energy Annual 1999

ENERGY INDUSTRY
Organization: Russia's energy sector is overseen by the Ministry of Energy, except for nuclear power, which is administered by the Ministry of Atomic Energy (Minatom).

Russia's Oil Sector is dominated by large joint-stock companies, although smaller independent producers also produce oil. The major vertically integrated companies include Lukoil, Yukos, Surgutneftegaz, Tyumen Oil (TNK), Tatneft, Sibneft, Slavneft, and Rosneft. Transneft has a monopoly over crude oil

transport, while Transnefteprodukt transports petroleum products.

Russia's Natural Gas Sector is dominated by the joint-stock company Gazprom, which is 38% owned by the Russian government. Gazprom produces over 90% of the country's natural gas and also controls Russia's pipeline network. Itera has gained a foothold in the natural gas sector as Russia's second-largest natural gas exporter.

Russia's Coal Sector, formerly operated by RosUgol, a government-owned holding company that was organized along regional lines, has been restructured, with many unprofitable mines closed down, RosUgol eliminated, and the remaining efficient mines privatized. Kuzbassrazrezugol and Krasnoyarskugol were Russia's biggest coal producers in 2001.

Russia's Electricity Sector is operated by the joint-stock company Unified Energy Systems (UES), which is majority state-owned. UES controls approximately 70% of the country's distribution system, 21 thermal power plants, 8 nuclear power plants, and oversees the country's 72 regional electricity companies, known as *energos*.

Major Producing Oil Fields: Samotlor, Romashkino, Mamontov, Fedorov, Lyantor, Arlan, Krasnolenin, Vatyegan, Sutormin

Major Oil Terminals: Novorossiisk (Black Sea), Tuapse (Black Sea), Primorsk (Baltic Sea); Russia also uses ports at Ventspils (Latvia), Odesa (Ukraine), Klaipeda (Lithuania), and Butinge (Lithuania)

Major Oil Export Pipelines outside the Commonwealth of Independent States: Friendship (Druzhba) (1.2 million bbl/d nominal capacity)

Major Oil Refineries (1/1/02E) (Capacity in bbl/d): Omsk (566,000), Angarsk (441,000), Nizhniy Novgorod (438,000), Grozny (390,000), Kirishi (388,000), Novo-Ufa (380,000), Ryazan (361,000), Novo-Kuibishev (309,000), Yaroslavl (290,000), Perm (279,000), Ufaneftekhim (251,000), Salavatnefteorgsintez (247,000), Moscow (243,000), Ufa (235,000), Syzran (211,000), Volgograd (200,000), Saratov (177,000), Orsk (159,000), Samara-Kuibishev (154,000), Achinsk (147,000), Ukhta (127,000), Nizhnekamsk (120,000), Komsomolsk (108,000)

Major Foreign Oil Company Involvement: Agip, BP, British Gas, ChevronTexaco, Statoil, Conoco, ExxonMobil, Neste Oy, Norsk Hydro, McDermott, Mitsubishi, Mitsui, Royal Dutch/Shell, and TotalFina Elf.

Major Producing Natural Gas Fields: Urengoy, Yamburg, Medvezh, Orenburg, Severo Urengoy, Vyngapurov

Major Natural Gas Export Pipelines outside the Commonwealth of Independent States (Capacity): Brotherhood (*Bratrstvo*), Progress, and Union (*Soyuz*) (to Europe, via Ukraine) (1 Tcf each); Northern Lights (0.8 Tcf) (to Europe, via Belarus and Ukraine), Volga/Urals-Vyborg (to Finland) (0.1 Tcf); Yamal (to Europe, via Belarus) (1.0 Tcf); Blue Stream (0.56 Tcf) (to Turkey, under construction)

Major Coal Producing Basins: Chelyabinsk, Kansk-Achinsk, Kuznetsk, Lena, Moscow, Pechora, Raychikhinsk, South Yakutia, Taymyr, Zyryanka

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Sources for this report include: Agence France Presse, Asia Pulse, Associated Press, BBC Monitoring International Reports, Central Asia & Caucasus Business Report, Caspian News Agency, Caspian Business Report, CIA World Factbook, Current Digest of the Post-Soviet Press, DRI/WEFA Eurasian Economic Outlook, DRI/PlanEcon, The Economist, Energy Day, The Financial Times, FSU Energy, FSU Oil and Gas Monitor, Gas Connections, Hart's European Fuel News, Interfax News Agency, The International Herald

Tribune, International Petroleum Finance, ITAR-TASS News Agency, Mining & Metals Report, The Moscow Times, Oil and Gas Journal, Petroleum Economist, Petroleum Report, Platt's International Coal Report, Platt's Oilgram News, Polish News Bulletin, PR Newswire, Project Finance, Radio Free Europe/Radio Liberty, Reuters, RosBusinessConsulting Database, Russian Economic News, The Russian Oil & Gas Report, Turkish Daily News, Ukraine Business Report, U.S. Department of Energy, U.S. Energy Information Administration, U.S. Department of State, Warsaw Business Journal, World Gas Intelligence, and World Markets Online.

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January 2002

Spain

Spain is one of the fastest growing European economies but has very limited domestic energy resources. As a result, Spain is expected to become an increasingly important energy importer.

Note: The information contained in this report is the best available as of January 2002 and is subject to change.

BACKGROUND

Spain's period of rapid (4% annual growth) economic expansion is slowing. Still, Spain's forecast growth rate of 2.4% in 2002 is still well above the average "eurozone" growth rate forecast of 1.4%. The unemployment rate has decreased significantly (although projected at 12-13% for 2002), and government finances have improved over the past year. Inflation is expected to ease from 3.7% in 2001 to 2.4% in 2002 as unions have recently given priority to job creation over wage increases. Prime Minister Jose Maria Aznar's center-right Popular Party was re-elected with an absolute majority in March 2000. Aznar is continuing his liberalization of Spanish industry. Legislation aimed at getting rid of monopolies (state-held or private) in the energy, telecommunications, and services industries passed in June 2000. Oil, natural gas, and electricity markets are key targets in Aznar's liberalization program.

The recent economic and political turmoil experienced by Argentina has adversely affected Spanish companies, which invested EUR 45 billion there over the last decade. Five large Spanish companies, including oil company Repsol-YPF and power company ENDESA, that alone account for about three-

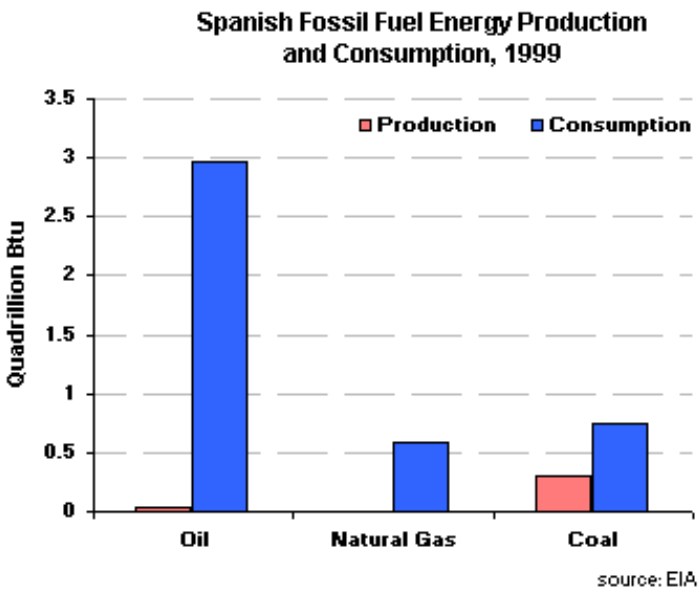
quarters of the trading volume on the Madrid stock exchange, are expected to lose billions of euros because of the default on Argentine government debt and the devaluation of the Argentine peso.

Spain's economic growth and accelerated industrialization associated with European Union (EU) membership have fueled energy demand, up 75% since the mid-1970s. Electricity demand is growing at a particularly rapid rate of 6% per year, reflecting a need for greater investment. Spain is highly dependent on imported oil, leaving the country economically vulnerable to world oil price fluctuations. Further energy demand increases are expected to be met largely with natural gas imports. The increasing use of natural gas has created a new dependency on Algeria, from which Spain obtains 60% of its natural gas imports. With an extensive gas network now in place, Spain's demand for natural gas is expected to increase dramatically during the next few years.

Spain assumed the six-month European Union (EU) presidency in January 2002, and Spanish Finance Minister Rodrigo Rato has announced that Spain will seek to establish a link between progress on the liberalization of energy markets and energy tax harmonization during its term. In December 2001, government energy regulator CNE recommended a EUR 4 billion investment in Spain's natural gas and electricity sectors in order to guarantee supply, to be financed mostly by Red Electrica and Gas Natural's Enagas.

OIL

Oil plays a major (albeit decreasing) role in the Spanish energy sector. In the 1970s, oil accounted for 73% of Spain's primary energy consumption. That percentage has now fallen to less than 60% and is expected to fall further as natural gas becomes an increasingly important fuel source. In 2001, Spain consumed about 1.5 million barrels per day (bbl/d) of oil, 99% of which was imported.



Spain has very limited domestic oil reserves and production. The largest producing area is in the Mediterranean Sea, with the Casablanca complex producing about 4,000 bbl/d. In October 2001, Spain authorized Conoco's UK subsidiary to explore for hydrocarbons off the coast of the southern Mediterranean province of Malaga. The permit for exclusive exploration rights is for six years.

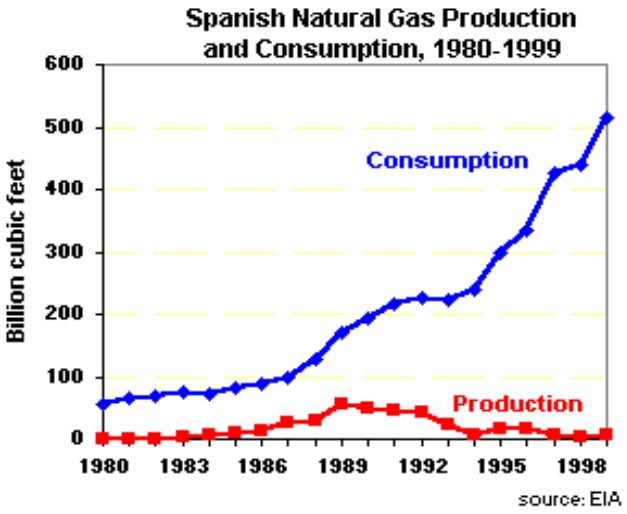
Until 1993, the Spanish oil industry was state-controlled. Today, formerly state-held (now private) Repsol still dominates the Spanish oil sector (and also the Spanish natural gas sector, through a controlling share in the Gas Natural Group). The company acquired the top Argentine oil company, YPF, in 1999, changing the company name to Repsol-YPF. Repsol-YPF is responsible for over 50% of Spain's oil production. Worldwide, the company has reserves of 4.8 billion barrels of oil equivalent and and a daily production of about 1 million barrels of oil equivalent per day. The company owns the majority of Spain's refineries, its distribution network (through Compania Logistica de Hidrocarburos, CLH, in which it holds a majority stake), and its gasoline stations (through its trademarks Repsol, Campsa, and Petronor). Divestments in the wake of the merger are working to lessen Repsol-YPF's control in the industry. June 2000 economic liberalization plans also work toward this end; the company's share in CLH must be reduced from 62% to 25%. Repsol-YPF's profits will be much lower for 2001 than the record $2.10-billion profit achieved in 2000 because of the Argentine economic situation. Repsol-YPF derives 45% of its operating income from Argentina's oil and natural gas fields, and is negotiating a "contribution" to Argentina's government expected to be between $300 million and $500 million.

Compania Espanola de Petroleos (Cepsa), established in 1929, is Spain's oldest private oil and gas company. The company has exploration and production activities in Colombia and Algeria. It is the second largest oil group in Spain, with a 25% retail market share. BP Oil is also active in Spain. Repsol, Cepsa, and BP Oil account for almost all of the activity in the Spanish oil sector.

Refining

Spain has nine major refineries. Four are owned by Repsol, and another is owned by a Repsol subsidiary, Petronor, in which Repsol has an 88% stake. Cepsa owns three, and one is owned by BP. Because of state regulation of the industry, Spain has avoided developing the excess refining capacity that characterizes some other countries in southern Europe. Spain's total crude oil refining capacity stands at 1.3 million bbl/d.

NATURAL GAS



Natural gas is expected to account for a much larger share of Spain's total energy consumption in coming years, especially as new pipelines and natural gas-fired power plants come on line. Natural gas consumption has grown from 2% of total energy consumption in the 1970s to more than 11% in 1999. Preliminary estimates of consumption for 2000 are about 611 billion cubic feet (Bcf). Some estimates predict natural gas consumption growing at a 15% annual rate in this decade. Spanish energy company Endesa predicts demand for natural gas rising to about 883 Bcf by 2005. Almost all of this consumption will be satisfied with imports, as Spain has extremely limited natural gas reserves. The country's largest natural gas field went out of production in 1995, and only a very small number of smaller fields remain in production.

The Gas Natural Group (GN) is the leading natural gas conglomerate in Spain, dominating Spain's gas sector with 90%-95% of the market. However, in the market for industrial customers, which was partially opened in 2000, GN's market share was down to 79% by the first half of 2001. Repsol-YPF controls the Group, with 47% of its shares and majority board representation. GN is comprised of Gas Natural SDG, the main natural gas distributor in Spain; Enagás, a transport company; Gas Natural Aprovisionamientos (supplies); Gas Natural Comercializadora (commercialization); Gas Natural Servicios, the services company of the Group; Gas Natural Overseas Trading Company; 14 natural gas distribution companies in Spain; and Gas Natural Internacional, which brings together in a single business unit the interests of GN in Gas Natural BAN (Argentina), Gas Natural ESP (Colombia), Companhia Distribuidora de Gas do Rio de Janeiro-CEG, CEG RIO and Gas Natural SPS (Brazil), in addition to Gas Natural México. Also, GN has minority holdings in three natural gas distribution companies in the region of Aragon and in the Basque Country.

According to liberalization legislation passed in June 2000, no single operator may command over 70% of the Spanish natural gas market by 2004. Since June 2000, large industrial consumers have been able to choose suppliers, and all consumers should be able to choose suppliers by 2003. Several additional regulatory measures were taken in 2001: In July, Spain's Economy Ministry published the terms under which GN must auction off one-third of its 580 Bcf per year Algerian pipeline natural gas imports. In September, Spain's Economy Ministry detailed new natural gas sector regulations that include a revised system for calculating pipeline tariffs and procedures for accessing the national grid. Finally, in October, the government ended GN's monopoly of natural gas imports when a contract for Algerian gas imports equivalent to about 25% of Spain's total annual consumption was awarded to Spain's four largest electricity companies (Endesa, Iberdrola, Union Fenosa, and Hidrocantabrico), BP, and Royal Dutch/Shell. This is part of a strategy being pursued by Spanish electricity companies to enter into the natural gas market. As Algeria supplies about 75% of Spain's imports, these companies now control about 19% of the market. These

companies have until 2004 to sell the natural gas to their industrial clients. The planned sale of 65% of GN subsidiary Enagas cannot be valued until the publication of new natural gas tariffs by the government, expected sometime in 2002.

The Group's Enagás transports natural gas imports to the Iberian Peninsula via gas pipelines connected to international networks (or via methane carriers for liquefied natural gas, discussed below). There are two international gas pipelines in Spain: Lacq-Calahorra in the north and the Pedro Duran Farell pipeline (formerly the Mahgreb-Europe line) in the south. The Lacq-Calahorra gas pipeline is the main Spanish connection to the European network, linking to Norway's North Sea gas sources. The Pedro Duran Farell pipeline, which crosses through Algeria and Morocco and travels under the Strait of Gibraltar, is about 870 miles (1,400 kilometers) long and connects the Algerian deposits with the Spanish gas pipeline network in Córdoba. This pipeline made its first Spanish delivery in 1996. Work is underway to expand the Pedro Duran Farell pipeline's annual capacity from 282.5 Bcf to 388.5 Bcf by adding a compressor station. Completion is expected in late 2003.

There are two new projects underway as well. Spain will have an additional connection with France via Irun in the Basque Country as a new transfrontier connector is being built with completion expected by the end of 2003. A further extension of the pipeline network coming to and from Irun is planned to be ready between 2005 and 2008. It will have 111 miles in Spain and 93 miles in France, and possess an annual capacity of 144.8 Bcf. In July 2001, Cepsa and Sonantrach of Algeria signed an agreement for the construction of the new Medgaz undersea natural gas pipeline between Algeria and Almeria, Spain, which received political backing in August. A feasibility study is scheduled to be completed in early 2003. The pipeline would have a length of 137 miles and have a capacity of between 282.5 Bcf and 353 Bcf. Natural gas would be alloted in proportion to each shareholder's equity ownership. At present, Sonatrach and Cepsa each hold 20%, while BP, Endesa, Eni, Gaz de France, and TotalFinaElf each hold 12%. Some natural gas from this pipeline may transit through Spain onto other European destinations.

Liquefied Natural Gas

Spain is Europe's second-largest liquefied natural gas (LNG) importer, behind France. Spain has three regasification terminals (Barcelona, Cartagena, and Huelva), the most of any country in Europe. All three are owned and operated by GN. Algeria is Spain's largest LNG supplier. Spain also is involved in long-haul LNG transit, importing LNG from the United Arab Emirates and Qatar. In 1999, Spain began receiving shipments from Trinidad and Tobago and Nigeria. In October 2000, shipments began from Oman, with 17 received through the end of January 2002. In June 2001, GN and Enel of Italy signed an agreement to develop joint marketing and sales negotiations for LNG internationally.

The GN plans to expand its three regasification terminals and its tanker fleet in order to handle increased LNG imports for rising domestic consumption. Spanish electricity generator Union Fenosa signed a firm contract with the Egyptian General Petroleum Corporation in July 2000 for the purchase of LNG from a new liquefaction terminal under construction at Damietta, Egypt. Union Fenosa and Iberdrola, which are constructing the new receiving gasification plant together, had disagreed on the location, but in November 2001 they settled on Fenosa's proposal at the Sagunto port in Valencia. The plant, to be completed in winter 2004, will be able to process 282.5 Bcf per year and will be linked to new combined cycle gas turbine plants being constructed by Fenosa nearby and Iberdrola in Castellon. Some of the natural gas will also transit to other locations.

A new regasification plant is planned for northern Spain. The Bahia de Bizkaia Gas group, a consortium led by BP and including Repsol-YPF, Iberdrola, and EVE (the Basque Energy Authority), will build the new import facility in conjunction with a new power station. The regasification facility is expected to begin operations in 2003.

Seven Spanish companies and Algeria's Sonatrach, forming the Reganosa group, will begin building in 2002 another new LNG import facility. Algerian LNG will supply the new Ferrol terminal in Galicia in northwest Spain for ten years following the terminal's projected 2004 commissioning. In conjunction with the terminal, which will have an initial capacity of 88 Bcf per year, a new pipeline will be constructed to

connect the terminal to power plants located about 60 miles away.

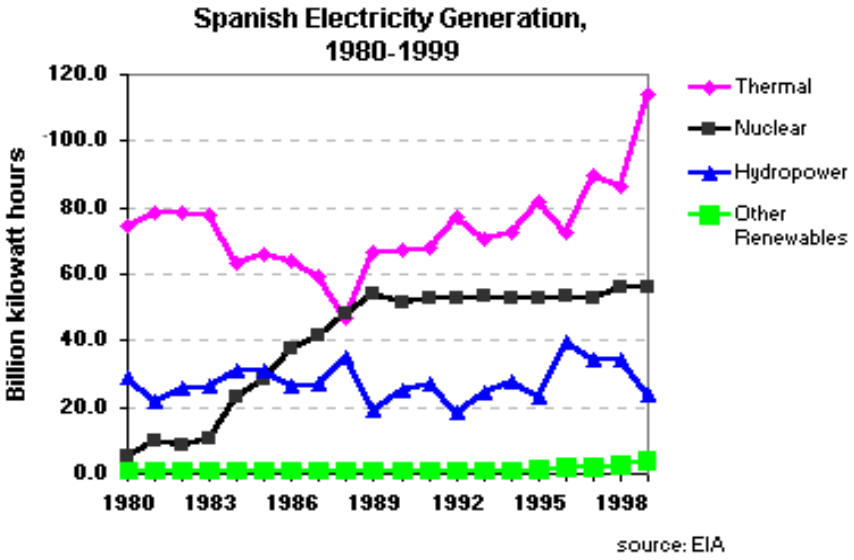
COAL

Coal is Spain's most plentiful indigenous energy source. Production has fallen in recent years, and the decline is expected to continue as Spain works to meet environmental standards. Currently, 95% of coal is used to generate electricity. All of the major coal companies are state-owned.

Spanish coal is too expensive to be competitive in a free energy market, with about 80% of the coal costing at least twice international prices to produce, so the Spanish government subsidizes coal production. According to new EU regulations that will take effect in July 2002, Spain must lower its coal production by 65% over the next ten years. Also, coal mines that do not improve their economic viability will only be able to receive production subsidies until 2008. Spain is one of three EU countries that will be permitted to continue coal production for reasons of economic security, and hence will continue to receive subsidies for more competitive mines. There is increased pressure on coal, however, as the electricity market privatizes, and as electricity generation will no longer be a captive market for domestic coal. Imports of foreign coal already are on the rise, and electricity generators are looking more to natural gas.

The sector now employs only half the number of people as a decade ago. However, most of those employed are in the Asturias region, where the jobs are badly needed. It would be difficult to completely phase out coal mining because of this region's dependence on the industry for employment.

ELECTRICITY



Spain has the fifth largest electricity market in Europe (behind Germany, France, the United Kingdom, and Italy), and it is growing quickly. Electricity demand is estimated to have grown by 5.4% in 2001 to about 205 billion kilowatthours (bkwh). Red Electrica de España (REE), Spain's network operator, invested heavily in the network in 2001, with EUR 78.4 million invested in expanding the electricity network and REE announced plans in October 2001 to invest between EUR 60.2 million and EUR 72.2 million to improve the electricity connection with France. Spain's three largest electricity groups - Endesa, Iberdrola, and Union Fenosa - have announced massive investments planned from August 2001 to 2005 of EUR 34 billion, with much of that in Latin America and other European countries, but nevertheless including EUR 8 billion for new generating plants in Spain.

Endesa announced in July 2001, that it will build a natural-gas-fired, 400-megawatt (MW), combined-cycle generating turbine (CCGT) plant in Huelva by June 2004, in addition to three other gas-fired 400-MW CCGTs the company already has under construction in Spain near Cadiz, Barcelona, and Tarragona. Union Fenosa plans to add 5,000 MW of new capacity by 2005, mostly in Spain, of which 2,800 MW would be natural-gas-fired. Piemsa, an affiliate of Petronor, is planning to construct an 800-MW integrated gasification combined-cycle (IGCC) complex at a refinery near Bilbao that will make use of heavy refinery stocks. The plant will be one of the largest and most advanced of its kind in the world.

Spain's electricity market is privatizing ahead of the schedule mandated by the EU. A 1996 EU directive required that at least 26.48% of electricity sales in member countries be open to competition, beginning in February 1999. This requirement increased to about 28% in February 2000 and will grow to 33% in 2003.

Spain already has surpassed the 2003 requirement.

The Spanish electricity sector is in the midst of restructuring. There are five major utility companies in Spain, in descending order of size: the formerly state-held Endesa, Iberdrola, Union Fenosa, Hidrocantabrico, and the newly independent Viesgo. Viesgo's acquisition by Enel of Italy from Endesa was completed in January 2002, and Viesgo has a 5% market share. This is part of Enel's strategy of regaining market share abroad after selling its Elettrogen utility at home to Endesa in 2001.

Hidrocantabrico was sold in October 2001 to Electricite de France (EdF) and Eletricidade de Portugal (EdP), after the Spanish government decided to lift the veto on EdF's and EdP's voting rights. Some 60% of Hidrocantabrico will actually be owned by Energie Baden-Wurttemberg (EnBW) of Germany, which is controlled by EdF. The agreement is subject to commitments by the French and Portuguese governments to open up their electricity markets to Spain and subject to France increasing its interconnection with Spain from 1,000 MW to 4,000 MW between 2006 and 2011. This includes a new 1,200 MW line to run along side the planned high-speed rail line between Perpignan and Figueras in Catalonia.

In August 2001, Spain and Portugal signed an agreement to form a single electricity market by completely unifying their electricity networks. The unification is to be completed by sometime in 2003. There are still several unresolved obstacles to this. One obstacle is that there is minimal separation between transport and distribution activities, which remain monopolies, and production and marketing activities, which are open to competition. Another problem is that in Portugal production is sold to the state-held REN, which transports the electricity, whereas in Spain producers compete to sell electricity, but receive compensation payments for market liberalization called CTCs. The Spanish government in March 2001 reiterated its support for CTCs, but these payments are under investigation by the EU. The opposition PSOE party has called for their end. However, electricity companies have called for an end to tariff privileges enjoyed by several large industrial companies that they believe have made these companies uncompetitive internationally. In addition, electricity companies would like to raise their rates, arguing that prices have fallen 17% in the past five years, while inflation for the period has been 14%. In December 2001, a 1% rate increase was authorized for industrial customers. The Economy Ministry began investigating several electricity companies for alleged restrictive practices in order to raise prices in November 2001, though it has not revealed which companies are under investigation.

As electricity demand has increased rapidly in Spain in the past year combined with flat or low hydroelectric capacity, domestic supply has not been sufficient, and Spain began to import electricity from Morocco for the first time in December 2001 when cold temperatures created a surge in demand. Union Fenosa and Endesa have signed agreements with Moroccan power company ONE. Spain granted ONE the status of an "external operator" in 1998, giving the company the right to deal directly with Spanish electricity companies or on the Spanish spot market. The power exchange between ONE and Spanish companies is through the Spain-Morocco grid interconnection, which became operational in 1998. Two power connections between Algeria and Spain are also planned, one of which will run along side the Medgaz pipeline.

Spanish utilities are becoming increasingly involved in foreign power markets, especially in Latin America. Endesa owns a controlling stake in Chile's largest power provider, Union Fenosa is involved in Guatemala and Panama, and Hidrocantabrico has interests in Mexico. In neighboring France, Endesa acquired a 30% stake in SNET, which owns five coal-fired power plants, and hopes to control the company completely in a few years.

Nuclear Power

Spain is about 27% reliant on nuclear power for its electricity generation. Spain currently has nine nuclear reactors. In 2001 Spain's nuclear plants produced a record 63.6 bkwh, an increase of 2.3% compared to 2000. The Popular Party supports nuclear power, but the PSOE has indicated that it supports a gradual shut-down of Spain's nuclear plants. Currently, the construction of new nuclear plants is not illegal, but companies are unlikely to invest in such plants because of high costs and little government incentive.

COUNTRY OVERVIEW

Head of State: King Juan Carlos (since November 1975)
Prime Minister: Jose Maria **Aznar** (since May 1996)
Independence: 1492 (expulsion of the Moors and unification)
Capital City: Madrid
Population (July 2001E): 40 million
Location/Size: Southwestern Europe, bordering the Bay of Biscay, Mediterranean Sea, North Atlantic Ocean, and Pyrenees Mountains, southwest of France/504,750 sq km (slightly more than twice the size of Oregon)
Language: Castilian Spanish 74%, Catalan 17%, Galician 7%, Basque 2%
Religion: Roman Catholic 99%, other 1%

ECONOMIC OVERVIEW

Finance Minister: Cristobal Montoro
Currency: Euro (EUR)
Exchange Rate (1/29/2002): 1 US Dollar = 1.156 EUR Spanish Peseta
Gross Domestic Product (GDP, nominal, 2001E): $579 billion
Real GDP Growth Rate (2001E): 2.6% **(2002F):** 2.4%
Inflation Rate (consumer prices, 2001E): 3.7% **(2002F):** 2.4%
Unemployment Rate (2001E): 13.4% **(2002F):** 13.0%
Merchandise Exports (2000E): $115.1 billion
Merchandise Imports (2000E): $147.8 billion
Merchandise Trade Deficit (2000E): $32.7 billion
Major Trade Partners: France, Germany, Italy, United Kingdom, United States, Portugal
Major Export Products: Automobiles, tourism, power generation equipment, electrical machinery, petroleum and chemical products, foodstuffs
Major Import Products: Crude petroleum, vehicle and automobile parts, capital goods, and food

ENERGY OVERVIEW

Proven Oil Reserves (1/1/02E): 21 million barrels
Oil Production (2001E): 21,000 barrels per day (bbl/d), of which 7,000 bbl/d was crude oil
Oil Consumption (2001E): 1.48 million bbl/d
Net Oil Imports (2001E): 1.46 million bbl/d
Crude Oil Refining Capacity (1/1/02E): 1.3 million bbl/d
Natural Gas Reserves (1/1/02E): 18 billion cubic feet (Bcf)
Natural Gas Production (1999E): 5.1 Bcf
Natural Gas Consumption (1999E): 513.8 Bcf
Net Natural Gas Imports (1999E): 508.7 Bcf
Coal Reserves (12/31/96): 728 million short tons (Mmst)
Coal Production (1999E): 27 Mmst
Coal Consumption (1999E): 49 Mmst
Electric Generation Capacity (1999E): 44.9 million kilowatts
Electricity Generation (1999E): 197.7 billion kilowatthours (bkwh)
Electricity Consumption (1999E): 189.6 bkwh

ENVIRONMENTAL OVERVIEW

Minister of Environment: Jaume Matas
Total Energy Consumption (1999E): 5.2 quadrillion Btu* (1.4% of world total energy consumption)
Energy-Related Carbon Emissions (1999E): 81.5 million metric tons of carbon (1.3% of world carbon emissions)
Per Capita Energy Consumption (1999E): 132.6 million Btu (vs U.S. value of 355.8 million Btu)
Per Capita Carbon Emissions (1999E): 2.1 metric tons of carbon (vs U.S. value of 5.5 metric tons of carbon)
Energy Intensity (1999E): 8,707 Btu/$1990 (vs U.S. value of 12,638 Btu/$1990)**

Carbon Intensity (1999E): 0.14 metric tons of carbon/thousand $1990 (vs U.S. value of 0.19 metric tons/thousand $1990)**
Sectoral Share of Energy Consumption (1998E): Industrial (43.1%), Transportation (31.6%), Residential (15.0%), Commercial (10.3%)
Sectoral Share of Carbon Emissions (1998E): Industrial (39.3%), Transportation (38.9%), Residential (13.1%), Commercial (8.7%)
Fuel Share of Energy Consumption (1999E): Oil (57.0%), Coal (14.3%), Natural Gas (11.2%)
Fuel Share of Carbon Emissions (1999E): Oil (66.6%), Coal (23.1%), Natural Gas (10.3%)
Renewable Energy Consumption (1998E): 521.4 trillion Btu* (1% increase from 1997)
Number of People per Motor Vehicle (1998): 2.1 (vs U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (ratified December 21st, 1993). Signatory to the Kyoto Protocol (signed April 29th, 1998 - not yet ratified).
Major Environmental Issues: Pollution of the Mediterranean Sea from raw sewage and effluents from the offshore production of oil and gas; water quality and quantity nationwide; air pollution; deforestation and desertification.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Marine Life Conservation, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants, Desertification.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 1999.

Sources for this report include: CIA World Factbook; DRI/WEFA; Economist; Economist Intelligence Unit; European Union; Financial Times; Gas Natural; Petroleum Economist; Repsol; U.S. Energy Information Administration; World Markets Online.

Links

For more information from EIA on Spain, please see:
Spain Country Data

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Energy Information Administration

April 2002

Russia: Oil and Natural Gas Export Pipelines

OIL PIPELINES

Russia has an extensive domestic oil pipeline system, with links to nearly all of the former Soviet republics. Transneft, the state-owned transport monopoly, manages, services, and is responsible for developing Russia's pipeline system. Russia's main export pipeline to Europe is the 1.2-million-bbl/d-capacity *Druzhba* (Friendship) pipeline that traverses Belarus before splitting into northern and southern routes and delivering oil supplies to customers throughout Europe. The northern Druzhba line runs from Russia via Belarus to Poland and on to eastern Germany, while the southern Druzhba line cuts across northern Ukraine and on to Hungary, Slovakia, and the Czech Republic.

However, aside from the Druzhba pipeline and the Novorossiisk export terminal on the Black Sea, Russia's ability to export its oil to world markets is limited. With the breakup of the Soviet Union, Russia 's main export terminals for crude oil and oil products--in Ventspils (Latvia), Klaipeda (Lithuania), Tallinn (Estonia), and Odessa (Ukraine)--were located outside Russia's borders, forcing the country to pay transit fees to its neighbors in order to export its oil.

Since oil exports are a major source of revenue for Russia's budget, the country is seeking to increase its domestic export capacity and reduce the fees it pays to transit countries. Thus, Russia is building a number of new pipelines and export terminals, such as the Baltic Pipeline System, as well as increasing capacity at several existing terminals and pursuing plans to construct additional pipelines, including a potentially major oil export pipeline to China.

Baltic Pipeline System

Outside of the Caspian Sea region, the 284-mile Baltic Pipeline System (BPS) is Russia's largest new pipeline export scheme. This system involves the laying of a new main pipeline from Kharyaga (Nenets Autonomous District, Arkhangelsk region) to Usa (Komi Republic), the reconstruction of the Usa-Ukhta, Ukhta-Yaroslavl, and Yaroslavl-Kirishi pipeline segments, and the construction of a new pipeline from Kirishi to Primorsk and an oil terminal in Primorsk on the Gulf of Finland. The first stage of the BPS, with an export capacity of 240,000 bbl/d, was put into operation in December 2001 when the first tanker was loaded at Primorsk. The cost of the first stage of the BPS has been estimated at $460 million.

The BPS, which will export most of the oil from the Timan-Pechora and West Siberian oil provinces, as well as some oil from Kazakhstan, gives Russia a direct outlet to northern European markets, allowing the country to reduce its dependence on transit routes through Estonia, Latvia, and Lithuania. Use of the BPS, which is fully owned and operated by Transneft, the Russian pipeline monopoly, should bring the Russian government $100 million per year in fees, as well as allow Russia to save up to $1.5 billion each year in transit tariffs. In addition, Russian officials argue that the oil-loading terminal in Primorsk also allows Transneft to maneuver between southern and northern export routes, giving exporters greater flexibility and attracting more oil from the Caspian Sea region to transit Russia.

Transneft President Semyon Vainshtok announced in November 2001 that construction of the second stage of the BPS will begin in June 2002. The second stage of the BPS, which will take a year and a half to complete, will involve construction of three pump stations and eight storage tanks, as well as upgrades to the Yaroslavl-Kirishi pipeline. The cost of the second stage of construction, which will increase the capacity of the BPS to 360,000 bbl/d, is estimated at around $350 million to $400 million.

However, the BPS has already run into problems. In January 2002, Transneft pumped an average of 236,000 bbl/d through the BPS, nearing its capacity, but in February 2002, Finnish energy company Fortum, which purchased nearly one-third of the BPS exports in January, cut its orders by 85%. After ordering an average of 72,300 bbl/d for the month in January 2002, Fortum reduced its purchases from the BPS to an average of just 10,845 bbl/d in February, citing high levels of sulfur that entered the BPS in the Udmurtia and Bashkortostan republics, making it more expensive to process on delivery in Finland. Most of the oil that was pumped through the BPS in January 2002 came from came from Sibneft, Lukoil and Surgutneftegaz.

China Oil Pipeline

In order to supply China's increasing oil demand and boost its own export potential, Russia has been negotiating with China to build an oil pipeline linking the two countries. In July 2000, Russian President Vladimir Putin and Chinese President Jiang Zemin signed a memorandum of understanding on a feasibility study for a potential oil pipeline between Russia and China, and in September 2001, Russian and Chinese officials signed a general agreement to prepare a feasibility study for the construction of a Russia-China oil pipeline.

Originally, Transneft and Russia's second largest oil producer, Yukos, were working together on the idea of building the proposed $2.5-billion pipeline, which would bring East Siberian oil to northeastern China. Under a 25-year deal, the pipeline would supply China with 400,000 bbl/d starting in 2005--the equivalent of 26% of China's projected net imports then. Spur lines would eventually link the Talakanskoye, Verkhne-Chonskoye, and Yurubchenskoye fields to the main pipeline, boosting capacity to 600,000 bbl/d by 2010 and helping to alleviate localized fuel shortages in Russia that have been aggravated by high rail tariffs.

The preliminary proposal signed by Chinese and Russian sides called for the line to stretch 1,400 miles from Angarsk, across Mongolia, then into Beijing. Russia wants to cut the pipeline's distance by

traversing Mongolia, but China would like to circumvent Mongolia for security reasons. In addition, Yukos and Transneft have differed in their preferences for the pipeline route, with Yukos, which previously favored a pipeline route from its fields in the Tomsk region straight to China, now favoring a route that would terminate in Nakhodka on Russia's Pacific Ocean coast. Yukos argues that shipping crude via Nakhodka would give producers a bigger choice of buyers, while Transneft has said that both routes could eventually be built. Discussions on a final route for the pipeline are continuing.

Sakhalin Pipelines

Sakhalin Energy (Sakhalin-2), a consortium led by Royal Dutch/Shell (Netherlands/U.K.), has plans to build oil export pipelines to Japan, South Korea, and Taiwan by constructing nearly 480 miles each of oil and natural gas pipelines down the length of Sakhalin Island to the ice-free port of Prigorodnoye. The Sakhalin-2 energy project currently produces oil in the six months of the year when the bitterly cold seas off the island's eastern shores are free of ice. Sakhalin Energy's plan is expensive, but will allow year-round oil and natural gas exports.

The rival Sakhalin-1 group favors a shorter, 150-mile underwater pipeline. Sakhalin-1 partners propose to export their oil across the Tatar Straits to DeKastri, on the Russian mainland, where an existing tanker terminal could be expanded to handle exports to Asia. It will be much cheaper to build, but off-takers will have to contend with ice for several months a year. Capacity of both the terminal and pipeline is planned at 240,000-300,00 b/d. Sakhalin-1 says its export route will be cheaper than that of Sakhalin-2, and although Sakhalin-1 is attempting to speed up its timetable to start production in 2003 instead of 2005 as originally scheduled, Sakhalin-1 acknowledges that exports will not begin before 2005.

CPC Pipeline

In March 2001, the Caspian Pipeline Consortium's (CPC) Tengiz-Novorossiisk pipeline was commissioned. The CPC pipeline, which is run by an international consortium rather than Transneft, has an initial capacity of 564,000 bbl/d, with throughput eventually increasing to 1.34-million bbl/d in 2015. Oil from the Tengiz field in Kazakhstan began to flow via the 990-mile pipeline to Russia's Black Sea port of Novorossiisk, but flows were suspended several times because the CPC did not have an agreement with Russia's State Customs Committee to transit Russian territory. After Russia and Kazakhstan negotiated an oil transportation agreement and an "oil quality bank", the first tankers were loaded at Novorossiisk in October 2001.

With a 24% stake, the Russian government is the largest shareholder in the Caspian Pipeline Consortium, but the lack of a pipeline linking the CPC pipeline with Russia's Transneft pipeline system currently prevents Russian oil from flowing through the CPC pipeline. As a result, the ChevronTexaco-led Tengizchevroil consortium looks set to be the only bidder for pipeline space in 2002. Future inclusion of Russian crude will require Transneft to link its system to the CPC pipeline, as well as additional regulations or changes to the existing oil transit agreement and quality bank.

Druzhba-Adria Pipeline Integration

In October 2000, Yukos announced plans to integrate the Druzhba southern pipeline with the Adria

pipeline, which runs from the Adriatic port of Omisalj in Croatia to Hungary. Yukos signed a $20-million agreement with Croatian oil transport company Jadranski Naftovod to modernize the Adria pipeline to help integrate the two pipelines. By reversing the flows of the 110-mile pipeline between Omisalj and Sisak, the integration of the Druzhba and Adria pipelines will allow direct exports of Russian oil to the coast of the Adriatic Sea.

According to Yukos, Russian Urals blend crude oil should be flowing the 1,987-mile route to the deepwater Omisalj port by the end of 2002. In December 2001, the Ukrainian parliament ratified an agreement to reduce its tariff for Russian oil crossing its territory en route to Omisalj, a step that Russian oil companies had seen as the last major obstacle for the integration project to move forward. Ukraine's agreement to cut its transit tariff brought it in line with Belarus, Slovakia, Hungary, and Croatia, the other countries through which the route passes.

With the line reversed to Omisalj, Russian oil exporters will have direct access to the Mediterranean Sea, allowing them to bypass the Black Sea and the increasingly crowded Bosporus Straits. The entire Druzhba-Adria pipeline route would handle 100,000 bbl/d in 2003, the first full year of operation. Transneft and Jadranski Naftovod have said that exports via the pipeline would rise to 200,000 bbl/d after five years, and to 300,000 bbl/d after 10 years.

Sukhodolnaya-Rodionovskaya Pipeline

In September 2001, Transneft completed a 162-mile pipeline from Sukhodolny to Rodionovsky in the southern Rostov region, allowing oil headed south for the Russian Black Sea port of Novorossiisk to avoid transiting Ukraine. The 320,000-bbl/d line removes the need for Russian oil exporters to use a 60-mile stretch of pipeline in Ukraine. The original, Soviet-era pipeline sidetracked west into Ukraine to serve the Lisichansk refinery, but after the collapse of the Soviet Union, Ukraine began charging Transneft high transit fees to use the pipeline. Transneft decided it was worth the $240-million cost to construct a bypass pipeline in order to avoid Ukraine's high transit fees.

NATURAL GAS PIPELINES

Russia has a comprehensive domestic natural gas distribution system run by the state natural gas monopoly Gazprom, as well as a series of natural gas pipelines linking Russia to the former Soviet republics. Russia's main natural gas export pipelines to Europe run from West Siberia, across the Volga-Urals and Timan-Pechora, and through Ukraine and Belarus to Europe. The Brotherhood, Progress, and Soyuz gas pipelines, with capacities of 1 trillion cubic feet (Tcf) each, transit Ukraine, while the 1.0-Tcf Yamal-Europe pipeline crosses Belarus, and the 0.8-Tcf Northern Lights gas pipeline transits both Belarus and Ukraine.

With world natural gas demand increasing, Russia is attempting to increase its capacity to export its natural gas. In addition, with so many natural gas pipelines crossing Ukraine, Russia is seeking to build new pipelines to diversify its natural gas export routes. In order to reach lucrative markets in Western Europe and Asia, Russia is proceeding with the construction of a number of international natural gas pipeline projects, including the Blue Stream pipeline to Turkey, and possible pipelines from Russia's

Sakhalin Island to Asian markets.

"Blue Stream" Pipeline

In 1997, Russia and Turkey signed an intergovernmental agreement for the sale of 565 billion cubic feet (Bcf) per year of natural gas, beginning in 2001. To implement this agreement, the "Blue Stream Pipeline Company" was formed, and the countries agreed to build a pipeline directly from Russia to Turkey, via the Black Sea.

Construction on the 565-Bcf-per-year-capacity Blue Stream pipeline officially began in February 2000. The pipeline includes a 222-mile section in Russia, from Izobilnoye to Dzhugba on the Black Sea Coast, a 235-mile section on the bottom of the Black Sea that will connect Dzhugba to Samsun on the Turkish coast, and a further 300-mile link from Samsum to Turkey's capital at Ankara. The estimated cost of the pipeline, which is Russia's largest investment project, is between $3 billion and $3.3 billion. The seabed stretch of the pipeline, which will be laid at depths deeper than any other pipeline in the world, is estimated to cost $2 billion alone. ENI (Italy) and Gazprom each have a 50% stake in the Blue Stream project.

In the spring of 2001, investigations into allegations of corruption in Turkey in the tendering for the Blue Stream pipeline set the project back several months. Turkey's Energy Minister, Cumhur Ersumer, was forced to resign after being named in a court indictment of 15 ministry officials charged with corruption. Aside from setting back the timetable for completion of the project, the Blue Stream pipeline itself was unaffected, and in August 2001, the Saipem 7000, an Italian technological innovation that is the only ship in the world capable of laying pipelines at such depths, began laying the pipeline at the bottom of the Black Sea at a depth of nearly 7,000 feet.

In February 2002, the Saipem 7000 completed laying the first of two branches of the subsea section of the pipeline, with work on the second branch to be completed in May 2002. Construction of the Turkish onshore section of the pipeline is already complete, while the 222-mile Russian section of the pipeline, which includes compressor stations and underground storage facilities, is scheduled to be finished by September 2002.

Natural gas supplies through the Blue Stream pipeline are slated to being in the third quarter of 2002, with Russia scheduled to deliver 70.6 Bcf of natural gas to Turkey via the pipeline this year. From 2003 to 2009, Russia will increase deliveries via Blue Stream by 70.6 Bcf per year each year, with the pipeline reaching peak capacity of 565 Bcf per year in 2009. Over the course of the 25-year agreement, Russia will pipe 14.1 Tcf of natural gas to Turkey.

Ukraine Bypass and Yamal-Europe Pipelines

Gazprom currently supplies around 25% of European natural gas demand, and the company is eager to increase its penetration in the region. Approximately 90% of Russia's total natural gas exports to Europe are routed through Ukraine, which receives natural gas supplies as in-kind payment for allowing Russia's natural gas to transit its territory en route to European consumers (Ukraine purchases additional natural

gas from Russia to meet its domestic demand). The Yamal-Europe pipeline, which is routed through Belarus and Poland to Germany, is Russia's only natural gas export pipeline to Europe that is not routed through Ukraine.

Russia has questioned Ukraine's reliability as a transit country, noting Ukraine's $2-billion debt for natural gas supplies. Several times in the past few years, Russia has accused Ukraine of illegally taking more natural gas from than the amount for which it had contracted. With Russia's long-term energy supply agreement with the European Union, Russian officials have said that they need additional export routes to be able to meet Russia's increased supply obligations. As a result of the strained relations between Ukraine and Russia over natural gas transit, in October 2000 Gazprom officials proposed a new pipeline that would bypass Ukraine. However, Ukraine pledged to stop siphoning natural gas from the transit pipelines, and in October 2001, the two countries agreed on a 12-year debt restructuring deal for Ukraine's natural gas debts.

Gazprom has sent conflicting signals on its intentions with the second leg of the Yamal pipeline (stipulated in a 1993 Russia-Poland intergovernmental agreement) and the related question of a possible bypass route around Ukraine. In February 2002, Gazprom board member Boris Fyodorov told investors that the company's board of directors had decided to increase the capacity of the Yamal-Europe pipeline and drop the project to build the natural gas pipeline through Poland, bypassing Ukraine. Gazprom officials, however, denied reports that the company has scrapped plans for a north-south pipeline from Belarus to Slovakia via Poland, avoiding Ukraine.

Although there has been confusion as to what Gazprom's position is, what is clear is that the company is still interested in boosting Russia's natural gas export capacity to Europe by diversifying its export routes. Currently, the Yamal-Europe pipeline annually carries about 600 Bcf of Russian natural gas, which is sold to the Russian-German trading company Weih, and the pipeline is expected to handle about 1.17 Tcf of natural gas per year by 2003 after new compressor stations have been built in Poland. Gazprom's plans for a second stretch of the Yamal-Europe pipeline through Poland would increase capacity to 2.1 Tcf of natural gas per year, but Russia and Poland have differed on the route for the second leg, and Russia's shorter route would still cost an estimated $2 billion to construct. As a result, Yamal-Europe II appears to be on hold.

China Natural Gas Pipelines

Russia also is looking to eastern markets to export its natural gas to Asian countries. On September 29, 2000, Russia announced that it would expedite the development of eastern Siberia natural gas fields, as well as conduct a feasibility study for laying a natural gas pipeline to China in a bid to supply natural gas to China. Several international projects are seeking to deliver Russian natural gas to China, although China has narrowed it down to two major options: a BP (U.K.)-led consortium that is developing the Kovykta natural gas field, and the the Sakha consortium developing the Chayandinovskoye field. Analysts believe that only one pipeline will be needed.

The Chayandinovskoye option would cost approximately $6 billion-$10 billion and would entail a 1,700-

mile pipeline link from the Chayandinskoye field to Xinjiang region northern China. In March 2001, Russia's Sakhaneftegaz and China's National Oil & Gas Development Corp. signed a preliminary agreement to develop the Chayandinovskoye field, which is estimated to contain 43 Tcf of natural gas, and build a dedicated pipeline with capacity of between 423 Bcf and 706 Bcf per year. Gazprom may act as the operator for the pipeline.

The second option for China to receive Russian natural gas is via a pipeline linking Russia's Kovykta field in Irkutsk with northeastern China. The Kovykta field, which is being developed by Russia Petroleum, a BP-led consortium, has estimated natural gas reserves of 49 Tcf. The pipeline would terminate in South Korea via a sub-sea pipeline across the East China Sea. The most direct route for the proposed Irkutsk pipeline--which Russia Petroleum strongly prefers--would be to lay the pipeline through Mongolia into northern China and then down to South Korea.

However, China is urging that the pipeline bypass Mongolia and instead go around the eastern edge of that country and follow a route on to Manzhouli in northeastern China, then cross into North Korea before terminating in South Korea. China feels that a route across Mongolia would be geopolitically risky and argues that Mongolian natural gas demand does not justify having the pipeline cross its territory.

If China insists that the pipeline not traverse Mongolia, an extra 700 miles will be added to the 2,000-mile pipeline route. In addition to the political issues related to the pipeline crossing North Korea, the added cost (from the extra length) of the pipeline may make the extension to South Korea unfeasible. Thus far, Russia Petroleum has failed to agree on the price China will pay for the natural gas.

North TransGas Pipeline

In late April 2001, Gazprom signed an agreement with Finnish and German customers for a feasibility study on a pipeline that would carry Russian natural gas across the Baltic Sea to serve Scandinavia and Germany. The North TransGas pipeline, if it is built, will be well located to export natural gas production from the far north of European Russia and the Barents Sea, and also will allow Gazprom to avoid negotiating fees for transit countries. Gazprom's partners in the North TransGas pipeline project are Finland's Fortum and Germany's Wintershall and Ruhrgas. However, until Gazprom is restructured and attracts more foreign investment, it appears that only one of the proposed northern natural gas pipelines--Yamal-Europe II or the North TransGas pipeline--is possible due to Gazprom's financial woes.

Sakhalin-1 Natural Gas Pipeline to Japan

The Sakhalin-1 consortium, made up of ExxonMobil (U.S.), Rosneft, ONGC Videsh (India), and a consortium of Japanese firms, is developing the Odoptu, Chayvo and Arkutun-Dagi oil and natural gas fields on Sakhalin Island off Russia's Pacific Coast. The consortium is proposing to deliver natural gas from Sakhalin to Japan via a 120-mile pipeline linking its fields with Sapporo, on Japan's northernmost island of Hokkaido. A feasibility study for the pipeline, which could be extended to Tokyo, is scheduled to be completed in April 2002.

ExxonMobil, the project's operator, previously has stated that it believes the pipeline will be economically viable. ExxonMobil has already given the green light to increase investment at the fields, and the company has announced that Sakhalin-1 is planning to produce 335 Bcf of natural gas per year in 2003. Sakhalin-1 hopes to start piping natural gas to Japan in 2008, with exports reaching 360 Bcf per year.

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Baltic Sea Region

The Baltic countries--including Estonia, Latvia, and Lithuania--occupy a strategic location as transit centers for Russian oil exports. In addition, Belarus is becoming a major transit center for Russian natural gas exports to Europe.

Note: Information contained in this report is the best available as of December 2001 and is subject to change.

GENERAL BACKGROUND

Estonia, Latvia, and Lithuania--together often known as the Baltic states--have moved rapidly towards European integration since they won their freedom from the Soviet Union in 1991. Alone among the former Soviet republics, the Baltic states were quick to adopt market economies and to implement democratic reforms. As a result, they largely have avoided the economic and political crises that have beset other regions in transition from a centrally planned economy, including the Balkan region and Southeastern Europe.

Due to their small sizes, the Baltic countries have joined forces in a number of political and economic arenas in order to give themselves more clout on the international stage. In addition, the countries have agreed to cooperate in the military sphere in order to bolster their individual security. Each country has applied to join the North Atlantic Treaty Organization (NATO), and each has made membership in the European Union (EU) a stated foreign policy goal. The Baltics have agreed to coordinate their energy markets and to harmonize their national energy programs in a unified bid to meet the the EU's membership requirements.

Belarus, on the other hand, has been reluctant to implement political and economic reforms since the collapse of the Soviet Union. Rather than attempting to integrate with the West, Belarussian President

Alyaksandr Lukashenko has isolated Belarus from the West by refusing to implement political reforms and instead returning the country to a form of market socialism. Although Belarus is just as dependent on Russian oil and natural gas as are the Baltic states, Belarus has not made any serious attempts to diversify its energy sources. Unlike the Baltics, Belarus has maintained a close relationship with Russia, and as such it has benefited by receiving cheaper energy supplies from its eastern neighbor.

REGIONAL ENERGY ISSUES

Although not important energy consumers or producers, together the Baltic states occupy a key location for Russian oil exports. Other regional energy issues in the Baltics include Russian natural gas transit and alternative natural gas supplies, energy sector privatization and energy market liberalization, electric grid unification, and integration with the EU.

Russian Oil Export

Latvia's Ventspils port is Russia's primary crude oil export terminal in the north, and both Estonia and Lithuania have important ports for Russian crude oil and petroleum products for export. Transit fees for these oil and petroleum products that are destined for export are an important source of revenue in the Baltic states.

However, Russia is keen to avoid these transit fees by constructing its own oil export terminal at Primorsk, part of Russia's new Baltic Pipeline System (BPS). The Primorsk terminal, with an initial capacity of 240,000 barrels per day (bbl/d), is scheduled to load its first tanker in December 2001. According to various estimates, ports in the Baltic states could lose between 10% and 50% of their current Russian oil export volumes. Nevertheless, projected increases in Russian oil exports, along with increased oil exports from the Caspian Sea region, especially Kazakhstan, appear to ensure that the ports in Estonia, Latvia, and Lithuania will remain important oil export terminals in the future.

Estonian Ports

In recent years, Estonia's ports at Tallinn and nearby Muuga have become major terminals for the export of Russian petroleum products. By the end of 1999, these terminals were exporting over 300,000 barrels per day (bbl/d) of products, rivaling Ventspils as the largest transshipment center in the Baltics. Estonia's ports, which only export petroleum products such as heavy fuel oil, are not reliant on pipelines to deliver supplies. Instead, Estonian transit companies, such as Eurodek Tallinn and Pakterminal, use trains to transport oil products from Russia to Estonian sea ports.

In 2000, Pakterminal handled 8.5 million tons (171,000 bbl/d) of oil products, around 500,000 tons (10,000 bbl/d) more than in 1999, despite a plunge in imports from Russia in the third quarter that forced the company to transit other oil products. In the first nine months of 2001, the company reported handling an average of 182,000 bbl/d of oil products, an increase over the record volumes in 2000. Thus, Pakterminal, Estonia's largest oil transit company, is confident that Russia's Baltic Pipeline System and new port at Primorsk will not substantially cut into its business.

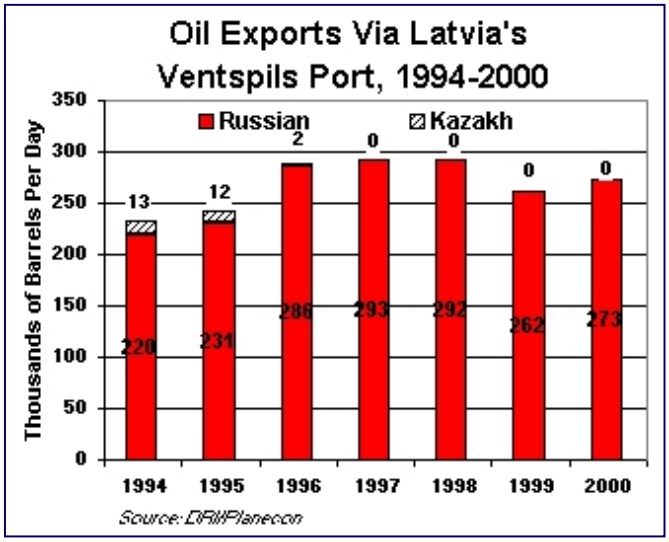
Eurodek Tallinn also is increasing its export volumes after handling 6.2 million tons (124,500 bbl/d) of oil products in 2000. In the first half of 2001, the company handled 3.6 million tons (144,500 bbl/d), and in August 2001, Eurodek opened a new $50-million terminal in the port of Muuga. The 60,000-bbl/d-capacity terminal will allow the company to boost its export capacity. A smaller 16,000-bbl/d-capacity terminal is also being constructed by Alexela Oil in Padiski, with work due to be completed by August 2002.

Overall, a total of 1.8 million tons of oil products passed through the Port of Tallinn during September 2001, and 16.1 million tons (431,000 bbl/d) during the January 2001-September 2001 period.

Latvian Ports

Latvia's Ventspils port is the largest oil export terminal in the Baltics, and both Riga and Liepaja also have ports for exporting oil and oil products. The Ventspils oil terminal can handle about 500,000 bbl/d of crude, and Latvian officials have stated that its throughput capacity could be increased to 1.8 million bbl/d (although this would require about $30 million in investment). Actual exports from Ventspils have been far below capacity, however, due to a bottleneck in Polotsk, Belarus that has limited pipeline flows.

To reduce the bottleneck at Polotsk, the Western Pipeline System joint-stock company was formed in 1998 to help build a second pipeline from Polotsk to Ventspils. The project calls for an additional 360,000 bbl/d capacity by 2005, with backing sought from Russian, Latvian, Belarussian, and Western companies, and additional backing to come from the European Bank for Reconstruction and Development (EBRD).



According to PlanEcon, Ventspils handled 273,000 bbl/d of crude oil in 2000, all of which was Russian crude oil. In the past, Kazakhstan also has exported small amounts of oil via Ventspils, with as much as 13,000 bbl/d of Kazakh crude flowing through the terminal in 1994. Increasing Russian oil exports have limited Kazakhstan's ability to export via Latvia, and Latvia's efforts to reach an agreement with Kazakhstan to export up 100,000 bbl/d via Latvian ports have been hindered by the need to reach an agreement with Russian on rail tariffs and the use of its pipelines.

Although in 2000 Ventspils retained its status as the Baltic port with the largest share of Russian oil exports, competition from other Baltic ports is increasing and eroding Ventspils' market share. In an effort to attract more Russian oil exports, Ventspils Nafta, the company that runs the terminal, has cut its reloading tariffs several times in the past few years. Nonetheless, it is still one of the highest-cost routes for Russian crude oil, and recent reductions in exports could force it to reduce loading charges again in order to stay competitive. Russian companies now pay Latvia in excess of $100 million annually for transit services.

Russia's new Baltic Pipeline System is the biggest threat to Ventspils, since the BPS would allow Russian oil companies to save large amounts of money on transit services and transshipment. Semyon Vainshtok, president of Transneft, the Russian pipeline monopoly, has assured Latvian government officials that the opening of the BPS in December 2001 will not affect the amount of oil loaded at Ventspils, since increases in Russian exports will necessitate the use of both Ventspils and the BPS. Latvia is looking to sell its 43% stake in Ventspils Nafta, hoping that the privatized company will make the port more competitive. Latvia also may offer Transneft a larger stake in LatRosTrans, the Latvian-Russian joint venture that operates the oil and oil product pipelines between Polotsk and Ventspils, in exchange for an increase in the amount of oil shipped to Ventspils.

Lithuanian Ports

Lithuania is positioning itself as a transit center for oil exports from Russia. Lithuania's port of Klaipeda

once had been one of the former Soviet Union's primary export outlets for refined products, but its importance has declined in recent years, and Lithuania now ranks behinds both Latvia and Estonia as a petroleum transshipment center.

Lithuania has moved forward with its plan for a $120 million upgrade of the port at Klaipeda, and the country recently built a new $267 million export port at Butinge near the Latvian border. The Klaipeda oil terminal is expanding its product export capability from 90,000 bbl/d to 160,000 bbl/d. The Butinge terminal, which was launched in July 1999, will have a final capacity of 160,000 bbl/d of crude oil for import or export, and 50,000 bbl/d of products.

The Butinge terminal has been beset by problems since it was launched. Since privatizing Mazeikiu Nafta, the company that operates the Butinge terminal, in 1999, Lithuania has been unable to secure enough oil supplies to load at the terminal. Russia's Lukoil, the coordinator of Russian oil exports in the country's northwest, reduced oil supplies to Lithuania after being left out of the Mazeikiu Nafta privatization. As a result, the Butinge terminal exported just 60,000 bbl/d of crude oil and petroleum products in 2000.

Kazakhstan has been ready for a number of years to supply oil to Lithuania, but an agreement between Kazakh oil companies and the Russian side regarding transportation of oil to Lithuania has not been reached. In July 2000, Kazakhstan's Karazhbasmunai and Mazeikiu Nafta signed a three-year oil supply under which Kazakhstan was to supply up to 60,000 bbl/d to Lithuania, but deliveries have not yet begun due to the lack of an agreement with Russia on transportation tariffs.

In addition, an oil spill at Butinge in March 2001 caused tensions between Latvia and Lithuania as winds blew the spill into Latvian waters. Reportedly, a tanker was being filled with crude oil when a cable snapped, resulting in pipes being disconnected and a small amount of oil was spilled into the Black Sea, where it later sunk to the seabed in Latvian territorial waters. Mazeikiu Nafta and the Latvian Maritime Environment Board have argued over the amount of oil spilled and the damage it caused, as well as Mazeikiu Nafta's compensation to Latvia. The Butinge terminal has experienced several additional accidents since the March 2001 oil spill.

In the summer of 2001, Mazeikiu Nafta did sign a five-year agreement with Russian oil major Yukos to export 80,000 bbld/d of crude via its Butinge terminal, and deliveries began in July 2001. From January 2001 to September 2001, the Butinge terminal handled an average of 112,000 bbl/d, up from an average of 75,000 bbl/d during the same time period in 2000.

Electric System Unification

The power systems of Estonia, Latvia, and Lithuania originally were built to be part of the Soviet Union's northwestern unified energy system. After achieving their independence, the Baltic states disconnected from the grid, forming their own national grids. However, the independent national grids continued to run in parallel mode, allowing Latvia, whose power-generating capacity is mainly seasonal hydropower, to import electricity supplies from Estonia and Lithuania when necessary. In 1999, Russia, Belarus, Estonia, Latvia, and Lithuania agreed to re-connect their electricity grids in order to ensure reliable power suppliers for consumers in the five countries. Lithuania, which remained connected to Belarus, Latvia, and Estonia, withdrew from the five-party agreement at the last minute due to political reasons.

The Baltic states' power grids are not connected to the Western European energy grid. As a result, both Lithuania and Estonia, which have excess power-generating capacity, have been limited in their ability to

export power. In addition to exporting power to Latvia, Lithuania has exported power to Belarus periodically, but Belarus has been delinquent in its payments for electricity supplies. Belarus owes Lithuania around $50 million for electricity in 1998 and 1999, but after a one-year break, Lithuania agreed to begin power exports to Belarus again in July 2000 after concluding a unique three-way arrangement with Russian and Belarus. Under the agreement, Russia agreed to purchase 2.2 billion kilowatt-hours (Bkwh) of power from Lithuania's Ignalina nuclear power plant for subsequent delivery to Belarus. In exchange, Russia supplied the Ignalina plant with nuclear fuel, while Belarus paid Russia in commodities rather than cash.

In October 2000, Lietuvos Energija, Lithuania's power utility, halted exports to Belarus due to a lack of payment guarantees. Lithuania announced that it is unwilling to export power to Belarus directly without firm payment guarantees. Thus, in February 2001, representatives of Lithuania, Estonia, Latvia, Russia, and Belarus signed a multi-lateral agreement on the parallel work of their energy grids, bringing Lithuania on board to the earlier agreement. The agreement gives Lithuania, which also is looking to link directly with Poland, the ability to transit its electricity via Belarus to other markets such as Slovakia, with which Lithuania recently signed an export contract. In addition, in the spring of 2001, Lithuania and Russia signed a deal on the export of 7 Bkwh of Lithuanian electricity in 2001, 2 Bkwh of which was to be sent to the Kaliningrad Region of Russia and 5 Bkwh to be sent to Belarus.

Estonia, for its part, has been pushing to link its grid to the Western European grid. BALTREL, the Baltic countries' power cooperation organization, also has proposed supplying Sweden and Finland with power generated in the Baltic states. To begin with, this would mean linking the 51-mile stretch of sea between Tallinn and Helsinki via an underwater cable. A consortium of electric companies agreed in September 1998 to build the electricity transmission cable, and ABB (Sweden) has been chosen to lay the 315-MW-capacity cable, beginning in the spring of 2002. The project, dubbed "Estlink," is estimated to cost $100 million and should be ready by the end of 2003. Electricity transmission via the cable could be underway by mid-2004.

Regional Natural Gas Supplies

Russia is the main source of natural gas supplies for each of the Baltic states, and the proposed North TransGas project by Russia's Gazprom could bring additional Russian natural gas exports to the Baltics. The project, which would be carried out by Gazprom in conjunction with Finland's Fortum and Germany's Wintershall, would pump natural gas to Scandinavian and German customers via a pipeline beneath the Baltic Sea.

Three options for the pipeline route have been identified: Russia-Finland-Gulf of Bothnia-Sweden-Baltic Sea-Germany; Finland-Baltic Sea-Gotland-Germany; or St. Petersburg-Germany via a pipeline on the bottom of the Baltic Sea. Although none of these options call for the pipeline to transit any of the Baltic states, a pipeline extension to Estonia may be possible and, according to Estonian officials, it may even be desirable for the project's participants, since it could cut down on the costs of part of the subsea pipeline. In addition, Latvia's huge natural gas storage facilities could play an important role in the project, and an extension from the Baltic Sea to Latvia is another possibility.

The Baltics also are looking to diversify their natural gas supplies, and the recent natural gas deal between Norway and Poland may provide the Baltic states with an alternative supply of natural gas. In September 2001, PGNiG, the Polish natural gas distributor, and the leading natural gas companies from the Norwegian market (including Statoil, Norsk Hydro, TotalFinaElf, ExxonMobil, and Shell) signed a 16-year, $11-billion deal to supply Poland with a total of 2.6 trillion cubic feet (Tcf) of natural gas. A dedicated pipeline will be

built to supply Poland, with annual supplies of 88 billion cubic feet (Bcf) to begin in 2008 and rise to 177 Bcf in 2011, lasting until 2024.

Although the deal appears to threaten Poland with oversupply, since Poland does not consume as much natural gas as the deal calls for, the possible re-export of Norwegian natural gas from Poland to the Baltic states would take care of the excess natural gas on the Polish market. Lithuanian and Estonian officials have expressed their interest in receiving natural gas from Poland, which would require the Baltic supply network to be linked to Poland. Approximately 120 miles of pipeline would have to be laid from Poland to Lithuania in order to connect the networks. Estonia wants Lithuania, the new presiding head of the Baltic Council of Ministers, to take vigorous action in issues concerning the establishment of a common natural gas pipeline and natural gas supply.

ESTONIA

Since regaining its independence from the soviet Union in 1991, Estonia has moved rapidly to reorient itself to the West, adopting market reforms and luring foreign direct investment, especially from Finland. The country has made substantial progress integrating with the West, gaining membership in the World Trade Organization (WTO), and applying for membership in the EU and NATO. As a result of the rapidity with which Estonia adopted political and economic reforms, the country was invited to begin EU accession negotiations in the first wave of new members, putting Estonia on the fast track to become an EU member.

Russia remains the major power in the region, and because Estonia has a sizable ethnic Russian population in the northeastern part of the country, Estonia's political and economic activities necessarily take into context the country's huge neighbor to the east. In addition, because of its lack of indigenous energy resources aside from oil shale, Estonia still is dependent on Russia for the majority of its energy supplies. After falling into recession in 1999, when the effects of Russia's 1998 financial crisis reverberated through the Estonian economy, Estonia rebounded to post 6.9% economic growth in 2000. Foreign direct investment, which was equal to 7% of the country's real GDP in 2000, has slowed in 2001. Nevertheless, Estonia's economy still is projected to grow by 4.8% for 2001.

Oil

Estonia has no proven crude oil reserves, but *polevkivi* (oil shale) is abundant in the northeastern part of the country. Oil shale provides over 75% of Estonia's total energy supply, making Estonia the only country in the world where oil shale is the primary source of energy. Oil shale is produced by majority state-owned Eesti Polevkivi (Estonian Oil Shale) near Kohtla-Jarve. Oil shale is consumed for power generation by the Eesti Energia and Kohtla-Jarve Soojus electric companies and for shale-to-oil processing by Kiviter AS, which processes the oil shale to produce about 4,400 bbl/d of distillate liquid fuels. Estonia's indigenous oil shale production, however, is not sufficient to meet the country's demand for oil, which stood at 23,000 bbl/d in 2000 and is projected to remain relatively constant in 2001.

Eesti Polevkivi's is projecting its oil shale production in 2001 to remain stable at approximately 12 million

tons a year despite the consolidation and restructuring of several of its quarries. The Narva and Sirgala quarries have been unified into one firm (Narva Quarry), while the Kohtla mine and Aidu quarry are being consolidated into one company as well. Eesti Polevkivi also is planning to close the Ahtme mine and to stop oil shale extraction there in 2002. Nevertheless, oil shale mining continues at the Viru and Estonia mines, and Eesti Polevkivi plans to produce around 12 million tons of oil shale per year until 2006.

The impending closure of another mine follows on the 1999 closure of the Tammiku mine and foreshadows the industry's downturn. After 2006, Eesti Polevki is forecasting its production target will shift downward, to 10.5 million tons per year, as Estonia tries to curb pollution from the oil shale industry in an effort to meet EU environmental regulations. Eesti Polevkivi has indicated that it expects the oil shale industry to continue for another 40 years, but no new mines are scheduled to be built, and Estonia is coming under heavy pressure from the EU to cut back significantly on oil shale production. Estonian politicians have announced they will ask the EU to accord special treatment to oil shale, approaching it the same way that the EU does coal, since the problems of the two natural resources are similar.

In February 2001, Narva Elektrijaamad (Narva Power Plants) and Eesti Polevkivi signed a $73-million supply contract for 2001 under which Eesti Polevkivi will sell Narva Power Plants 9.4 million tons of oil shale this year. In 1999, Narva Power Plants used 85% of the total output of Eesti Polevkivi. According to the terms of NRG Energy's (USA) purchase of 49% of Narva Power Plants from Eesti Energia (Estonian Energy, the country's electric utility), Eesti Polevkivi is now a subsidiary of Narva Power Plants. On top of the cost for the power plants, NRG Energy paid $27.6 million for a 51% controlling share in Eesti Polevkivi, and the U.S. energy firm has committed up to $80 million in investment in the oil shale company, including modernizing the technology used at Eesti Polevkivi and renovating its infrastructure.

Downstream/Refining

Estonia has no refineries, so it must import all petroleum products, either by rail or by pipeline.

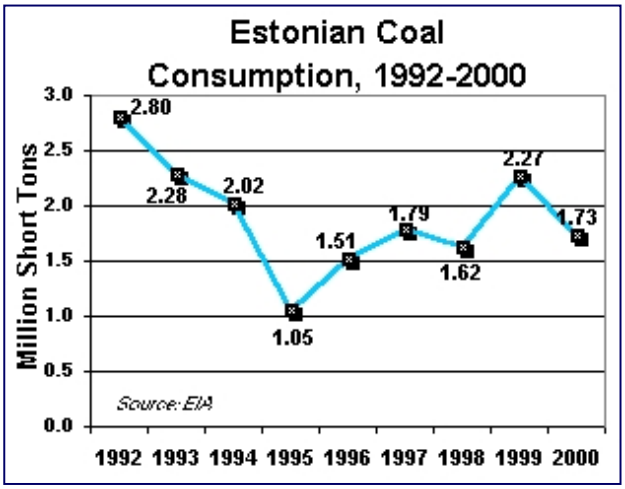
Natural Gas

Estonia has no natural gas reserves and therefore must import all of its natural gas for domestic consumption. Currently, Estonia imports all of its supplies via the country's 250-mile pipeline network from Russia, but Estonia is keen to diversify, and Norway is a potential supplier. Estonia's natural gas consumption collapsed from 53 Bcf in 1992 to just 21 Bcf in 1993 as Estonia attempted to reorient its economy to the West, but the country's consumption of Russian natural gas has crept slowly upwards in ensuing years. In 2000, Estonia consumed 39.6 Bcf of natural gas.

Eesti Gaas (Estonian Gas), the former state-owned gas company that was fully privatized in 1997, is the largest natural gas supplier in Estonia. In November 1999, Eesti Gaas, which is owned by Ruhrgas (Germany, 32%), Gazprom (Russia, 31%), Fortum (Finland, 10%), and Itera (9.5%), signed a long-term agreement with Gazprom to supply Estonia with natural gas from 2000-2005. Over 90% of Estonian district heating stations use natural gas, and natural gas is the primary fuel of the Viru Power Station, which produces both heat and power.

Coal

Estonia does not have any coal reserves or coal production, but the country does import a small amount of lignite, mainly for district heating. Throughout much of the 1990s, Estonia's coal consumption was on the decline, with consumption falling from 2.08 million short tons (Mmst) in 1992 to 1.62 Mmst in 1998.



However, with the rise in oil and oil shale prices that began in March 1999, Estonia turned to coal for more of its energy needs, and consumption shot up to 2.27 Mmst in 1999. In 2000, Estonia's coal consumption was back down, to 1.73 Mmst, and over time, the country's coal consumption is forecast to fall even further as Estonia brings its energy balance in line with EU environmental regulations.

Electricity

With 3.4 GW of electric-generating capacity, Estonia produces ample power to meet its own consumption requirements. The lion's share of this generating capacity comes from Estonia's two oil-shale-fired power plants in the northeast of the country, the 1,610-MW Eesti Elektrijaam and the 1,390-MW Balti Elektrijaam. The two power stations, which together make up the Narva Power Plants, currently supply approximately 95% of Estonia's electricity. Although Estonia has a small amount of hydropower and other renewable energy capacity, the power produced at these facilities costs twice as much as the electricity generated at the oil-shale-fired power plants.

In 2000, Estonia generated 7.1 Bkwh of electricity, which was more than enough to cover the country's overall consumption of 5.4 Bkwh of power. Estonia exports its excess power to Latvia and to northwestern Russia. As Estonia strives to liberalize its energy market in line with EU directives, the country wants the EU to recognize the importance of oil-shale-fired power generation to its economy. If the local power market is opened to imported electricity immediately upon the country's entry into the EU (in keeping with the union's competition policy), Estonian officials are worried that it would lead to a steep drop or even a cessation of oil shale-fueled power generation, creating a social and economic crisis in northeastern Estonia. As a result, Estonia wants the EU to recognize and to accept that the majority of the country's electricity will come from oil shale-fueled power plants until at least 2015.

Prior to 1995, all of Estonia's electricity had been produced entirely by Eesti Energia, the state-owned electric company, but in 1996, the first steps towards privatization were taken with the establishment of the joint-stock company Kohtla-Jarve Soojus comprising Estonia's two smaller oil shale-fired power plants, the Ahtme and Kohtla-Jarve Power Stations. Then, on August 25, 2000, after more than four years of negotiations, the Estonian government finalized a controversial $70.5 million deal to sell a 49% stake in the Narva Power Plants to NRG Energy. As part of the deal, NRG Energy also was to receive a 51% share of Eesti Polevkivi, the state oil shale firm. In June 2001, in an effort to appease domestic critics of the deal, including former Estonian President Lennart Meri, NRG agreed to pay an additional $27.6 million for the stake in Eesti Polevkivi, completing the final sale details.

Under the terms of purchase, NRG committed to investing approximately $361 million in reconstructing and refurbishing the Soviet-era Narva Power Plants and making environmental improvements. In September 2001, Eesti Energia and NRG Energy signed a contract with three international banks for a 14-year, $280-

million loan to begin renovation of the Narva Power Plants. Two energy blocks at the Eesti and Balti power plants will be renovated by Finland's Foster Wheeler Energia, with renovation starting with the Eesti power block. In addition, a portion of the loan money will be spent on reconstruction of Eesti Polevkivi oil shale mines.

As a condition of the privatization terms of Narva Power Plants, the Estonian government stipulated that NRG Energy must ensure that the Estonian energy market becomes part of the European energy market. Estonia's power grid is configured to the old Soviet power grid, and as Estonia reorients itself to the West and moves towards EU integration, one of the country's security-political priorities is to create an energy connection to the West European electricity grids. In the meantime, in February 2001, Estonia, Latvia, Lithuania, Belarus, and Russia signed an agreement formalizing their already existing arrangement to cooperate in the power sector by connecting their energy grids and by sharing power supplies.

LATVIA

In the decade since Latvia declared its independence from the Soviet Union, the country has moved rapidly towards integration with Europe. Latvia has applied for membership in both the EU and NATO, and in February 1999, Latvia became the first Baltic state to join the World Trade Organization. In addition, in December 1999, Latvia was invited to begin accession talks with the EU in the so-called "second wave" of EU aspirants, and membership in the organization is a top foreign policy priority.

Relations with Russia still color many of Latvia's activities. In addition to ongoing citizenship questions surrounding Latvia's large ethnic Russian minority, the Latvian economy is tied to Russia's since Latvia is dependent on Russian oil and natural gas exports for its domestic consumption. Nevertheless, Latvia weathered the brunt of Russia's 1998 financial crisis without falling into a recession, and in 2000 Latvia's real GDP growth bounced back to a healthy 6.6%. Most small- and medium-sized enterprises have been privatized, and energy sector privatization and energy market liberalization is underway. With the transition to a functioning market economy nearly complete, the country's real GDP is projected to grow another 6.5% in 2001.

Oil

Latvia has no domestic oil production or refineries, so it is entirely dependent on imports of petroleum products to meet its consumption needs. Since 1992, when Latvia consumed an average of 52,200 bbl/d of oil products, domestic consumption has been on the decline, dropping to 25,000 bbl/d in 2000. Latvia imports all of its oil in the form of refined productst, mostly from Russia, Belarus, and Lithuania, with only a small amount coming from the EU.

In April 2001, Latvia announced a tender for licenses to search, explore, and develop oil deposits in the Latvian territorial waters in the Baltic Sea. The Latvian Development Agency claimed that the licenses covered fields possibly containing up to 733 million barrels of oil, although analysts have estimated the country's possible offshore oil reserves at 300 million barrels of crude oil. On October 31, 2001, the closing

date for bids for oil exploration, Latvia announced that one bidder, the U.S.-Norwegian joint venture TGS Nopec, had applied for a license. The non-exclusive exploration license, which will enable TGS Nopec to carry out exploration activities but not oil extraction, is for two years, although Latvia retained the right to extend the term of the license for up to five years.

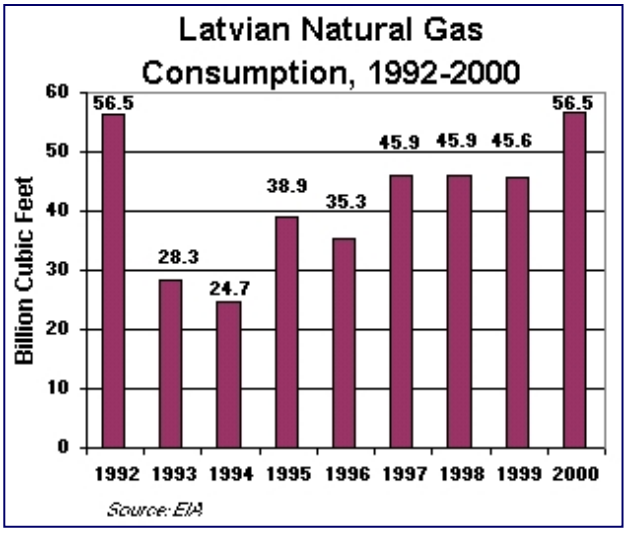
Bids for exploration and production licenses, which will grant exploration and production rights for up to 30 years, are due by January 25, 2002. Exploration and production in the tract covered by the tenders, which is close to Liepaja, had been delayed for several years due to Latvia's border dispute with Lithuania. In 1996, the Latvian Economics Ministry had issued oil licenses to Amoco (now BP Amoco) and OPAB (Sweden) to explore the Baltic shelf of the then-unidentified tract, but the deals were never signed after Lithuania vehemently protested and the border talks reached a deadlock. Latvian and Lithuanian officials initialed a border agreement in May 1999. Experts estimate that actual oil extraction in the tract will start only in five to six years after oil is found there.

Downstream/Refining

Although Latvia currently has no refineries, Russia's Lukoil has been considering building a small refinery in the country. After Lithuania decided to sell its Mazeikiai refinery--the only only refinery in the Baltics--to Williams International (USA) rather than to Lukoil, the Russian oil giant announced plans to build a $200-million, 40,000-bbl/d-capacity refinery in Latvia as an alternative refinery in the Baltics to compete with the Mazeikiai refinery. However, Lukoil has not set a timetable for when it might construct this refinery.

Natural Gas

Since Latvia has no domestic natural gas reserves, all of the country's natural gas for domestic consumption is imported, mainly from Russia. After fluctuating wildly in the first few years after independence, Latvia's domestic consumption of natural gas climbed to 56.5 Bcf in 2000, matching its 1992 total. Of this total, approximately 50% is consumed by the country's main electric utility, Latvenergo. Latvia's natural gas consumption is predicted to increase in the coming years as the country aligns its energy consumption patterns with EU directives.



Latvijas Gaze (Latvia Gas) controls the country's natural gas distribution system and its huge underground storage facility near Riga at Incukalns, the only natural gas storage facility in the Baltics and the third-largest storage facility in Europe. The former state-owned company has been restructured as a joint-stock company and has been substantially privatized, with the state holdings in the company reduced to just 8% after another 2% of the government's share was auctioned off in December 2000. Latvijas Gaze's largest shareholders are Gazprom, Germany's Ruhrgas and Eon Energie AG, and Itera Latvija, a subsidiary of Itera.

With a number of large storage facilities that can hold more than 70 Bcf of natural gas, Latvia has the potential to play an important role in Russia's bid to supply natural gas to Scandinavia via the proposed North TransGas pipeline. Latvijas Gaze typically pumps natural gas into the 141 Bcf-capacity Incukalns storage facility during the spring and summer, drawing it down as needed during heating season in the winter. Latvia has a number of other large natural gas storage facilities, and Gazprom exports a portion of

the natural gas stored in these facilities to Estonian, Lithuanian, and Russian consumers, while Latvijas Gaze is charged for the natural gas which is distributed within Latvia. An additional 7 Bcf of natural gas was pumped into Incukalns in the fall of 2001 as part of a project to increase the reservoir's storage capacity to 177 Bcf by 2005.

In late-October 2001, the Latvian Cabinet of Ministers approved a concept to liberalize the country's national gas market gradually in line with EU requirements (Latvia has concluded the energy chapter of its accession negotiations with the EU). Drafted by the Latvian Economics Ministry, the concept envisages market prices and promises to open up the market to multiple suppliers; currently, Gazprom is Latvia's only natural gas supplier. The Ministry's plan stipulates that Latvia's energy law should be amended by April 2002 in order to meet the EU directives concerning gas market liberalization. The EU has conceded that Latvia's lack of alternative pipeline routes make it impossible for the country to immediately open up its natural gas market to non-Russian suppliers.

Previously, in May 2001, the Latvian government had rejected amendments to the country's energy law, proposed by Latvijas Gaze's shareholders, that would have stopped natural gas price regulation for industrial consumers. In early October 2001, Latvijas Gaze took the Latvian government to the international court of arbitration over the state's failure to liberate natural gas prices for industrial consumers. Latvijas Gaze claimed that it was unable to recoup its rising production costs without instituting a price increase.

Coal/Peat

Latvia has no domestic coal reserves or coal production. The country imports a small amount of coal, mostly from Poland. Consumption has been on the decline since independence: in 1992, Latvia consumed 0.74 Mmst of coal, but by 2000, that figure had fallen to 0.15 Mmst. The drop reflects Latvia's attempt to shift its energy balance towards cleaner fuels in line with EU environmental standards.

Latvia produces about 500,000 metric tons of peat each year, as well as a substantial amount of wood for fuel. All peat production companies in Latvia have been privatized, but most of the peat deposits are still owned by municipal governments, which rent the deposits for extraction. There are now approximately 25 peat extraction companies. Peat covers approximately 10% of Latvia's territory, with the heaviest concentration in the eastern plains near Riga.

Electricity

Hydroelectricity plays a key role in the Latvian power sector. Nearly 73% of the country's 2.1 GW power-generating capacity is hydroelectric, and hydropower accounted for about 67% of all power produced in 2000, with the remainder generated by thermal plants using natural gas and, to a lesser extent, peat and fuel oil. The three hydro plants, Kegums-Plavinas-Riga, constitute the Daugava cascade located on the Daugava River. All three hydro plants have recently been modernized, with the Kegums hydropower station, built in 1939, officially re-opened in August 2001 after $21 million worth of renovation to extend its service life for another 40 years.

Hydroelectric power plants on the Daugava River are Latvia's main power producers, but their output, along with the TEC-1 and TEC-2 power plants that constitute 97% of Latvia's thermal power-generating capacity, is insufficient to cover the country's power needs. In 2000, Latvia produced 3.3 Bkwh of power domestically, but imported power was necessary to meet the country's electricity demand of 5.2 Bkwh, which was down nearly 31% from the 7.5 Bkwh Latvia consumed in 1992.

With the fluctuations in water levels affecting the output of its hydropower plants, at times Latvia has been forced to import between 30% and 40% of its electricity. According to Latvenergo, the country's state-run electric utility, in the first nine months of 2001 Latvia's electricity consumption grew 2.5% over the same period in 2000, with Latvenergo importing 24% of the total power consumed. Latvia regularly imports electricity from Estonia and Lithuania, both of which have excess capacity. The agreement between Latvia, Lithuania, Estonia, Russia, and Belarus to connect their electricity grids and to share power supplies when needed will give Latvia access to additional electricity imports.

Latvenergo, the country's largest company and the operator of all of Latvia's major hydro and thermal power plants, as well as the transmission and distribution system, was scheduled to be privatized in 2000, but public opposition to foreign ownership forced the Saeima (the Latvian parliament) to amend the country's energy law to prevent the company's privatization. Prime Minister Andris Berzins, who took office in May 2000 promising to speed up privatization, was dealt a major rebuke by the canceled privatization as the World Bank had made restructuring and privatizing Latvenergo by December 2001 one of the conditions for a 3-year, $120 million loan package signed in March 2000.

In October 2000, however, the Latvian government accepted a plan for the utility's reorganization. The reorganization, which will be guided by the EU directive with regard to energy market liberalization, is geared to prepare the utility for free market conditions. The EU directive demands that production, transmission, and distribution of power be separated at least as far as necessary to review their accounting reports and operations as individually and transparently as if they were completely independent companies. Large, so-called "qualified" electric power consumers already can choose alternative suppliers, and actual liberalization of Latvia's electric power market could take place by 2007, according to Latvenergo President Karlis Mikelsons.

Some Latvian privatization officials have warned that Latvenergo's energy distribution system may deteriorate unless there is a new influx of investment. In September 2000, Berzins announced that Latvenergo will increase its energy tariffs by an average of 9% annually over the next 10 years in order to finance renovations and repairs to its electric power generation and distribution system.

LITHUANIA

In March 1990, Lithuania became the first country to declare its independence from the Soviet Union. Since that time, the country has made efforts to reorient itself towards the West, applying for membership in the EU and NATO and taking steps to integrate its economy with Europe. The transition to a market-oriented democracy has proceeded relatively smoothly, although the repercussions of a controversial oil industry privatization in 1999 continue to be felt in the political sphere, with several changes in government in the past two years. In December 1999, Lithuania was invited to begin EU accession talks, and as Lithuania continues to fulfill membership requirements, the country is expected to become a member of the EU later in this decade.

Relations with Russia still affect much of Lithuania's activities

and, like Estonia and Latvia, the country remains heavily reliant on Russia for oil and gas supplies. In addition, as the Baltic state that has conducted the most trade with Russia, Lithuania faced its own economic and financial crisis in 1999 after the government's inadequate response to Russia's August 1998 financial crisis. Lithuania's economic recovery has been slow. Although the country climbed out of recession in 2000 with real GDP growth of 3.9%, the unemployment rate (11.5% in 2000) was at its highest point since independence. The unemployment rate is projected to increase to 12.7% for 2001, but inflation has remained low and economic growth is expected to accelerate to 4.6% for the year.

Oil

Lithuania has 12 million barrels of proven reserves, but the country's estimated total onshore oil resources amount to 337 million barrels, with reserves in the Lithuanian shelf of the Baltic Sea estimated between 220 million and 440 million barrels. Geonafta, Lithuania's oil exploration company, and several joint ventures are undertaking onshore drilling projects in western Lithuania. Minijos Nafta, the country's biggest oil producer, produced approximately 60% of the country's oil in 2000, when Lithuania's overall oil production increased to 6,000 bbl/d at 10 oil fields. Lithuania's oil production is projected to decline slightly in 2001, to 4,500 bbl/d, but with an average rate of 66,000 bbl/d of consumption, the country remains a net oil importer. Russia is Lithuania's main supplier of crude oil.

After winning its independence from the Soviet Union, Lithuania reorganized and unified much of its oil industry, creating Mazeikiu Nafta by merging the Lithuania's only refinery (the 263,000-bbl/d-capacity Mazeikiai refinery), Butinge Nafta (which operates a new oil terminal at Butinge that is connected by pipeline to the Mazeikiai refinery), and Naftotiekis of Birzu (which operates the Birzu oil pipeline bringing Russian crude oil into Lithuania via the Russian Druzhba pipeline). The unified company accounts for between 5% and 10% of the country's nominal GDP.

In October 1999, Lithuania concluded a controversial $150 million agreement to sell Williams International (USA) a 33% stake in Mazeikiu Naftu. The deal gave Williams, which committed another $650 million in investment and modernization, operational control of the refinery, pipeline and crude terminal, as well as the right to buy a majority stake within five years. In addition, the Lithuanian government promised to cover a $350 million capital deficit that the company had incurred. The deal also included provisions allowing a 10% stake to be transferred to financial institutions such as the European Bank for Reconstruction and Development (EBRD) and 10% to oil suppliers.

In addition to opposition from Lithuania's citizens, who were upset at the terms of the sale, Russian oil giant Lukoil was dismayed to be shut out of the partial privatization. Lukoil, the coordinator of Russian oil exports to Lithuania, had offered the Lithuanian government guarantees for an annual supply of 120,000 bbl/d of oil, provided that it be given an equal opportunity to participate in the privatization of the Mazeikiai refinery. When Lithuania's government expressed its preference to sell to Williams, Lukoil immediately began reducing oil supplies to the refinery.

Downstream/Refining

As a result, oil supply problems caused several shutdowns of the Mazeikiai refinery in 2000-2001, and Mazeikiu Nafta suffered $40 million in losses in 1999. In May 2000, Williams and Lukoil reached a tentative oil supply agreement, but the deal fell through. In 2000, the Mazeikiai refinery processed 98,000 bbl/d of oil, which was a 7% increase over 1999, but still far below the refinery's 263,000-bb/d capacity. Mazeikiu Nafta and Karazhbasmunai (Kazakhstan) had signed a 3-year oil supply deal in July 2000, with

supplies to Lithuania to reach as high as 60,000 bbl/d, but the lack of of an agreement with Russia regarding transportation tariffs has kept the agreement from being implemented.

The continued shortage of crude supplies left Mazeikiu Nafta with another $45 million in losses in 2000, and $18 million in losses in the first quarter of 2001 alone had the company facing possible bankruptcy. In June 2001, however, Williams reached an oil supply deal with Yukos, Russia's second-largest oil company, that should help the refinery overcome its supply problems. According to the 10-year agreement, which Lithuania's parliament ratified in August 2001, Yukos, already the refinery and oil terminal's biggest supplier, will guarantee to supply almost 100,000 bbl/d each year to the refinery, plus an additional 80,000 bbl/d per year for export through the Butinge terminal owned by Mazeikiu Nafta.

In exchange, Yukos received the right to buy 26.9% of Mazeikiu Nafta, becoming an equal partner with Williams, whose stake in the company decreased to 26.9% while the Lithuanian government's stake in Mazeikiu Nafta decreased from 59% to 40.6%. Williams retains management control of the company. Yukos, which provided over 38% of the refinery's supplies in 2000, began providing approximately 72,000 bbl/d to the refinery starting in July 2001. The refinery has a target figure to process 7 million tons of oil (140,500 bbl/d) in 2001, and through the first nine months of the year, Mazeikiai had refined 5.07 million tons of oil (135,757 bbl/d), an increase of 35% over the same time period in 2000.

In March 2000, Mazeikiu Nafta announced that it planned to borrow around $150 million for a modernization project in the Mazeikiai oil refinery. According to the plan, the first stage of the refinery's modernization will cost an estimated $400 million and take four years to implement. The EBRD has expressed its interest in participating in the refinery's modernization since Williams bought its stake in Mazeikiu Nafta in 1999.

Natural Gas

Lithuania has minimal natural gas reserves and no natural gas production, making the country completely reliant on imports. Lithuania consumed 91.8 Bcf of natural gas in 1999, which is 35% less than the country consumed in 1992 just after its independence. In December 1999, Lietuvos Dujos (Lithuanian Gas), the state-owned company that controls Lithuania's natural gas transmission, distribution, and export operations, signed a long-term agreement with Russia's Gazprom, starting with 53 Bcf in 2000 and increasing to 88 Bcf in 2005.

Itera also has begun supplying the Lithuanian market with Russian natural gas, and in line with the Lithuania's national energy strategy to diversify its supply sources, Lithuania is looking to Poland to supply it with Norwegian natural gas. Poland, which recently signed a 6-year, $11-billion deal to import a total of 2.6 Tcf of natural gas from Norway, hopes to build another part of a natural gas pipeline from Gdansk to Lithuania by 2004.

In October 2001, the Lithuanian government made a final decision on the privatization plan for Lietuvos Dujos. The plan calls for selling a 34% stake to a Western strategic investor and a 34% stake to a Russian gas supplier and its partners in Lithuania. The Western strategic investor, which will receive management control of the company, will be required to upgrade the gas distribution network, to ensure alternative natural gas supply sources, and to integrate the network with Western Europe (since Lithuania currently has no alternative to Russia for its natural gas supplies). The Lithuanian government, which currently owns 92.4% of Lietuvos Dujos, will hold on to a 24% share and sell it later on the stock exchange.

The Lithuanian government attempted to privatize Lietuvos Dujos in 1997, but the privatization failed because the company was not restructured first. In May 2000, the Lithuanian Cabinet of Ministers passed regulations for re-organization of the company, and in early 2001 the government approved privatization of Lietuvos Dujos. However, the privatization is already nine months behind schedule, and delays in reforming the country's natural sector caused have concerned the World Bank, which in June 2001 postponed the extension of a $50-million loan, the second tranche of its $100 million structural adjustment loan. Gazprom, Itera, and Williams International have all expressed interest in bidding in the privatization tender.

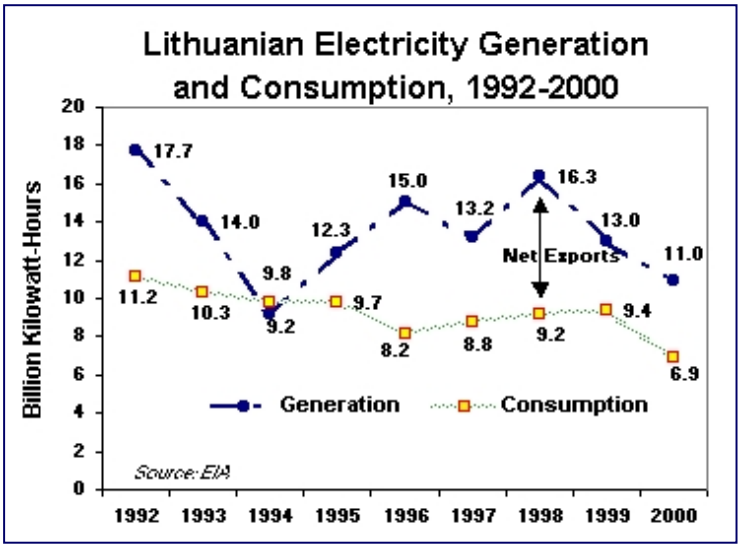
Coal

Lithuania produces no coal. Small amounts of coal are imported by Lietuvos Kuras, a joint-stock company that operates Lithuania's service stations. In 2000, Lithuania consumed 0.18 Mmst of coal, down 75% from its consumption level of 0.73 Mmst in 1992.

Electricity

With a generation capacity of 5.8 GW, Lithuania's power sector generates substantially more electricity than the country consumes domestically. In 2000, Lithuania produced 11.0 Bkwh of electricity compared to 6.9 Bkwh of domestic electricity consumption. In 1994, however, Lithuania actually consumed more electricity (9.8 Bkwh) than it produced (9.2 Bkwh), owing to a substantial decrease in electricity generation in the first few years after Lithuania's independence from the Soviet Union. In the past seven years, the country's electricity generation has rebounded and has outpaced domestic consumption, leaving Lithuania with excess power to export to neighboring countries.

Lietuvos Energija (Lithuanian Energy), a joint-stock company formed by the reorganization of the Lithuanian state power system in 1995, is the largest electric power company in Lithuania. Lithuania holds an 86.5% share in the company, with Vattenfall, a Swedish utility, owning an additional 10.1%. Besides transmitting and distributing all electricity generated in Lithuania, Lietuvos Energija owns the Ignalina Nuclear Power Plant, which generated over 70% of the country's electricity in 2000, as well as all major conventional fuel power plants in Lithuania, including Elektrenai, Kruonis Hydro Power Plant, Kaunas Hydro Power Storage Plant, and Mazeikiai Combined Heat and Power Plant. In 1998, the Vilnius Power Station became independent of Lietuvos Energija.



In August 1999, Lithuania's Ministry of Economy and the Lietuvos Energija Board of Directors approved the main guidelines for the restructuring of the company. Additionally, in January 2001, the Lithuanian parliament passed a law on the company's restructuring, paving the way for privatization of Lithuania's electricity industry. According to the restructuring plan, which the company has approved, Lietuvos Energija is to be split into five companies, including separate generation, transmission and distribution companies. No privatization timetable has been set for the soon-to-be-created companies, but Vattenfall previously confirmed its intention to increase its share in Lietuvos Energija, and several companies have expressed an interest in Lietuvos Energija's distribution network.

Nuclear

Lithuania is more dependent on nuclear power than any other country in the world. Nearly 73% of all of Lithuania's electricity is generated by the country's sole nuclear power plant, the massive, 2,370-MW Ignalina Nuclear Power Plant. However, the EU has expressed safety concerns over the Ignalina station, which is of the same Soviet-era design as Ukraine's ill-fated Chornobyl Nuclear Power Plant. Despite a number of safety measures introduced at Ignalina over the past decade, the EU considers the plant's two power units to be dangerous, and as a result the EU has made closure of the Ignalina plant a pre-condition for Lithuanian membership in that organization.

In exchange for the right to begin EU membership negotiations, in 1999 Lithuania's parliament pledged to take Ignalina-1 out of operation by January 1, 2005, while a decommissioning date for the second reactor is still undecided. Lithuania had planned to decide the fate of Ignalina-2 in 2004, but the EU has insisted that a decision on its closure should be made in 2002. The EU previously has tried to convince Lithuania to shut down the second reactor before 2009.

To facilitate the closure and to develop alternative sources of power, the EU announced at the end of 1999 that it would provide additional aid to Lithuania through its Phare program. In June 2000, representatives from countries around the world pledged nearly $195 million to help Lithuania shut Ignalina-1. However, preliminary estimates for shutting down only the first reactor block come to $530 million, while about $1 billion will be needed for the closure of the second reactor block. According to Lithuanian energy officials, the country also needs $910 million to modernize its non-nuclear power plants and transmission lines to ensure generation after Ignalina-1 is closed.

The most critical project is modernization of the 1,800-MW combined heat and power Lithuanian Power Plant (LPP). The LPP, which can run on both oil and gas, was built between 1962 and 1972 and operated at full capacity until 1992. Although the LPP has used over 80% of its technical lifetime, a Lithuanian government study has shown that it is less costly to modernize the plant than to build a modern plant of similar size. Once Ignalina shuts down, the LPP will be the country's primary source of power generation. Between 2001 and 2005, $13 million will be needed to renovate the LPP, with a further $264 million needed between 2006 and 2010.

A second project is renovation of the Kaunas combined heat and power plant, a 170 MW unit built in 1960 that also runs on gas or oil. Modernization is estimated to cost $13.2 million between 2001 and 2004, and Lithuanian officials hope to increase the plant's capacity by 100 MW when Ignalina-2 is closed. Another $331 million will be needed for modernizing Lithuania's transmission grid, a two-stage project planned for 2001-2005 and 2006-2010. About a quarter of the grid's substations have been operating for more than 30 years, and a significant amount of the equipment is obsolete.

BELARUS

Unlike the Baltic countries, Belarus has been reluctant to adopt structural and political reforms since becoming independent from the Soviet Union in 1991. After winning election to the presidency in 1994, Alyaksandr Lukashenko re-imposed administrative controls over prices and currency exchange rates, and expanded the state's right to intervene in the management of private enterprise. As a result, Belarus has seen little structural reform over the last seven years, and the International Monetary Fund (IMF) stopped lending to Belarus in 1996.

President Lukashenko's authoritarian policies and refusal to liberalize the economy have led to the country's isolation from the West. Only a few small businesses have been privatized, and there is little foreign investment in any sector of the Belarus economy because of the poor investment climate, as well as the very high rate of inflation (which slowed from 251% in 1999 to 107% in 2000). Nevertheless, Belarus has maintained a very close relationship with Russia, and boosted by Russian imports, the country's real GDP recovered from the effects of the 1998 Russian financial crisis to post 5.8% growth in 2000. On September 9, 2001, Lukashenko was re-elected president with a reported 75% of the popular vote.

Oil

Belarus has a small oil industry, and the country produced 37,000 bbl/d of oil in 2000. The country has 198 million barrels of oil in proven reserves, but the lack of political and economic reform in the past decade has hindered any investment to boost production. Belarusnafta, the state-owned oil production monopoly, estimates that active oil deposits may last for another 17 years, with more difficult deposits (e.g. those with a water content of over 80% or with high viscosity) lasting for 34 years, taking into account the company's plan for oil extraction will remain around 40,000 bbld/d.

Although oil consumption in Belarus has fallen by more than half in the past decade, from 375,000 bbl/d in 1992 to approximately 145,000 bbl/d in 2000, Belarus still must import nearly 80% of its oil. Most of this comes from Russia, as the northern branch of Russia's 1-million-bb/d-capacity Druzhba oil export pipeline runs through Belarus on its way to the oil terminal in Ventspils, as well as to Poland and Germany. Oil exported from Russia via Belarus (approximately 50% of Russia's net oil exports go through Belarus) is not subject to export duties due to the Russian-Belarussian Union agreement, which, along with high oil prices in 1999 and 2000, contributed to a significant increase in the amount of oil flowing through the pipeline and to Belarussian refineries.

Belarus also has been granted licenses for oil exploration and production in Russia. Belarus and Russia already jointly own the Slavneft oil company, and the two governments have signed agreements allowing Belarus to produce oil in several autonomous regions in Russia. In September 2001, Slavneft and Belneftekhim, the Belarussian state-run oil and chemical concern, founded the Slavic Oil Company, and Slavneft immediately reassigned its license to produce oil in the Taidakovskoye oil field in Western Siberia to Slavic Oil. The Taidakovskoye field in the Khanty-Mansi Autonomous Area is estimated to contain 454 million barrels of oil reserves. The oil produced is to be delivered to Belarussian refineries, with the

processed products to be sold both in and outside of Belarus.

Downstream/Refining

As one of the former Soviet Union's major industrial republics, Belarus specialized in the production of machinery and equipment, and the country's industrial base, as well as its location as a transit point, meant that it inherited a sizable refining industry. Although some excess capacity has been shuttered, Belarus has two refineries, the Naftan refinery in Navapolatsk Vitsebsk Region and the Mazyr refinery in the Homel Region, with a combined refining capacity of 493,000 bbl/d--still far higher than the country's oil production and its consumption needs. In addition, despite increased Russian oil exports, Belarussian refineries received reduced supplies from Russia during much of 2000 and 2001 as Russian exporters shipped their oil to Western customers able to pay market prices.

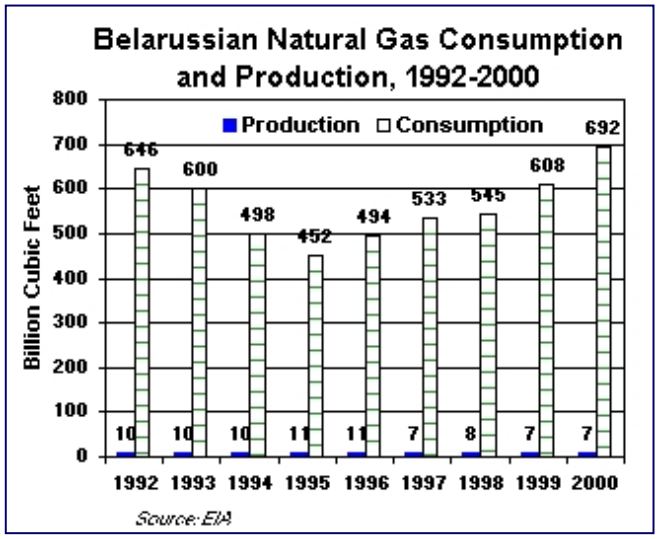
In September 2000, the Mazyr refinery's management completed an agreement with the Belarussian government to carry out the fourth stage of modernization at the refinery. According to Belapan, the Belarussian state news service, once the upgraded Mazyr refinery is completed in November 2003, it will become one of the most modern oil-processing plants in the CIS. Over $28 million was invested in the modernization of the refinery, with the total cost of the project estimated at $120 million. The Naftan refinery also is scheduled for modernization after signing a $90-million framework contract with Mitsui (Japan).

Natural Gas

Belarus is heavily reliant on natural gas imports from Russia. Belarus produced only 7 Bcf of natural gas in 2000 while the country's natural gas consumption, buoyed by a return to economic growth, rose to 692 Bcf. Due to Belarus's inadequate natural gas pricing structure and payment recovery from consumers, the country has built up large arrears to Russia's Gazprom. In April 2001, Gazprom and Beltransgaz, the Belarussian state-run gas distributor, signed an agreement on restructuring debt for the natural gas supplied to Belarus over 1997-1999.

Under the agreement, $40 million of Beltransgaz's direct indebtedness and $37.2 million of overdue-payment will be paid off over three years by supplying Belarussian tractors and Beltransgaz bills of exchange. Since the agreement, Belarus has paid Gazprom on time, leaving Belarus's total debt to Russia for natural gas at $183 million as of September 2001. Despite Belarus's debts to Russia for natural gas supplies, Gazprom has continued to supply Belarus with natural gas at the low price of $30 per 1,000 cubic meters in 2001.

Russia charges Belarus lower prices for natural gas since Russia receives reduced tariff rates for its natural gas that transits Belarus to customers in Western Europe. Beltransgaz, which operates 3,780 miles of natural gas pipelines in Belarus, charges Russia a transit tariff that is approximately one-third of the tariff in other countries. More than 883 Bcf of Russian natural gas transited Belarus via the Northern Lights and Yamal-Europe I pipelines to customers in Western Europe in 2000, and with the second extension of the Yamal-Europe I pipeline beginning operation earlier in 2001, Belarussian gas transit volumes for 2001 are estimated to exceed 1 Tcf.



Beltransgaz has said that the Belarussian natural gas transportation system is developing so that when the third extension of the Yamal-Europe I gas pipeline becomes operational, and new compressor stations are built, the pipeline's capacity will more than double. Construction of the Krupskaya compressor stations has already begun, and the Minsk and Orsha stations will be built within the next two to three years. By 2005, analysts say, natural gas transit to Europe via the transcontinental Yamal pipeline alone may exceed 1 Tcf.

Additionally, Gazprom announced plans in October 2000 plans to construct a new natural gas export pipeline, the Yamal-Europe II, that would run via Belarus. Gazprom's proposed route for the pipeline would link to the existing Northern Lights pipeline in Belarus and divert natural gas from crossing Ukrainian territory en route to Poland and Slovakia. Ukraine, which transits significant amounts of Russian natural gas to customers in Europe, has been accused of illegally taking Russian natural gas destined for other customers. Russian and Belarussian authorities have stated that the new pipeline will not lower the volume of natural gas pumped via Ukraine, but Poland has not yet agreed to the pipeline route, which would also lower Poland's transit fees fees. The cost of the Belarussian section of the proposed pipeline is put at approximately $70 million.

Coal

Belarus has no coal reserves, nor any coal production. The country consumed 2.05 Mmst of coal in 1992, but since the fall of the Soviet Union, coal imports have dwindled, and in 2000 Belarus imported only 0.66 Mmst of coal for domestic consumption.

Electricity

Belarus has a power-generating capacity of 7.5 GW. Oil- and natural gas-fired power plants make up 99.9% of Belarus's power generation, with hydroelectric accounting for just 0.1%. Both electricity consumption and generation have declined in the decade since independence, but the country's decaying infrastructure and a lack of investment in maintenance and upgrades has resulted in power generation slipping faster than consumption, leaving Belarus a net importer of electricity. In 2000, the country produced 24.7 Bkwh of power but consumed 26.8 Bkwh.

The Belarussian government has attempted to reduce consumption further by implementing incremental price increases, but fears of accelerating inflation have slowed the implementation of tariff reform to cover the costs of power generation, and price rises have been consistently outstripped by inflation. As a result, the

country's electricity consumption still exceeds its production, forcing Belarus to import about 20% of its consumption needs. As of September 2001, Belarus's debt for imported electricity stood at $69 million, including $19.4 million owed to Russia and $49.6 million owed to Lithuania.

With Lithuania periodically suspending electricity supplies to Belarus in order to force debt payment, Belarus has turned to Russia as its main source for its power imports. In 2000, Belarus consumed approximately 33 Bkwh, of which 7 Bkwh was imported from Russia. In the first nine months of 2001, Belenerha, the state-owned energy utility, imported 4.8 Bkwh of Russian electricity, with an additional 0.7 Bkwh of power imported from Lithuania. In October 2001, Russia's electricity monopoly, Unified Energy Systems (UES), and Belenerha signed an agreement by which UES will supply Belarus with up to 5.5 Bkwh of electricity in 2002.

Table 1. Economic and Demographic Indicators for Selected Baltic Sea Region Countries

Country	Gross Domestic Product (Nominal GDP), 2000E (Billions of U.S. $)	Real GDP Growth Rate, 2000 Estimate	Real GDP Growth Rate, 2001 Projection	Per Capita GDP, 2000E	Population 2000E (Millions)
Estonia	$5.0	6.9%	4.8%	$3,515	1.4
Latvia	$7.1	6.6%	6.5%	$3,017	2.4
Lithuania	$11.3	3.9%	4.6%	$3,064	3.7
Total/weighted average	$23.4	5.3%	5.2%	$3,120	7.5

Source: WEFA

Table 2. Energy Consumption and Carbon Dioxide Emissions in Selected Baltic Sea Region Countries, 1999

Country	Total Energy Consumption (Quadrillion Btu)	Petro-leum	Natural Gas	Coal	Nuclear	Hydro-electric	Other Electricity	Net Electricity Imports	Carbon Dioxide Emissions (Million metric tons of carbon)

Estonia	0.10	52.9%	33.9%	17.3%	0%	0.1%	0.2%	-4.3%	2.1
Latvia	0.16	46.4%	29.5%	1.8%	0%	18.3%	0%	4.0%	2.2
Lithuania	0.32	49.5%	23.7%	1.7%	32.7%	1.5%	0%	-9.0%	4.4
Total/ weighted average	0.58	49.2%	27.1%	4.4%	18%	5.9%	0.03%	-4.6%	8.7

Source: Energy Information Administration
Note: percentages may not add up to 100% due to rounding.

Table 3. Energy Supply Indicators, Selected Baltic Sea Region Countries

Country	Proven Crude Oil Reserves, 1/1/01 (Million Barrels)	Natural Gas Reserves, 1/1/01 (Trillion Cubic Feet)	Coal Reserves, 1/1/01 (Million Short Tons)	Petroleum Production, 2000 (Thousand Barrels Per Day)	Natural Gas Production, 2000 (Billion Cubic Feet)	Coal Production, 2000 (Million Short Tons)	Electric Generating Capacity, 2000 (Gigawatts)	Crude Oil Refining Capacity, 1/1/01 (Thousand Barrels Per Day)
Estonia	4 million mt of oil shale	none	none	4.4 (oil shale)	none	none	3.4	none
Latvia	minimal	minimal	none	none	none	none	2.1	none
Lithuania	12	minimal	none	6.0	none	none	5.8	263
Total	12+oil shale	minimal	none	10.4	none	none	11.3	263

Source: Energy Information Administration

Sources for this report include: Agence France Presse, Baltic News Service, The Baltic Times, BBC Former Soviet Union Monitoring Unit, CIA World Factbook, U.S. Department of Commerce's Central and Eastern Europe Business Information Center, Deutsche Presse-Agentur, Dow Jones, U.S. Deparment of Energy, U.S. Energy Information Administration, Environment News Service, Estonian News Agency, The Financial Times, FSU Oil and Gas Monitor, Interfax News Agency, ITAR-TASS, Nefte Compass, PAP Polish Press Agency, PlanEcon, PR Newswire, Radio Free Europe/Radio Liberty, Reuters, RosBusinessConsulting Database, Russian Business Monitor, Russian Economic News, Russian Oil and Gas Report, U.S. Department of State, The St. Petersburg Times, WEFA Eurasian Economic Outlook, and World Markets Online.

LINKS

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August 2002

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Ukraine

Ukraine is important to world energy markets because it is a critical transit center for exports of Russian oil and natural gas to Europe, as well as a major energy producer and consumer in its own right.

Information contained in this report is the best available as of August 2002 and is subject to change.

GENERAL BACKGROUND

Following eight consecutive years of recession, Ukraine experienced its second straight year of economic growth in 2001. Fueled by increases in industrial production and a strong harvest, Ukraine's real gross domestic product rose an impressive 8.9% in 2001, improving on the 5.8% GDP expansion in 2000. Although growth has slowed somewhat in 2002, analysts are still projecting Ukraine's economy to increase by 5.6% overall this year.

Although Ukraine has witnessed a substantial cooling of inflation (6% in 2001, down from 25.8% in 2000) and there has been a marked drop in unemployment, in many ways Ukraine remains mired in the transition from a centrally-planned economic system to a market economy. While the country's recent economic gains appear to signal that Ukraine has turned the corner, the government remains burdened by a 12 billion foreign debt that is continuing to increase.

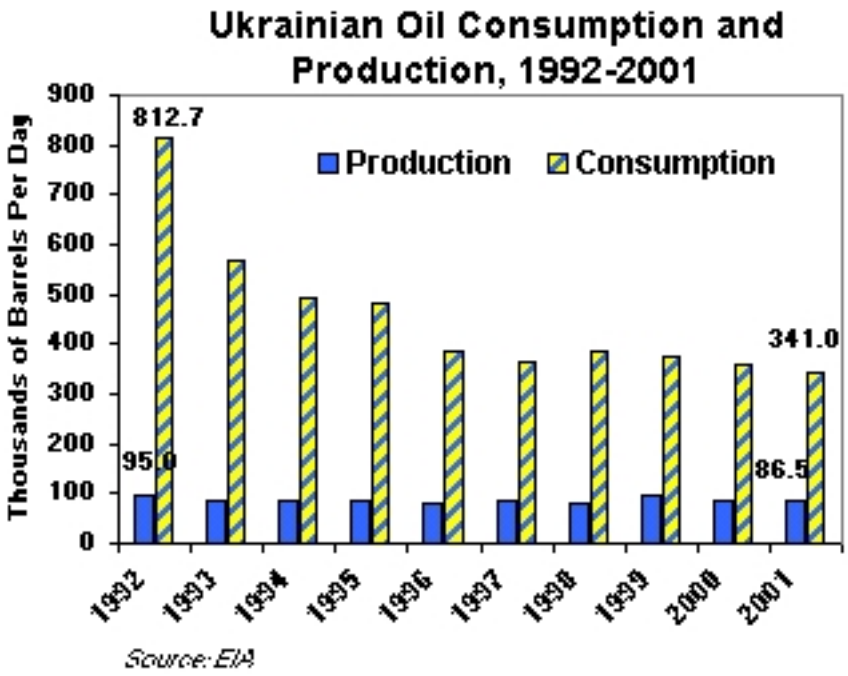
In addition, the confusing web of tax requirements and excessive state interference in the private sector has contributed to a poor investment climate, and the pace of reforms has slowed considerably since Victor Yushchenko was ousted as Prime Minister in April 2001. Yushchenko, a former chairman of the National Bank of Ukraine, pushed through a number of economic reforms during his time in office before he lost a parliamentary vote of no-confidence in Ukraine's parliament, the Verkhovna Rada.

Under the leadership of Anatoly Kinakh, who was installed as Prime Minister by Ukrainian President Leonid Kuchma in May 2001, the Ukrainian government pushed through tax and land reforms in the fall of 2001, but the reform process slowed in the run-up to parliamentary elections on March 31, 2001. Energy sector reforms are still needed, although the Ukrainian government has taken a number of halting steps forward in 2002. Still, Ukraine's energy sector is riddled with debt, and its energy sector suffers from outdated equipment and a lack of funds for modernization. In addition, Ukraine's lack of domestic natural resources means that the country is heavily dependent on Russia for energy supplies, making good relations with its eastern neighbor a necessity.

OIL

Ukraine has 395 million barrels of proven oil reserves, the majority of which are located in the Dnieper-Donetsk basin in the eastern part of the country. Although the pace of exploration has picked up, particularly in Ukraine's sector of the Sea of Azov, Ukraine's oil production steadily declined in the years following the country's independence, from 95,000 bbl/d in 1992 to 82,000 bbl/d in 1998. With the rise in world oil prices in 1999, Ukraine's oil output shot up to 98,500 bbl/d before tailing off again to 88,300 bbl/d in 2000. In 2001, Ukraine produced 86,500 bbl/d of oil, and Naftohaz Ukrainy, the country's state-owned umbrella oil and gas company, reported that oil production is down 0.7% through the first quarter of 2002.

Ukraine's oil production volumes satisfy only about 25% of the country's domestic needs, making Ukraine highly dependent on foreign oil supplies. Although Ukraine's oil consumption has dried up dramatically since it began the transition to a market economy--decreasing 58%, from 813,000 bbl/d in 1992 to 341,000 bbl/d in 2001--the country's consumption still far outstrips its production capacity. Ukraine imports the majority of its oil from Russia, with lesser amounts coming from Kazakhstan.



Oil Transit

With a highly developed oil pipeline system, Ukraine plays an important role as a transit country for Russian oil exports to Europe. The southern branch of the 1.2-million-bbl/d Druzhba pipeline from Russia transits Ukraine en route to Slovakia, Hungary, and on to western Europe.

In addition, due to its geographic location and its oil pipeline system, Ukraine has an excellent opportunity to play a major role in bringing increased oil exports from Azerbaijan and Kazakhstan to European oil markets. Rather than seeking to import Caspian Sea region oil for domestic consumption, Ukraine is hoping to reap tariffs for Caspian oil transiting its territory as it heads westwards.

The chief components of Ukraine's strategy are the newly constructed Pivdenny oil terminal and the 560,000-bbl/d Odesa-Brody pipeline, which cost a combined $750 million to build. Ukraine is hoping to entice Caspian oil exporters shipping oil via the Black Sea to bypass the crowded Bosporus Straits, already a major chokepoint for tankers, and instead send their oil to European markets via Ukraine. However, Ukraine has not yet found any oil companies to fill the pipeline, and the country's attempts to make itself more attractive to investors--by stepping up oil sector privatization efforts or by proposing that an international consortium to manage the pipeline--have seen only limited results thus far.

Refining/Downstream

Ukraine has six refineries, with a combined crude oil refining capacity of just over 1.1 million bbl/d. However, with domestic demand at just over 30% of the country's refining capacity, Ukraine's refineries are operating significantly below capacity. Until recently, Ukraine's refineries did not even receive enough crude oil supplies to supply the country's petroleum product demand.

Ukraine has begun to achieve better results in securing sufficient crude oil supplies for its refineries by offering oil exporters in Russia and Kazakhstan a stake in the country's refineries. Ukraine's recent success in privatizing its refineries has allowed the country to secure additional oil supplies to meet domestic demand, as well as to attract funds for necessary renovation work and to boost utilization rates at its refineries.

Although still operating far below its 320,000-bbl/d potential, throughput has increased at the Lisichansk (LiNOS) refinery since Russian oil major Tyumen Oil (TNK) purchased 67% of the refinery in July 2000. Likewise, with Lukoil's purchase of a controlling share in the Odesa refinery, the Russian oil company agreed to pay $39.6 million of the refinery's debts and promised to supply 48,000 bbl/d of crude to the refinery annually until 2004. Ukraine boosted its imports of petroleum products by 8% in the first quarter of 2002 while crude oil supplies to refineries declined, owing to increased exports of refined products from Russia.

NATURAL GAS

Ukraine has natural gas reserves of 39.6 trillion cubic feet (Tcf). The country's natural gas production, which stood at 636 billion cubic feet (Bcf) in 2000, has remained relatively flat since 1995. In the first five months of 2002, Ukraine produced 272.8 Bcf of natural gas, a 1% year-on-year increase. Of this total, Naftohaz Ukrainy, the country's state-owned natural gas company, extracted 262.2 Bcf, accounting for 96% of the country's total natural gas output.

According to Chornomornaftohaz, a division of Naftohaz Ukrainy, three new natural gas deposits have been found on the southern Sea of Azov shelf in the

last few years. As many as 13 natural gas and condensate and dry gas deposits with a combined 2.6 Tcf of possible reserves are on the shelf, but Ukraine's biggest natural gas deposits are already over 90% exhausted, and many of the country's recently developed natural gas deposits have been quite small. In June 2002, Chornomornaftohaz, which is developing four natural gas fields in the Black Sea, made a proposal to foreign investors to set up a $20 million joint venture to develop the Odesa natural gas field, which holds proven reserves of 389 Bcf.

Still, Ukraine's consumption of natural gas far exceeds the country's natural gas production. In 2000, Ukraine consumed 2.78 Tcf of natural gas, leaving the country dependent on imports for nearly 80% of its consumption needs. Traditionally, Russia has been Ukraine's major source of natural gas supplies, with Ukraine receiving up to 1.1 Tcf per year of Russian natural gas as payment for transiting Russian natural gas to European markets.

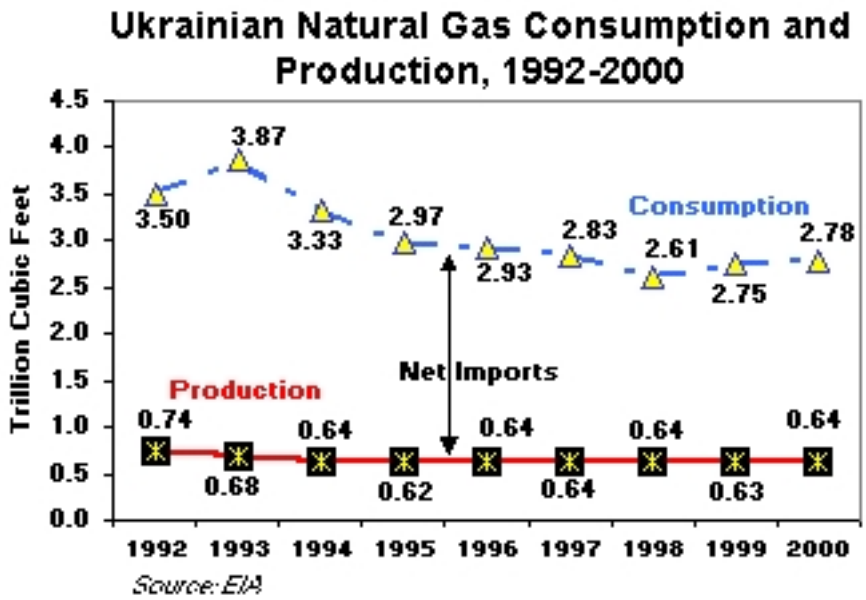
Due to Ukraine's deficiency of indigenous natural gas, Ukraine has been forced to buy additional natural gas from Russia beyond what it receives as compensation for transit. In 2002, for the first time, Ukraine received natural gas from Russia as payment for transit services, but did not buy any additional supplies. Instead, Ukraine imported natural gas from Turkmenistan in order to supplement its own domestic production.

Ukraine-Russia Natural Gas Accords

Ukraine has run up a substantial debt to Russia for natural gas already supplied. In addition, Russia accused Ukraine of illegally siphoning natural gas destined for European consumers between 1998 and 2000, leading to heightened tensions between the two countries and prompting Russia to pursue plans to build a "Ukraine bypass" natural gas pipeline to Europe. Nearly 90% of Russia's natural gas exports travel to Europe via Ukraine.

With Ukraine's continued illegal siphoning of Russian natural gas in early 2000, Russia clamped down, demanding Ukraine pay its nearly $2 billion natural gas debt and halt unauthorized Russian natural gas consumption. In

the fall of 2000, Russia offered to swap Ukraine's natural gas debt for equity in Ukraine's transit pipelines. However, Ukraine balked at the idea, and in May 2001 Ukraine reduced its dependence on Russian natural gas by contracting with Turkmenistan to receive 8.83 Tcf of natural gas between 2002 and 2006. The Turkmenistan deal will provide Ukraine with nearly 60% of its projected natural gas needs during that time period.



In December 2001, the sides broke the deadlock by coming to an initial agreement on Ukraine's debt for Russian natural gas supplies. Ukrainian and Russian negotiators agreed that Ukraine owes Russia $1.4 billion and that the sum will be paid over the next ten years, with no debt payments other than interest to be made in the first three years. In February 2002, the board of directors of Gazprom, the Russian natural gas monopoly, failed to address the issue of the proposed Ukrainian bypass pipeline, a move that analysts said signaled that the company did not have the financial wherewithal to undertake the project.

In June 2002, relations between Ukraine and Russia on the issue of natural gas transit warmed considerably as the sides agreed on a long-term transit agreement, as well as a preliminary deal to create an international consortium to manage and modernize Ukraine's natural gas transit pipeline system. The countries also signed a protocol to an earlier transit agreement, specifying that Ukraine would receive 918 Bcf of natural gas in 2003 as payment for transiting up to 4 Tcf of Russian natural gas to Europe, while Russia agreed to transit 1.06 Tcf of Turkmen natural gas for Ukrainian consumption. In addition, Ukraine agreed to allow Gazprom to operate Ukraine's underground

natural gas storage facilities until 2013.

Future Natural Gas Imports

According to a study by the Ukrainian National Academy of Science, Ukraine's natural gas consumption could double by 2030, while the country's natural gas production may only increase 33% over that time period. As a result, Naftohaz Ukrainy is considering alternative sources of natural gas, including Iran and Norway. However, Mikhail Derkach, deputy chief executive officer of Naftohaz Ukrainy, has stated that it is not beneficial to buy Norwegian natural gas through Poland because of the high cost.

With construction of a natural gas pipeline from Iran to Armenia under development, Ukraine believes that an Iran-Armenia-Georgia-Crimea pipeline is possible, linking the pipeline from Georgia across the Black Sea to Ukraine's Crimean port of Feodosia. Iran is looking to increase its natural gas imports to Europe, and Ukraine is interested in maintaining its position as the major transit point for natural gas to Europe. However, the distance and substantial projected cost of such a pipeline has inhibited the implementation of this plan.

Thus, according to Derkach, Ukraine's most realistic plan is to increase natural gas imports from Turkmenistan. Ukraine currently imports natural gas from Turkmenistan for $42 per 1,000 cubic meters (35,300 cubic feet), which Ukraine pays for 50% in cash and 50% through participation in construction and industrial projects in Turkmenistan. The May 2001 deal is contingent on Ukraine remaining current in its natural gas payments to Turkmenistan, but Ukraine still owes Turkmenistan approximately $280 million for natural gas supplied between 1993 and 1994. The two countries have agreed on a schedule of current debt payments of $46 million for natural gas supplies in 2002.

COAL

Ukraine has 37.6 billion short tons in proven coal reserves, accounting for over 60% of the former Soviet Union's total coal reserves. Most of Ukraine's

coal is mined in the Donetsk/Donbas basin in the eastern region of the country. In the mid-1990s, Ukraine's coal production dropped 43%, from 147.3 million short tons (Mmst) to 83.5 Mmst, before inching back up to 90.3 Mmst in 2000. Through the first five months of 2002, Ukraine produced 31.1 Mmst of coal, 0.4% less than in the same period of 2001.

The decline in Ukraine's coal production during the 1990s was caused in large part by the collapse of domestic demand--which, at 97.2 Mmst in 2000, still exceeds domestic supply--and the closing of heavy industry as Ukraine's economy contracted. Since Ukraine became independent in 1991, the country's coal sector has fallen into disarray: the industry, which counts 193 mines and employs around 450,000 people, suffers from labor strikes, hazardous working conditions, inefficiency and low productivity, corruption, consumer nonpayments, unpaid wages and huge debts, and outmoded equipment.

Ukraine's coal mining sector, which remains heavily subsidized by the Ukrainian government, has the world's highest death rate, mostly the result of obsolete equipment and low safety standards. On July 7, 2002, a fire at the Ukraina mine in eastern Ukraine killed 35 miners, the latest in a series of deadly accidents. Through the end of July 2002, over 150 miners had died in mining accidents in Ukraine this year, following nearly 300 deaths in 2001.

Meanwhile, the industry's debt level has risen to more than $2 billion--over 50% greater than the value of annual production and twice as much as its accounts receivable. Attempts to reform the sector began in 1996 but had little effect as the then-Ministry for Coal concentrated on barter deals, investments and subsidies while lobbying for a ban on coal imports. Although some reforms have begun to take root and wage arrears are beginning to be paid down, coal sector privatization has stalled, and a $300 million World Bank structural adjustment loan that was designed to close down more than 80 loss-making pits between 1997 and 2000 failed to close even half of those mines.

In September 2001, the Ukraine cabinet approved an $8.8 billion program to

revive the country's coal sector over the next ten years. The program recognizes that the industry must switch to cash payments, improve mines, budgeting and asset management, seek investment sources, and reduce the mines' high level of debts before proceeding with further privatization. The program also aims to improve mine safety and work practices, as well as providing for a reduction in the number of coal mines to 157 in 2010. About two-thirds of Ukraine's 193 mines are unprofitable.

The World Bank has criticized Ukraine's coal mining strategy, saying that it contains no major mechanisms that would reduce barter and that the plan closes too few mines too slowly. However, in February 2002, Viktor Yanukovich, the head of administration of the Donetsk coal mining region, described the World Bank's suggested plan to close 50 to 60 mines in the next two or three years as "unacceptable" because it would result in a considerable decrease of jobs in the region. Although Ukraine's mines are expensive to operate, the Ukrainian government has been reluctant to reduce the number of mines due to the social costs of closing so many pits in an area with few other jobs.

Instead, the Ukrainian government plans to hike coal prices for the country's power generators by 10% before the end of 2002 and reduce state subsidies for the sector. Coal prices are to be increased to approximately $28.20 per metric ton, up from the current $25.60 per metric ton. The price hike should help the coal sector raise an additional $165 million after the government cut state subsidies. The Ukrainian government originally planned to spend $324 million to subsidize the coal sector in 2002, but due to a financial crunch can provide only $159 million, according to analysts.

ELECTRICITY

Ukraine's power sector, with 53.9 gigawatts (GW) of installed capacity, is plagued by debt and inefficiency. Thermal power plants (oil natural gas, coal) account for nearly 50% of the power produced in Ukraine, with nuclear power generating another 40%, and hydroelectric accounting for approximately 10%.

With four major thermal-fired power plants with 17 power generators, as well as four nuclear power plants with 13 reactors, Ukraine has enough generating capacity to produce twice its electricity needs. However, due to the inefficient and antiquated transmission and distribution network that the country inherited from the Soviet Union, a significant amount of power generated in Ukraine is wasted via line losses. According to Ukraine's Fuel and Energy Ministry, losses in electricity lines accounted for 21% of the total amount of electricity generated in 2000. Overall, Ukraine produced 163.6 billion kilowatt-hours (Bkwh) of electricity in 2000 against consumption of 151.7 Bkwh.

In February 2001, Russia and Ukraine struck a deal to reconnect their energy grids, providing Ukraine with a more stable electric frequency and allowing Russia to export its electricity to other countries--including Moldova, Romania, Bulgaria, and the Balkans--via Ukraine. Although the grids were supposed to be reconnected on March 1, 2001, the grids were not actually linked until August 2001.

Until recently, Ukraine's power sector also was beset by shortages of fuel for power generators. Since natural gas accounts for over 40% of the primary fuel consumption of Ukrainian thermal power plants, the country's reliance on Russian natural gas affects Ukraine's electricity sector as well. In mid-January 2001, Itera cut off natural gas supplies to four Ukrainian thermal electric power generators in order to force payment of debts for natural gas already supplied. With the recent agreements between Russia and Ukraine on natural gas supplies and transit, as well as a plan for Ukraine to pay its natural gas debts, the problem of natural gas cutoffs to power generators appears be resolved.

Non-payment by consumers is another obstacle hindering the further development of Ukraine's power sector. Although Ukraine's 27 regional energy distributors--called *oblenerhos*--legally are allowed to cut off non-paying customers to reduce losses and enforce payment discipline, in practice

this often cannot be done without government permission. Nevertheless, owing to reforms in the sector and increased economic growth leading to a rise in per capita income, the percentage of power bills paid in cash has risen from below 10% in 1999 to approximately 86% as of July 2002.

With the cycle of debt in the state-run power generating and distribution sectors, Ukraine has been trying to privatize its regional energy distribution companies in order to relieve the government of the heavy debt burden. The country partially privatized the first seven *oblenerhos* in 1998, then sold stakes in another six of the regional distribution companies in April 2001.

However, in May 2001, President Leonid Kuchma ordered a temporary halt to the privatization of the remaining *oblenerhos*, pending a presidential review of the recent privatizations and additional reforms to the sector. In December 2001, Kuchma lifted the ban on the sale of the *oblenerhos*, and Ukraine is hoping to sell controlling stakes in 5 *oblenerhos* before the end of 2002, with the remainder to be sold in 2003.

Nuclear

Ukraine currently has four operating nuclear power plants. These power plants have a total capacity of 11.8 gigawatts, which accounts for approximately 22% of the country's total power-generating capacity. Ukraine's nuclear power plants produce 40% of the country's power output, despite frequent malfunctions and lengthy repairs and maintenance.

On December 15, 2000, Ukraine permanently shut down the 925-MW, Unit 3 at the Chornobyl power plant, disabling the last remaining working reactor at the ill-fated power plant. To replace the power generated by Chornobyl, which Ukrainian officials say produced approximately 5% of the country's total, Ukraine has resumed construction of two 1-GW reactors at the Khmelnitsky and Rivne power plants.

Construction of Khmelnitsky-2 and Rivne-4 was begun under the Soviet Union, and both were more than 80% finished when Ukraine received its

independence and ran out of money to complete them. Ukraine is hoping to finish construction of both reactors with the help of financing from the European Bank for Reconstruction and Development (EBRD), but an EBRD loan for the project was put on hold in December 2001. Russia then offered Ukraine a $500 million loan to allow the country to finish construction of the two reactors, but most experts believe the reactors cannot be completed without additional financing. Ukraine is still negotiating with the EBRD to secure additional financing for the estimated $1.4 billion project.

ENVIRONMENT

The 1986 Chornobyl nuclear meltdown exposed the Soviet Union's negligent environmental record and triggered alarm across the globe. The world's worst nuclear accident created disastrous consequences for the environment, both in Ukraine and in neighboring countries. As a result, Soviet policies that encouraged industrial development at the expense of the environment came under harsh international criticism, and Chornobyl became a rallying cry for environmentalists around the world.

While Chornobyl remains the lasting symbol of environmental degradation in Ukraine, today air pollution in the major cities is a major problem. Yet, despite increased vehicle traffic, energy use is significantly lower now than in the mid-1990s. Although policies encouraging energy conservation and energy efficiency can take some of the credit, Ukraine's economic woes account for much of the reduction: as the economy contracted through the 1990s, industrial production and consumer demand dropped as well, resulting in lower carbon emissions. Ukraine's recent economic growth has led to increases in both carbon emissions and energy consumption.

In terms of energy consumption per dollar, Ukraine suffers from one of the highest levels of energy intensity in the world. The country's heavy dependence on coal makes it correspondingly high in carbon intensity, and the continued reliance on nuclear power--as well as a lack of financial resources or economic incentives--has stifled the country's use of renewable

energies. In order to protect its environment better in the coming years, Ukraine will need to shift away from fossil fuels and break the link of economic output from environmental pollution.

COUNTRY OVERVIEW

President: Leonid Kuchma (since July 19, 1994)
Prime Minister: Anatoliy Kinakh (since May 29, 2001)
Independence: December 1, 1991 (from Soviet Union); National holiday: Independence Day, August 24, 1991
Population (7/01E): 48.7 million
Location: Eastern Europe, bordering the Black Sea between Poland and Russia
Size: 233,090 square miles, slightly smaller than Texas
Major Cities: Kiev (capital), Kharkiv, Donetsk, Dnipropetrovsk, Odesa, L'viv
Languages: Ukrainian (official), Russian, Romanian, Polish, Hungarian
Ethnic Groups: Ukrainian 73%, Russian 22%, Jewish 1%, other 4%
Religions: Ukrainian Orthodox - Moscow Patriarchate, Ukrainian Orthodox - Kiev Patriarchate, Ukrainian Autocephalous Orthodox, Ukrainian Catholic (Uniate), Protestant, Jewish

ECONOMIC OVERVIEW

Minister of Economy: Oleksandr Shlapak
Minister of Finance: Ihor Yushko
Currency: Hryvnia
Market Exchange Rate (8/5/02): US $1=5.22 hryvnia
Nominal Gross Domestic Product (GDP) (2001E): $37.2 billion; **(2002E):** $42.3 billion
Real GDP Growth Rate (2001E): 8.9%; **(2002E):** 5.6%
Inflation Rate (Change in Consumer Prices, Dec. 2000-Dec. 2001E): 6.1%; **(2002E):** 9.2%
Official Unemployment Rate (2001E): 3.8%; **(2002E):** 4.5%
Current Account Balance (2001E): $1.27 billion; **(2002E):** $1.12 billion
Major Trading Partners: Russia, EU, U.S., Turkey

Merchandise Exports (2001E): $17.0 billion; **(2002E):** $18.1 billion
Merchandise Imports (2001E): $16.8 billion; **(2002E):** $18.2 billion
Merchandise Trade Balance (2001E): $200 million; **(2002E):** -$123 million
Major Exports: ferrous and nonferrous metals, fuel and petroleum products, machinery and transport equipment, food products
Major Imports: energy, machinery and parts, transportation equipment, chemicals
External Debt (12/01E): $12.0 billion

ENERGY OVERVIEW

First Deputy Prime Minister (for Energy Issues): Oleh Dubyna
Minister of Fuel & Energy: Vitaliy Hayduk
President, Naftohaz Ukrainy (National Oil and Gas Company): Yuri Boiko
Proven Oil Reserves (1/1/02E): 395 million barrels
Oil Production (2001E): 86,500 barrels per day (bbl/d); **(2002E):** 80,000 bbl/d
Oil Consumption (2001E): 341,000 bbl/d
Net Oil Imports (2001E): 254,500 bbl/d
Crude Refining Capacity (1/1/02E): 1.15 million bbl/d
Natural Gas Reserves (1/1/02E): 39.6 trillion cubic feet (Tcf)
Natural Gas Production (2000E): 636 Bcf
Natural Gas Consumption (2000E): 2.78 Tcf
Net Natural Gas Imports (2000E): 2.14 Tcf
Coal Reserves (1/1/01E): 37.6 billion short tons
Coal Production (2000E): 90.3 million short tons (Mmst)
Coal Consumption (2000E): 97.2 Mmst
Electricity Generation Capacity (2000E): 53.9 gigawatts (GW)
Electricity Production (2000E): 163.6 billion kilowatt-hours (Bkwh)
Electricity Consumption (2000E): 151.7 Bkwh

ENVIRONMENTAL OVERVIEW

Minister of Ecology and Natural Resources: Serhiy Kurykin
Total Energy Consumption (2000E): 6.46 quadrillion Btu* (1.6% of world

total energy consumption)
Energy-Related Carbon Emissions (2000E): 104.46 million metric tons of carbon (1.6% of world total carbon emissions)
Per Capita Energy Consumption (2000E): 130.3 million Btu (vs. U.S. value of 351.0 million Btu)
Per Capita Carbon Emissions (2000E): 2.1 metric tons of carbon (vs. U.S. value of 5.6 metric tons of carbon)
Energy Intensity (2000E): 193,312 Btu/$1995 (vs U.S. value of 10,918 Btu/$1995)**
Carbon Intensity (2000E): 3.13 metric tons of carbon/thousand $1995 (vs U.S. value of 0.17 metric tons/thousand $1995)**
Sectoral Share of Energy Consumption (1998E): Industrial (61.6%), Residential (15.6%), Transportation (14.1%), Commercial (8.6%)
Sectoral Share of Carbon Emissions (1998E): Industrial (64.6%), Residential (16.2%), Transportation (11.8%), Commercial (7.4%)
Fuel Share of Energy Consumption (2000E): Natural Gas (45.0%), Coal (29.7%), Nuclear (12.1%), Oil (11.5%)
Fuel Share of Carbon Emissions (2000E): Coal (46.3%), Natural Gas (40.1%), Oil (13.5%)
Renewable Energy Consumption (1998E): 175 trillion Btu* (36% increase from 1997)
Number of People per Motor Vehicle (1998): 10.6 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified May 13th, 1997). Signatory to the Kyoto Protocol (signed March 15th, 1999, not yet ratified)
Major Environmental Issues: Inadequate supplies of potable water; air and water pollution; deforestation; radiation contamination in the northeast from 1986 accident at Chornobyl Nuclear Power Plant.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Antarctic Treaty, Biodiversity, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear

Test Ban, Ozone Layer Protection, Ship Pollution, Wetlands. *Has signed, but not ratified*: Air Pollution-Persistent Organic Pollutants, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar and wind electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP based on EIA International Energy Annual 2000

ENERGY INDUSTRY

Organization: Naftohaz Ukrainy (state-owned oil and natural umbrella company with many subsidiaries, including UkrNafta (oil productionl), UkrTransNafta (oil transit), UkrTransHaz (natural gas transit), etc.); Enerhoatom (state-owned nuclear energy company).

Major Oil/Gas Fields: Dnieper-Donetsk Basin in eastern Ukraine, Precarpathian Basin in western Ukraine, Crimea, Arkhangelskoye (NW Crimea) Field, and the Sea of Azov

Major Oil Ports: Odesa, Sevastopol, Feodosia, Pivdenny

Oil Export Pipelines Crossing Ukraine: Friendship (Druzhba) (1.2 million bbl/d), Odesa-Brody (180,000 bbl/d, rising to 500,000 bbl/d), Eastern Products (30,000 bbl/d)

Major Oil Refineries (1/1/01 crude processing capacity): Kremenchuk (361,000 bbl/d), Lisichansk (320,000 bbl/d), Kherson (236,000 bbl/d), Odesa (78,000 bbl/d), Drogobich (78,000 bbl/d), Nadvornaja (74,000 bbl/d)

Foreign Oil and Gas Company Involvement: CanArgo Energy, Karpatsky Petroleum, Epic Energy, EuroGas, Gazprom, JKX, LVR, Momentum Enterprises, Odesa Petroleum

Natural Gas Export Pipelines Crossing Ukraine (Capacity): Northern

Lights (0.8 Tcf), Progress (1 Tcf), Shebelinka (0.7 Tcf), Soyuz (1 Tcf), Urengoy (1 Tcf), West Ukraine (0.15 Tcf)
Major Coal Fields: Donets/Donbass Basin, Lviv-Volhynian (West Ukraine) Basin, Dnieper Basin (lignite)
Nuclear Power Plants (Capacity): Zaporozhia (6,000 MW), South Ukraine (3,000 MW), Rivne (1,880 MW), Khmelnitsky (1,000 MW)

Sources for this report include: BBC Monitoring International Reports, CIA World Factbook, Current Digest of the Post-Soviet Press, DRI/WEFA Eurasian Economic Outlook, DRI/PlanEcon, The Economist, The Financial Times, FSU Energy, FSU Oil and Gas Monitor, Interfax News Agency, ITAR-TASS News Agency, Oil and Gas Journal, Petroleum Economist, Petroleum Report, Platt's International Coal Report, Platt's Oilgram News, Polish News Bulletin, PR Newswire, Project Finance, Radio Free Europe/Radio Liberty, Reuters, Ukraine Business Report, U.S. Department of Energy, U.S. Energy Information Administration, U.S. Department of State, Warsaw Business Journal, and World Markets Energy.

LINKS

For more information from EIA on Ukraine, please see:
EIA: Country Information on Ukraine

Links to other sites:
U.S. Agency for International Development
U.S. Department of Commerce, Business Information Service for the Newly Independent States (BISNIS)
U.S. Department of Commerce, Country Commercial Guides
U.S. Department of Commerce, International Trade Administration: Energy Division
U.S. Department of Commerce, Trade Compliance Center: Market Access Information

CIA World Factbook
U.S. Department of Energy, Office of Fossil Energy: International Affairs
U.S. International Trade Administration, Energy Division
Library of Congress Country Study on the former Soviet Union
Radio Free Europe/Radio Liberty (RFE/RL)
U.S. Department of State: Background Notes
U.S. Department of State, International Information Programs
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Eastern Economist
European Bank for Reconstruction and Development (EBRD)
INOGATE
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International Atomic Energy Agency (IAEA) Power Reactor Information System
International Energy Agency: A review of Energy Policies in Ukraine
Lonely Planet World Guide
Naftohaz Ukrainy
The Kyiv Post
TRACECA
Ukraine's Home Page
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UNIAN: Ukrainian Independent Information and News Agency
University of Texas - Russian and East European Network Information Center
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Caspian Sea Region

The Caspian Sea region, including the Sea and the littoral states surrounding it, is important to world energy markets because it holds large reserves of undeveloped oil and natural gas. The Caspian Sea's mineral wealth has resulted in disagreements between the five countries over ownership of the resources, and the region's huge energy potential has sparked fierce competition--between producers as well as consumers--over the final export routes for this oil and natural gas.

Note: Information contained in this report is the best available as of July 2002 and is subject to change.

GENERAL BACKGROUND

The Caspian Sea is located in northwest Asia, landlocked between Azerbaijan, Iran, Kazakhstan, Russia, and Turkmenistan. Since the breakup of the Soviet Union in 1991, the Caspian Sea--as well as the region surrounding it--has became the focus of much international attention due to its huge oil and natural gas reserves. The Sea, which is 700 miles long, contains six separate identified hydrocarbon basins, although most of its oil and natural gas reserves have not been developed yet. Although the littoral states of the Caspian Sea already are major energy producers, many areas of the Sea and the surrounding area remain unexplored.

The prospect of potentially enormous hydrocarbon reserves is part of the allure of the Caspian Sea region (which is defined here to include Azerbaijan, Kazakhstan, Turkmenistan, and the regions of Iran and Russia that are near the Caspian Sea). The Caspian region contains 10 billion barrels of proven oil reserves (defined as oil and natural gas liquids deposits that are considered 90% probable). In addition, despite a string of disappointing recent drilling results, mostly in Azerbaijan, the region's possible oil reserves (defined as 50% probable) could yield another 233 billion barrels of oil.

Overall, proven natural gas reserves in the Caspian region are estimated at around 170 Tcf. Possible natural gas reserves in the Caspian region are even larger, and could yield another 293 trillion cubic feet (Tcf) of natural gas. Turkmenistan (101 Tcf) and Kazakhstan (65 Tcf) are among the top 20 countries in the world in terms of proven natural gas reserves. Although it is not technically part of the Caspian Sea region, nearby Uzbekistan (66.2 Tcf in proven natural gas reserves) also holds significant natural gas deposits.

Since they became independent in 1991, Azerbaijan, Kazakhstan, and Turkmenistan have sought to develop their national oil and natural gas industries. Although the Soviet Union attempted to exploit each of the republic's energy resources, a lack of investment, deteriorating infrastructure, and out-dated technology resulted in declining rates of production in each of the countries at the time of the Soviet Union's collapse in 1991. Over the last 11 years, however, Azerbaijan and Kazakhstan, in particular, have received large amounts of foreign investment in their oil and natural gas sectors. With additional investment, the application of Western technology, and the development of new export outlets, oil and natural gas production in the Caspian region could grow rapidly.

Caspian Legal Status Unresolved

In order for the Caspian Sea region to realize its full energy potential, however, the littoral states must first agree on the legal status of the Sea. Prior to 1991, only two countries--the Soviet Union and Iran--bordered the Caspian Sea, and the legal status of the Sea was governed by 1921 and 1940 bilateral treaties. With the collapse of the Soviet Union and the emergence of Kazakhstan, Turkmenistan, and Azerbaijan as independent states, ownership and development rights in the Sea have been called into question.

Most of Azerbaijan's oil resources (proven as well as possible reserves) are located offshore, and perhaps 30% to 40% of the total oil resources of Kazakhstan and Turkmenistan are offshore as well. Currently, there is no agreed-upon convention that delineates the littoral states' ownership of the Sea's resources or their development rights. The potential oil and natural gas wealth, along with the corresponding environmental risks of resource development in the Caspian, have heightened the stakes for each country.

As a result, several conflicts have arisen over mutual claims to different regions of the Sea, especially in its southern waters. In July 2001, Iranian military gunboats confronted a British Petroleum (BP) Azeri research vessel exploring the Araz-Alov-Sharg structure, ordering the ship out of waters Iran

claims as its own. Azerbaijan, for its part, has objected to Iran's decision to award Royal Dutch/Shell and Lasmo a license to conduct seismic surveys in a region that Azerbaijan considers to fall in its territory. In addition, Turkmenistan and Azerbaijan remain locked in a dispute over the Serdar/Kyapaz field, while Turkmenistan claims that portions of Azerbaijan's Azeri and Chirag fields--which Turkmen officials call Khazar and Osman, respectively--lie within its territorial waters.

Thus, the unresolved status of the Caspian Sea has hindered further development of the Sea's oil and natural gas resources, as well as the construction of potential export pipelines from the region. Negotiations between the littoral states have made slow progress in ironing out differences between the countries: while Russia, Azerbaijan, and Kazakhstan have agreed on dividing the Sea by a "modified median" principle, Iran insists on an equal division of the Sea, and Turkmenistan agrees on the principle of dividing the Sea, but not the method. In April 2002, a long-delayed summit of the Caspian littoral heads of state failed to produce a multilateral agreement on the sea's legal status, prompting several states to sign bilateral agreements in an effort to solve the problem.

OIL

Despite the lack of a multilateral agreement on the Sea, several countries are undertaking active exploration and development programs in what is generally considered to be their sector of the Caspian Sea. In particular, Azerbaijan and Kazakhstan have made substantial progress in developing their offshore oil reserves.

Azerbaijan has signed a number of production-sharing agreements--both onshore and offshore--in order to develop its oil and natural gas industries. A significant percentage of Azerbaijan's oil production comes from the shallow-water section of the Gunashli field, located 60 miles off the Azeri coast. Although the country's oil production fell after 1991 to just 180,000 barrels per day (bbl/d) in 1997, Azerbaijan's oil production rebounded to 311,200 bbl/d in 2001 with the help of international investment in its oil sector.

Kazakhstan also has opened its resources to development by foreign companies. International oil projects in Kazakhstan have taken the form of joint ventures, production-sharing agreements, and exploration/field concessions. After Russia, Kazakhstan was the largest oil-producing republic in the Soviet Union, but after independence, Kazakhstan's oil production dropped more than 115,000 bbl/d, to 414,000 bbl/d, in 1995. Boosted by foreign investment in its oil sector, Kazakhstan's oil production has increased steadily since then, with output of 811,000 bbl/d in 2001, most of which came from three large onshore fields (Tengiz, Uzen, and Karachaganak). In addition, preliminary drilling in Kazakhstan's offshore sector of the Caspian has revealed bountiful oil deposits, especially in the Kashagan field, raising hopes that Kazakhstan may become one of the world's largest oil producers.

Overall, oil production in the Caspian Sea region reached approximately 1.3 million bbl/d in 2001. Production in the region is projected to increase severalfold, led by three major projects currently under development in Azerbaijan and Kazakhstan:

- In April 1993, Chevron concluded a historic $20 billion deal with Kazakhstan to create the Tengizchevroil joint venture to develop the Tengiz oil field, estimated to contain recoverable oil reserves of six to nine billion barrels. Tengizchevroil was producing approximately 250,000 bbl/d in June 2002, and the consortium is planning to invest $3 billion over the next three years to boost production capacity at the field now that Caspian Pipeline Consortium's Tengiz-Novorosiisk export pipeline is operational. Given adequate export outlets, the Tengizchevroil joint venture could reach peak production of 750,000 bbl/d by 2010.

- In what was described as "the deal of the century," in September 1994 the Azerbaijan International Operating Company (AIOC) signed an $8 billion, 30-year contract to develop three Caspian Sea fields--Azeri, Chirag, and the deepwater portions of Gunashli--with proven reserves

estimated at three to five billion barrels. Almost all of Azerbaijan's production increases since 1997 have come from AIOC, which produced an average of 120,000 bbl/d of oil in the first four months of 2002. In August 2001, AIOC and Azeri government officials signed an agreement to carry out an expansion, with oil production at ACG expected to reach 800,000 bbl/d by the end of the decade. The planned Baku-Ceyhan Main Export Pipeline will be the main vehicle for ACG oil exports.

- Although signed with less fanfare in 1997, the offshore Kashagan block being developed by the Agip Kazakhstan North Caspian Operating Company (Agip KCO, formerly OKIOC) may turn out to be more lucrative than both the Tengiz and the ACG group of deposits combined. Exploration and preliminary drilling in the Kashagan block has produced spectacular results, with analysts hailing the field as the largest oil discovery in the last 30 years. Although Agip KCO released estimates in June 2002 that the Kashagan field holds between seven and nine billion barrels of crude in proven reserves, as well as 38 billion barrels in probable reserves, both Kazakh officials and energy analysts have called that estimate "conservative."

These projects, along with others currently underway, could help boost Caspian Sea region production to around 3.7 million bbl/d by 2010. EIA expects production capacity from the Caspian basin to exceed 6.5 million barrels per day by 2020. Although not "another Middle East," as some analysts believed in the early 1990s, the Caspian Sea region is comparable to the North Sea in its hydrocarbon potential.

NATURAL GAS

Unlike with oil, the Caspian region's natural gas resources were extensively developed during the Soviet era. Caspian Sea region natural gas production, not including major Central Asian natural gas producer Uzbekistan, was 3.9 Tcf in 1990, but the collapse of the Soviet Union led to downturns across the region. After 1991, Caspian region natural gas, mostly from Turkmenistan,

became a competitor with Gazprom, the Russian state natural gas company. Since Gazprom owned all the pipelines, and since export routes for Caspian natural gas--such as the Central Asia-Center pipeline--were routed through Russia, Caspian natural gas was squeezed out of the hard currency market.

As a result, Turkmenistan's incentives for increasing its production of natural gas disappeared. The country's output dropped throughout the 1990s, plummeting from 2.02 Tcf in 1992 to just 466 billion cubic feet (Bcf) in 1998, when the country was locked in a pricing dispute with Russia over the export of Turkmen natural gas. With high world natural gas prices and a Turkmen-Russian agreement on Turkmen exports in place, the country's natural gas production rebounded to 788 Bcf in 1999, then skyrocketed to 1.64 Tcf in 2000. Turkmenistan has plans to boost natural gas output substantially over the next decade, contingent on securing adequate export routes, such as the proposed Trans-Caspian Gas Pipeline.

Uzbekistan is the third largest natural gas producer in the Commonwealth of Independent States and one of the top ten natural gas-producing countries in the world. Since becoming independent, Uzbekistan has ramped up its natural gas production nearly 32%, from 1.51 Tcf in 1992 to 1.99 Tcf in 2000. In order to offset declining production at some older fields such as Uchkir and Yangikazen, Uzbekistan is speeding up development at existing fields such as the Kandym and Garbi fields, as well as planning to explore for new reserves. However, since Uzbekistan is landlocked and its natural gas competes with Russian and Turkmen natural gas, Uzbekistan is limited in its ability to export. Instead, Uzbekistan has concentrated on supplying the Central Asian natural gas market, mainly through the Tashkent-Bishkek-Almaty pipeline.

With the emphasis on Azerbaijan's oil potential, the country's natural gas sector often has been overlooked. In the past, Azerbaijan has imported natural gas from Russia, Turkmenistan, and Iran to meet domestic needs, but consumption has been on the wane since the collapse of the Soviet Union, and in 2000, Azerbaijan's natural gas consumption and production were roughly equivalent at 200 Bcf. Azerbaijan is continuing to import natural gas, but the 1999 discovery of the Shah Deniz field will soon change that.

The Shah Deniz field, which is thought to be the world's largest natural gas discovery since 1978, is estimated to contain between 25 Tcf and 39 Tcf of possible (not proven) natural gas. Development of the field, which will cost upwards of $2.5 billion including related infrastructure, should produce the first natural gas by 2004, making Azerbaijan a significant net natural gas exporter. Already, Azerbaijan has secured an agreement with Turkey to export Azeri natural gas via a planned Baku-Erzurum pipeline.

As investment continues to pour into the Kazakh natural gas sector, the country's natural gas production is set to increase dramatically. In August 2001, the Kazakh Ministry for Energy and Mineral Resources approved a 15-year strategy for developing the country's natural gas sector that would increase natural gas production fivefold. According to the strategy, which the Kazakh government approved, Kazakhstan is aiming to increase its natural gas production to 1.2 Tcf by 2005, to 1.66 Tcf by 2010, and to 1.84 Tcf by

2015. Key to this strategy is the development of natural gas reserves at Kashagan, Karachaganak, and Tengiz. Provided that the necessary infrastructure is built, Kazakhstan soon could become a major natural gas exporter as well.

Overall, natural gas production in the Caspian Sea region reached nearly 2.1 Tcf in 2000. Projects currently underway could help boost Caspian Sea region natural gas production to over 6 Tcf by 2010, and the enactment of laws barring the flaring of associated natural gas may increase the region's total production. In 1999, Azerbaijan enacted a law requiring that each oil production project in the country include a plan to develop its natural gas potential, while Kazakhstan is requiring Agip KCO to capture and use all the associated natural gas from the Kashagan block. Previously, natural gas had been flared off in both countries instead of being piped to consumers because of a lack of a developed infrastructure to deliver natural gas from offshore fields.

EXPORT ISSUES

As increasing exploration and development in the Caspian Sea region leads to increased production, the countries of the region will have additional oil and natural gas supplies available for export. Already, in 2001, Kazakhstan's net oil exports were 631,000 bbl/d, while Azerbaijan's were 175,200 bbl/d. Overall, Caspian Sea region oil exports in 2001 amounted to about 920,000 bbl/d (of the 1.3 million bbl/d produced). With numerous oil projects in the region slated to boost production in the coming years, the region's net exports could increase to over 3 million bbl/d in 2010, and possibly another 2 million bbl/d on top of that by 2020.

With regards to natural gas, Turkmenistan led the way among Caspian Sea region producers with net exports of 1.38 Tcf in 2000. Overall, Caspian Sea region natural gas exports totaled just 1.2 Tcf in 2000, since both Azerbaijan and Kazakhstan have yet to tap their full natural gas production potential (and Kazakhstan is currently a net natural gas importer). With Azerbaijan's Shah

Deniz field in development, along with increased investment to develop infrastructure and markets for the region's natural gas, Caspian natural gas exports could increase by another 2-3 Tcf by 2020.

Existing Export Options

In order to boost oil and natural gas exports from the Caspian Sea region, a number of issues will need to be addressed. During the Soviet era, all of the oil and natural gas pipelines in the Caspian Sea region (aside from those in northern Iran) were designed to link the Soviet Union internally and were routed through Russia.

Prior to 1997, exporters of Caspian region oil had only one major pipeline option available to them, the 240,000-bbl/d Atyrau-Samara pipeline from Kazakhstan to Russia. Smaller amounts of oil were exported by barge and by rail through Russia, as well as by a second, smaller pipeline from Kazakhstan to Russia. In the decade since the collapse of the Soviet Union, several new oil export pipelines, such as the Baku-Novorossiisk, the Tengiz-Novorossiisk, and the Baku-Supsa pipelines, have been constructed, and the Atyrau-Samara pipeline recently was upgraded to increase its capacity to 300,000 bbl/d.

Nevertheless, the Caspian region's relative isolation from world markets, as well as the relative lack of export options, continues to hinder exports outside of the former Soviet republics. Of the 920,000 bbl/d exported from the region in 2001, only about 400,000 was exported to consumers outside of the former Soviet Union.

Natural gas exports from the Caspian region have been even more limited. All of the export pipelines from the region pass through Russia, requiring Caspian region natural gas exporters to make agreements with Gazprom, the Russian monopoly that owns the pipelines, in order to export their natural gas. Since Gazprom is also a competitor with the Caspian region for hard currency natural gas markets, the company has used its position to negotiate better deals and to limit pipeline access for Caspian region natural gas. Turkmenistan's economy, which is concentrated mainly in oil and natural gas,

experienced a huge 25.9% decrease in its gross domestic product (GDP) in 1997 when Gazprom denied Turkmenistan access to its pipeline network over a payment dispute.

Since Gazprom has reserved the hard currency markets of Europe for itself by limiting pipeline access for Caspian region natural gas producers, most exports from the region have remained in the Newly Independent States (NIS). Due to the ongoing transition process to a market economic system in much of the NIS, the majority of these former Soviet republics have been unable to pay existing world prices for natural gas supplies. Thus, in order to export their natural gas at all, the Caspian region's producers have had two options: either sell their natural gas to Russia at below-market prices or pay Gazprom a transit fee, then export those supplies via the Russian pipeline system to ex-Soviet states that cannot pay fully in cash or are tardy with payments for supplies already received.

In 1997, Turkmenistan and Iran completed the $190 million Korpezhe-Kurt Kui pipeline linking the two countries, thereby becoming the first (and so far, only) natural gas export pipeline from Central Asia to bypass Russia. Although Gazprom and Turkmenistan resolved their pricing dispute in 1998, in order to reach its full natural gas export potential, Turkmenistan and other Caspian region natural gas producers must solve the problem of how to pipe their natural gas to consumers and receive hard currency at market prices in return.

New Export Options

In order to bring much-needed hard currency into their economies, Caspian region oil and natural gas producers are seeking to diversify their export options to reach new markets. With new production coming online as well, new transportation routes will be necessary to carry Caspian oil and natural gas to world markets. To handle all the region's oil that is slated for export, a number of Caspian region oil export pipelines are being developed or are under consideration. Likewise, there are several Caspian region natural gas

export pipelines that have been proposed. Although there is no lack of export option proposals, questions remain as to *where* all these exports should go.

West?

The TRACECA Program (Transport System Europe-Caucasus-Asia, informally known as the Great Silk Road) was launched at a European Union (EU) conference in 1993. The EU conference brought together trade and transport ministers from the Central Asian and Caucasian republics to initiate a transport corridor on an West-East axis from Europe, across the Black Sea, through the Caucasus and the Caspian Sea to Central Asia.

In September 1998, twelve countries (including Azerbaijan, Bulgaria, Kazakhstan, Romania, Turkey, and Uzbekistan) signed a multilateral agreement known as the Baku Declaration to develop the transport corridor through closer economic integration of member countries, rehabilitation and development of new transportation infrastructure, and by fostering stability and trust in the region. The planned Baku-Ceyhan Main Export Pipeline to transport oil from Azerbaijan to Turkey and then to European consumers is the main component of this cooperation.

In addition, the EU has sponsored the Interstate Oil and Gas Transport to Europe (INOGATE) program, which appraises oil and natural gas exports routes from Central Asia and the Caspian, and routes for shipping energy to Europe. INOGATE is run through the EU's Technical Assistance to the Commonwealth of Independent States (TACIS) program.

East?

However, there is some question as to whether Europe is the right destination for Caspian oil and natural gas. Oil demand over the next 10 to 15 years in Europe is expected to grow by little more than 1 million bbl/d. Oil exports eastward, on the other hand, could serve Asian markets, where demand for oil is expected to grow by 10 million bbl/d over the next 10 to 15 years. In particular, Chinese oil consumption is projected to rise dramatically.

To supply this Asian demand, though, would necessitate building some of the world's longest pipelines. Geographical considerations would force any pipelines to head north of the impassable mountains of Kyrgyzstan and Tajikistan across the vast, desolate Kazakh steppe, thereby adding even more length (and cost) to any eastward pipelines.

South?

An additional way for Caspian region exporters to supply Asian demand would be to pipe oil and natural gas south. This would mean sending oil and natural gas through either Afghanistan or Iran. The Afghanistan option, which Turkmenistan has been promoting, would entail building pipelines across war-ravaged Afghan territory to reach markets in Pakistan and possibly India. With the ouster of the Taliban in Afghanistan in December 2001, proposals to build a Trans-Afghan natural gas pipeline and the Central Asian Oil Pipeline have re-emerged, but neither pipeline is realistic in the short-term.

The Iranian route for natural gas would pipe Caspian region natural gas (from Azerbaijan, Uzbekistan, and Turkmenistan) to Iran's southern coast, then eastward to Pakistan, while the oil route would take oil to the Persian Gulf, then load it onto tankers for further trans-shipment. Turkmenistan and Kazakhstan also have initiated low-volume oil "swap" deals with Iran, delivering oil in tankers to refineries in Iran's northern regions in exchange for similar volumes of crude at Iranian ports in the Persian Gulf. However, any significant investment in Iran would be problematic under the Iran and Libya Sanctions Act, which imposes sanctions on non-U.S. companies investing in the Iranian oil and natural gas sectors. U.S. companies already are prohibited from conducting business with Iran under U.S. law.

North or Northwest?

For its part, Russia itself has proposed multiple pipeline routes that utilize Russian oil pipelines to transport oil to new outlets being developed on the Baltic and Black Seas. In addition to the Caspian Pipeline Consortium's Tengiz-Novorossiisk pipeline, Russia's Baltic Pipeline System became

operational in December 2001, and the country is working with Croatia to connect the Adria pipeline with the southern Druzhba pipeline. Reversing the flows in the Adria pipeline and tying it to the southern Druzhba route will allow oil exports from the Caspian to run via Russia's pipeline system, across Ukraine and Hungary, and then terminate at the Croatian deep-sea Adriatic port of Omisalj.

In addition, Russia already has the most extensive natural gas network in the region, and the system's capacity could be increased to allow for additional Caspian region natural gas exports via Russia. However, there are political and security questions as to whether the newly independent states of the former Soviet Union should rely on Russia (or any other country) as their sole export outlet, and Caspian region producers already have expressed their desire to diversify their export options.

Bosporus/Black Sea Issues

A major problem with additional Caspian oil exports heading west is the increasing congestion in the Bosporus Straits. Turkey has raised concerns about the ability of the Bosporus Straits, already a major chokepoint for oil tankers, to handle additional tanker traffic. Most of the existing Russian oil export pipelines terminate at the Russian Black Sea port of Novorossiisk, requiring tankers to transit the Black Sea and pass through the Bosporus Straits in order to gain access to the Mediterranean and world markets.

Already, Turkey has stated its environmental concerns about a possible collision (and ensuing oil spill) in the Straits as a result of increased tanker traffic from the launch of the Caspian Pipeline Consortium's Tengiz-Novorossiisk pipeline in March 2001. The first tanker with CPC oil was loaded at Novorossiisk in October 2001, and exports are expected to increase to 400,000 bbl/d by the end of 2002. As a result, there already are a number of options under consideration for oil transiting the Black Sea to bypass the Bosporus Straits.

Regional Conflicts

In almost any direction, Caspian region export pipelines may be subject to regional conflicts, an additional complication in determining final routes. Despite the ouster of the Taliban government in December 2001, Afghanistan remains scarred and unstable after 23 years of war. The Azerbaijan-Armenia war over the Armenian-populated Nagorno-Karabakh enclave in Azerbaijan has yet to be resolved. Separatist conflicts in Abkhazia and Ossetia in Georgia flared in the mid-1990's. Russia's war with Chechnya has devastated the region around Grozny in southern Russia. In addition, the Uzbek government has been cracking down on Islamic fundamentalism in Uzbekistan, tensions between rivals Pakistan and India remain high, and the Caspian littoral states themselves have taken to bickering over territorial claims in the Sea.

Nevertheless, several export pipelines from the Caspian region already are completed or under construction, and Caspian region exports are already transiting the Caucasus. While the hope is that export pipelines will provide an economic boost to the region, thereby bringing peace and prosperity to the troubled Caucasus and Caspian regions in the long run, the fear is that in the short-term, the fierce competition over pipeline routes and export options will lead to greater instability.

Sources for this report include: Agence France Presse, BBC Monitoring Central Asia Unit, Central Asia & Caucasus Business Report, Caspian News Agency, Caspian Business Report, CIA World Factbook, DRI/WEFA Eurasian

Economic Outlook, The Economist, Environment News Service, The Financial Times, FSU Oil and Gas Monitor, Hart's European Fuels News, Interfax News Agency, The Moscow Times, PlanEcon, PR Newswire, Radio Free Europe/Radio Liberty, Reuters, RosBusinessConsulting Database, The Times of Central Asia, Turkish Business News, Ukraine Business Report, U.S. Department of Energy, U.S. Energy Information Administration, and U.S. Department of State.

LINKS

For more information from EIA on the Caspian Sea Region, please see:
EIA: Caspian Sea Region
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Links to other U.S. government sites:
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Library of Congress Country Study on Iran
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Radio Free Europe/Radio Liberty (RFE/RL)
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U.S. Department of State: Background Notes
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Ukraine: Oil and Natural Gas Transit

With its extensive network of oil and natural gas pipelines, Ukraine is a key transit state for Russian oil and natural gas exports heading to Europe. In addition, increasing oil and natural gas production in Russia and in the Caspian Sea region over the next decade should enable Ukraine to capture additional transit business--if the country can provide an economically and technically reliable transport service. Ukraine's geographic location makes it an ideal corridor for oil and natural gas transit to European markets, provided that the country invests in maintenance of its existing pipeline system. Ukraine also is looking to capture additional transit tariffs through the construction of the Pivdenny oil terminal and the Odesa-Brody pipeline.

OIL TRANSIT

Ukraine's highly developed oil pipeline system represents one of the country's main strategic advantages. Northwestern Ukraine hosts part of the 1.2-million-barrel-per-day (bbl/d) southern Druzhba oil pipeline, Russia's main overland crude oil export route. Ukraine also has the Pridniprovsky trunk pipeline, which transports oil to to southern Russia, as well as to several Ukrainian refineries. Including the new Odesa-Brody pipeline, Ukraine's oil transit capacity now exceeds 2 million bbl/d.

However, Ukraine plays a far less critical role as a transit corridor for oil exports to Europe than it does for natural gas, and its importance as an oil transit center is beginning to decrease. None of the export pipelines currently being planned or constructed by Russian pipeline company Transneft's touch Ukrainian territory, and some, such as the Sukhodolnaya-Rodionovskaya bypass, which became operational in 2001, are expressly designed to avoid Ukraine in order to avoid paying transit fees to Ukraine.

Through the first five months of 2002, Ukraine's transportation of transit oil fell 29.4% year-on-year, to an average of just 958,458 bbl/d. According to Ukraine's Fuel and Energy Ministry, oil transit to Western Europe (through Slovakia, Hungary, and the Czech Republic) fell 54% during the same time period, to an average of 518,000 bbl/d, as Ukraine received more oil via the Druzbha pipeline for its own needs.

Overall, oil piped from Russia via the Ukrainian section of the Druzhba pipeline only fell 3% in the first five months of 2002, but transit oil through the Pridniprovsky pipeline, which Russia is now able to

bypass via the Sukhodolnaya-Rodionovskaya pipeline, fell 38.9% during the same time period.

The 160-mile Sukhodolnaya-Rodionovskaya oil pipeline directly links two other pipelines, bypassing the Lisichansk-Tikhoretsk section in Ukraine, allowing Russia to save on transit costs. Although Russia did not use the Lisichansk-Tikhoretsk section section in the first few months of 2002, Russia has not imposed any limitations on Russian oil supplies to the Lisichansk, Odesa and Kremenchuk oil refineries that are served by the Pridniprovsky pipeline.

According to Oleksandr Todiichuk, board chairman of UkrTransNafta, a division of Naftohaz Ukrainy that was created in 2001 to handle Ukraine's oil transit system, Russia and Ukraine have reached an understanding that Transneft, the Russian pipeline monopoly, will pump some oil via the Ukrainian pipe when there is a peak load in the Sukhodolnaya-Rodionovskaya branch. Over 500,000 bbl/d of oil was transited via the Lisichansk-Tikhoretsk section in 2000, as well as 360,000 bbl/d in 2001.

Odesa-Brody Pipeline

Ukraine also is trying to avoid losing its position in the transit of oil from Kazakhstan. Until recently, about 320,000 bbl/d of Kazakh oil crossed Ukraine, mostly by rail to Black Sea export terminals. However, with the opening of the Caspian Pipeline Consortium's Tengiz-Novorossiisk pipeline in March 2001, Kazakhstan now has a more direct export route to world oil markets, and as a consequence it has reduced the amount of oil it exports via Ukraine.

Nevertheless, with the projected increase in oil production from the Caspian Sea region leading to concern over the Bosporus Straits' ability to handle increased tanker traffic, several years ago the Ukrainian government decided to build a new oil terminal and transit pipeline in an attempt to lure Caspian region oil exports to bypass the Bosporus and transit Ukrainian territory instead. The 400-mile Odesa-Brody pipeline, which Ukraine constructed with its own funds and completed in August 2001, has an initial capacity of 180,000 bbl/d, eventually rising to 560,000 bbl/d. The pipeline runs from the new Black Sea Pivdenny terminal, which was completed in December 2001, to the northwestern Ukrainian city of Brody, where it can tie in with the southern Druzhba pipeline.

Poland and Ukraine have discussed extending the Odesa-Brody pipeline with a 190-mile extension further north to Plotsk, Poland. From there, the pipeline could tie into the Druzhba northern route and/or an existing line to the Polish Baltic Sea port of Gdansk, thereby allowing Caspian region oil exports to reach Poland, Germany, and the Baltic states. Ukraine has argued that the Odesa-Brody route is the cheapest way to bring Caspian oil to northern Europe.

Poland, which supports the project in principle, has insisted that a multinational consortium be formed to extend the pipeline to Gdansk on the Baltic. Poland also wants the consortium to manage and market the pipeline. Ukrainian Prime Minister Anatoly Kinakh announced in June 2002 that Ukraine and Poland are stepping up work to create an international consortium to manage and complete the Odesa-Brody-Plotsk-Gdansk pipeline. Although Ukraine is using its own resources to construct additional pumping stations

for the Odesa-Brody pipeline section, the two countries are seeking outside financing to build the proposed extension for the pipeline.

An extension of the Odesa-Brody pipeline into Poland would take several years to complete, but Ukraine has other short- and medium-term options for selling crude oil via the Odesa-Brody pipeline to central European markets. In February 2002, U.S.-based oil services company Halliburton and Cambridge Energy Research Associates completed a U.S. Trade and Development Agency-funded feasibility study on the pipeline, concluding that the project would face tough market conditions in the short-term. In the medium-term, however, as more Caspian crude oil is exported from the region, the Odesa-Brody pipeline could become a more competitive route.

Although the pipeline was originally designed to allow Ukraine to transit Caspian oil and give central European countries an alternative to Russian oil, Russian oil companies have expressed an interest in the Odesa-Brody pipeline--but only if it pumps Russian oil in the opposite direction. However, Ukrainian officials have balked at the idea of using the pipeline to export more Russian oil via the Black Sea, and negotiations are continuing with Caspian Sea region oil exporters to pipe oil from Odesa to Brody. To date, Ukraine has not secured any contracts to ship oil via the Odesa-Brody pipeline.

NATURAL GAS TRANSIT

Ukraine is the main transit route for Russian natural gas exports to Europe. Designed in the Soviet era, Ukraine's natural gas pipeline network consists of over 36,000 kilometers (21,600 miles) of pipelines (including 13,680 miles of trunk lines), 112 compressor stations, and 13 underground natural gas storage facilities. The storage tanks, which are mainly located in the western part of the country, have a total capacity of 1.4 trillion cubic feet (Tcf), allowing it to enhance the stability of Russian natural gas exports to Europe. Overall, Ukraine's natural gas transit system has the capacity to pipe 170 billion cubic meters (6 Tcf) per year, according to Ukrainian officials.

Of the transit pipelines, Urengoy-Uzhgorod, Progress, Soyuz, Ivatsevitchi-Dolyna-Uzhgorod, and Torzhok-Dolyna transport natural gas to Slovakia and Hungary and to other European countries, while the Yelets-Kremenchuk and Kremenchuk-Ananiiv-Tiraspol-Izmail pipelines provide natural gas to Moldova, Romania, Bulgaria, and other Balkan countries. Ukraine also transits Russian natural gas to southern regions of Russia near the Black Sea. In 2001, Ukraine transited about 4.3 Tcf of Russian natural gas to Europe, and a similar amount of natural gas is expected to be sent in 2002.

Rather than receive payment for transiting Russian natural gas to European consumers, Ukraine has been receiving approximately 1 Tcf per year from Russia in kind. However, due to Ukraine's deficiency in domestic natural gas production, the country also has been buying natural gas from Russia. Ukraine's inability to keep current in its payments for natural gas already supplied, as well as the illegal siphoning of natural gas intended for European customers, led to a worsening of relations between Russia and Ukraine over the past few years.

As a result, Russia questioned Ukraine's reliability as a transit partner and began to make plans to build

an export pipeline that would bypass Ukraine. Ukrainian officials argued that renovations to the existing Ukrainian pipelines would be far more cost-effective than building a new pipeline. Russian officials also proposed a "debt for equity" swap, under which Russia would receive a stake in Ukraine's natural gas transit system in exchange for relieving Ukraine of its natural gas burden. Ukrainian politicians balked at this idea.

In December 2001, the two countries managed to reach an agreement on Ukraine's debt to Russia for natural gas supplies, as well as a deal on the transit of Russian natural gas for 2002. According to the transit deal, Ukraine will transit approximately 4.3 Tcf of natural gas to Europe in 2002, with Russian natural gas giant Gazprom supplying 918 billion cubic feet (Bcf) of natural gas to Ukraine this year for transiting the natural gas. Only 10% (91.8 Bcf) of the total volume of transit is to be paid in cash.

However, the two sides agreed to increase gradually the transit tariffs and the cost of natural gas used to pay for this transit. Thus, as of July 1, 2002, the tariff for natural gas via Ukraine rose to $1.44 per 1,000 cubic meters (35,300 cubic feet) from $1.09, with a simultaneous increase--from $50 to $67--in the cost of the natural gas used to pay for this transit.

Relations between Russia and Ukraine over Ukraine's transit of Russian natural gas have improved considerably in 2002. After Gazprom's board of directors appeared to shelve plans for the bypass pipeline in February 2002, Ukraine, Russia, and Germany signed a preliminary agreement in June 2002 to create an international consortium to manage and modernize the Ukrainian natural gas transit system, although specific details of the agreement still need to be worked out. Shortly thereafter, Russian and Ukrainian officials inked a deal that will ensure the long-term transit of Russian natural gas via Ukraine.

According to terms of the deal, Russian guarantee it will export at least 3.9 Tcf of natural gas per year (4.4 Tcf per year including exports to southern Russia and Moldova) via Ukraine between 2003 and 2013. Separate protocols will be signed each year to specify the actual volume of natural gas transit, with at least 4.5 Tcf of Russian natural gas scheduled to transit Ukraine in 2003. Fees for the transit natural gas will be paid in both cash and in kind. Additionally, Ukrainian and Russian officials signed an agreement on the operation of Ukraine's underground natural gas storage facilities by Russia's Gazprom up to 2013.

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March 2000

Poland: Environmental Issues

Introduction

During the 1980s, Poland was one of the most polluted countries in Europe. The Silesia region in southern Poland, best known at the time for its coal mines, steel plants, and polluted environment, epitomized the communist government's emphasis on maximum industrial activity, regardless of the environmental cost. Along with parts of northern Bohemia and eastern Germany, the environmental devastation in southern Poland earned the region the infamous nickname, "The Black Triangle."

In the wake of political changes since 1989, however, environmental issues have taken on greater importance. Policies promoting environmental protection have been introduced, and Poland's economic "shock therapy" has closed down many inefficient, polluting factories. In April 1997, the Polish parliament adopted a new energy law defining the principles for developing a national energy policy. The law, which went into effect in December 1997, was intended to ensure that the Polish government provides efficient and rational use of fuels and energy for the country, taking into consideration environmental protection requirements.

As a result, since 1989, river pollution in Poland has decreased by approximately 50% (in terms of contamination by discharges), and major air pollutant emissions have been significantly reduced (between 1987 and 1997, sulfur dioxide emissions were cut by nearly 50%). In addition, Poland's new commitment to environmental protection has brought to the forefront the need to modernize the country's obsolete and inefficient electricity generation facilities. Between 1992 and 2000, about 8,600 megawatts (MW) of electricity-generating capacity was retrofitted in order to increase energy efficiency and improve environmental protection.

Air Pollution

During the 1980s, Poland's Katowice district, which is part of the Silesia region and makes up 2.1% of the country, accounted for as much as 20%-25% of the country's total emissions of sulfur dioxide (SO2), nitrous oxides (NOx), and dust. In the region now known as "the Black Triangle," home to the largest basin of brown coal in Europe, approximately 200 million tons of coal were produced each year, leading to 3 million tons of SO2 and approximately 1 million tons of NOx emitted each year.

Environmental pollution in Silesia resulted from years of maximum industrial activity concentrated within a relatively small area. Emission of excessive amounts of pollutants resulted in severe acid rain, practically destroying the mountain forests and acidifying the soils in the Karkonosze and the Izerskie Mountains. As a result, the death rate for men in Katowice between the ages of 30 and 59 exceeds the national average by 40%, children are usually born underweight, and the occurrence of birth defects in the region is up to 60% more common than average.

Since 1991, however, Poland has spent an increasing amount of its gross domestic product on environmental protection. Investments in air quality protection in 1995 were four times as much as in 1992, with pollution control costs amounting to over $3 billion estimated through 1999. In addition, the Polish government has passed legislation, as well as given business and industry economic incentives, to improve the country's environmental situation.

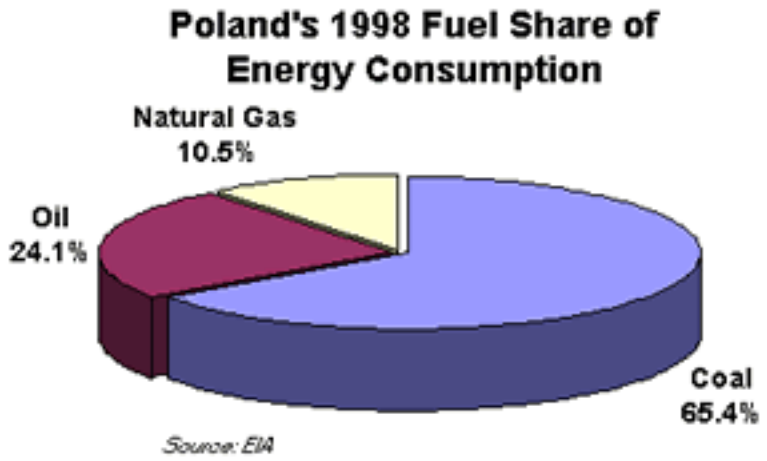
Poland's adoption of the EU's "Integrated Pollution Prevention Directive," mandating Best Available Control Technology, will require that plants use specific commercially available technology to control emissions, regardless of the current ambient conditions. Also, the government's facility-specific, compliance determinations option would give plants that are certified as environmentally EU-compliant tariff reductions earlier than non-compliant plants, a policy geared to encourage early adoption of EU requirements.

Working with the U.S. Environmental Protection Agency (EPA), the Krakow Air Monitoring Project has bought and installed a network of meteorological

instruments to provide real-time air quality assessments. The project has helped the Polish government identify stationary sources of air pollution, then order them to redesign their processes, install pollution controls, or shut down.

The effects of these efforts to improve air quality have been dramatic: air pollution by industry has decreased by 30-50% and is on the decline. The focus of Polish environmental efforts now has shifted to developing effective pollution control strategies for the more challenging "non-point" and mobile sources, where pollution has been on the rise.

Energy Consumption



Poland is the leading energy consumer among Central European countries, with 1998 total consumption of 3.5 quadrillion Btu. Coal accounts for the great majority of this consumption, with 65.4% of the total. Oil makes up an additional 24.1%, while natural gas accounts for 10.5%.

Coal is overwhelmingly dominant in the production of electricity in Poland, with 97% of all electricity generated in the country coming from coal-fired plants. Poland is an inefficient power consumer, however, as up to 30% of all electrical energy produced is lost.

Polish energy consumption trends have mirrored the country's transition to democracy. Between the years 1989-1991, as inefficient mines and factories were closed, Polish industrial production decreased by over 35%. Not surprisingly, then, a decrease in energy consumption (of approximately 25%) was apparent, as well as a reduction in the emissions of major atmospheric pollutants (about 25%-33%).

Since 1992, as Poland's economy has rebounded, the country has experienced

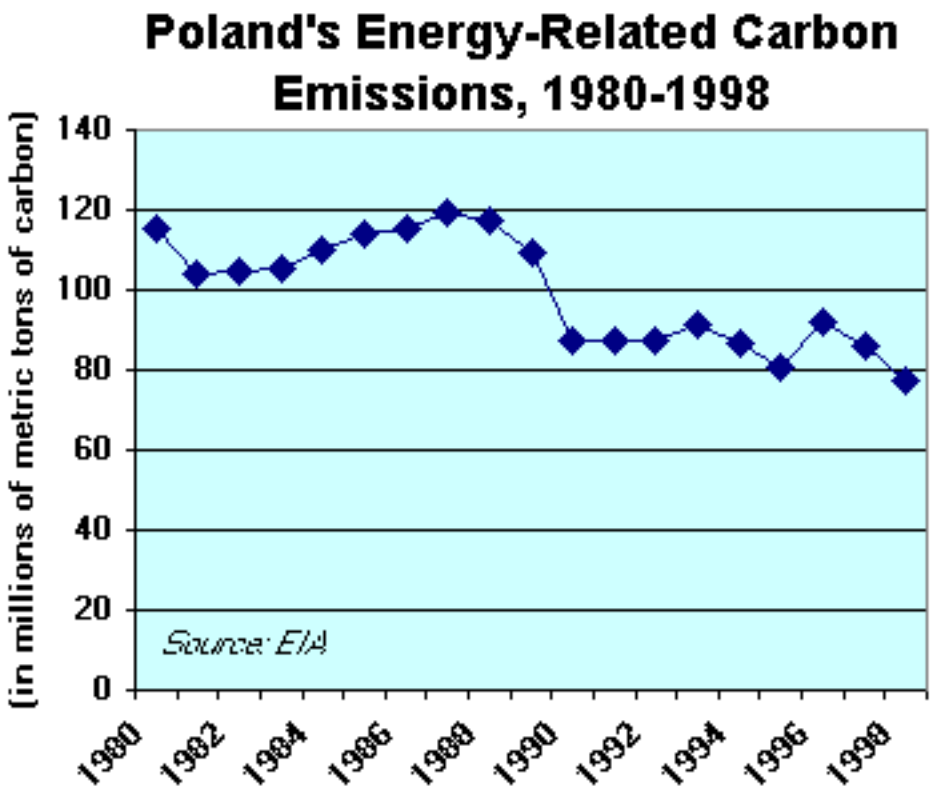
increased industrial production while energy consumption has remained relatively stable, at levels approximately 27% lower than in 1989. This is due to the fact that old, ineffective factories where energy was wasted were eliminated, reducing energy use, while many others were modernized, equipped with the newest energy-saving technology. Thus, although industrial production has increased, energy use has remained relatively constant at its new lower rate.

The European Bank for Reconstruction and Development is financing a multi-project facility to develop a network of energy service companies (ESCOS) for Central and Eastern Europe. ESCOS will install, at its own expense, appropriate technology in its clients' premises to reduce energy consumption. Along with government and market incentives to increase energy efficiency, these efforts should help reduce wasteful energy consumption in Poland.

Carbon and Energy-Related Emissions

Since 1989, energy-related carbon emissions in Poland have fallen sharply, to 77.1 million metric tons of carbon, compared to around 100-120 million metric tons emitted annually during the 1980s. By 1995, emissions of SO2 and dust were approximately 40% and 50% lower than in 1989, respectively.

Since 1994, there has been increasing financial investment in equipment for fuel desulfurization, as well as for reduction of dust emissions, nitrogen oxides and other toxic substances in Poland. The World Bank is financing desulfurization equipment installations for the Dolna Odra power plant and the Rybnik combined heat and power plant, and noteworthy investments have been made to reduce SO2 emissions from Poland's two largest power plants, Belchatow and Turow.



Although Poland's industrial sector is emitting less carbon and other toxic substances than it used to, one sector that has experienced a significant increase in emissions of atmospheric pollutants is the transportation sector. Poland has experienced a dynamic rise in the number of cars since the late 1980s--between 1989 and 1995, the number of personal automobiles in Poland skyrocketed by approximately 70% while the number of trucks increased by approximately 40%. At first, emissions rose since most of these cars were old and not equipped with modern environmental technologies, but the introduction of unleaded gasoline has tempered this rise; lead emissions in Poland decreased by 67% between 1990-1994 and continue to decrease. Increased emissions from the transportation sector figure to continue, although the introduction of catalytic converters should help somewhat.

The predominance of coal in Poland's energy production and consumption mix results in a great deal of carbon emissions and environmental pollution as well. Although the Polish government has planned to restructure and reform the industry to cut coal production and to make the industry more efficient, these structural reforms have met with strong opposition from the coal industry, which fears the loss of jobs.

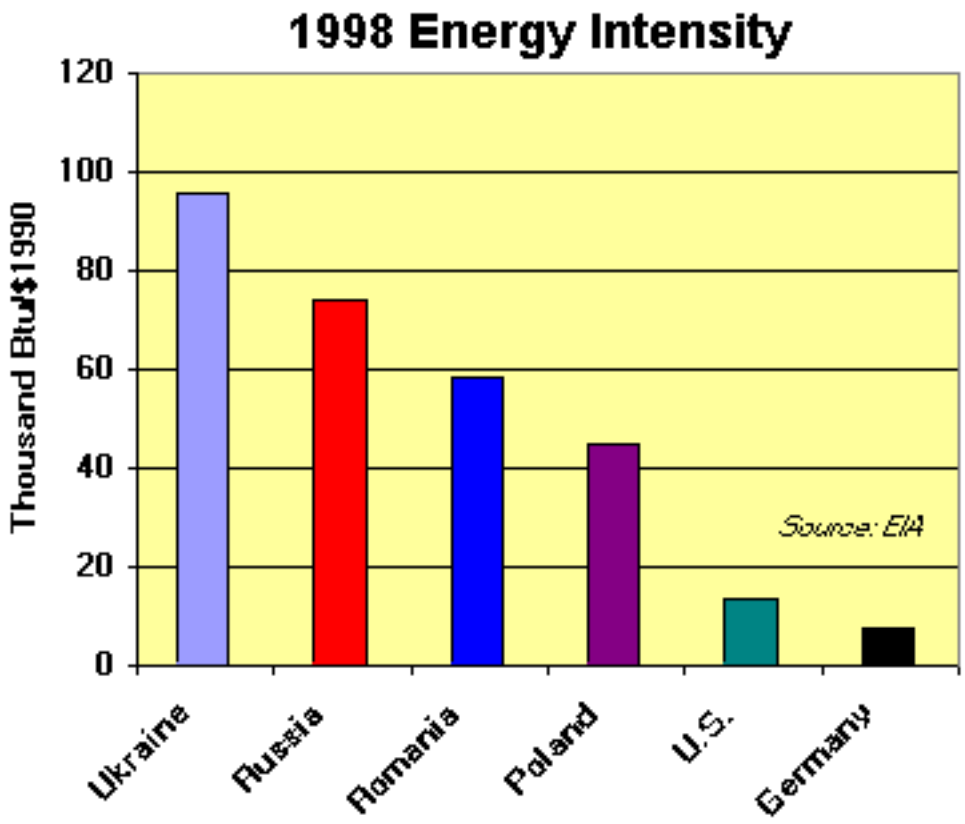
Nevertheless, Poland is likely to meet its commitments as an Annex I country under the United Nations Framework Convention on Climate Change. Under the Kyoto Protocol--which the Polish government signed on July 15th, 1998, but has not yet ratified--Poland has agreed to reduce greenhouse gases 6% below its

1988 levels by the 2008-2012 commitment period. By 2010, analysts estimate Polish CO2 emissions will level off at a rate 20%-25% lower than in Poland's baseline year of 1988.

Poland is not taking these emission reduction estimates for granted, however. In order to meet EU standards concerning emissions of SO2, NOx, and particulates, the Polish government in 1998 enacted new environmental regulations for emissions from boilers, requiring installation of sulfur control technology (such as scrubbers or fluidized bed boilers). With the support of the U.S. Agency for International Development, Poland's Environmental Action Programme Support (EAPS) assisted over 100 emission reduction projects and mobilized nearly $40 million in environmental financing. In addition, EAPS, which concluded in 1998, helped to develop management tools for local environmental financing institutions, train municipal officials, and disseminate information about environmental financing sources.

Energy and Carbon Intensity

Poland's energy intensity has decreased as the country has become more energy efficient, but it is still significantly higher than in most Western European countries. In 1998, Poland's energy intensity of 45,000 Btu/$1990 compared favorably to other transition countries, especially Ukraine (95,500 Btu/$1990), Russia (74,200 Btu), and Romania (58,400 Btu). By contrast, Poland's energy intensity was 3.5 times that of the U.S. (13,400 Btu) and more than 6 times that of its western neighbor Germany (7,300 Btu).



Poland's carbon intensity has shown the same downward trend over time, and Poland (1.0 metric tons of carbon/thousand $1990) ranks among the lowest of the transition countries but still high in comparison to the West. Poland has adopted a number of measures in efforts to lower the country's energy and carbon intensities to Western levels, including a number of energy saving initiatives at the local level in the past few years. Among these initiatives are the elimination of coal-heated stoves and small ineffective boiler rooms, thermoinsulation of buildings, and the introduction of thermostats and energy meters in centrally heated buildings.

In addition, Poland has officially adopted the "polluter pays" and "user pays" principles of environmental protection. Penalties for polluting the environment are collected by Poland's National Fund for Environmental Protection and Water Management, which has become one of the major financing sources for environmental ventures. To help finance environmental protection and restoration in the future, Poland also has sought debt-for-environment swaps, proposing that a portion of Poland's debt be redirected from the lender into an Ecofund.

Renewable Energy

Poland's renewable energy consumption is marginal, with a 1998 consumption estimate of 236 trillion Btu (compared to the U.S. level of 6.6 quadrillion Btu). Only about 3% of Polish power plants are hydroelectric, with a total installed capacity of 2,008 MW, about 7% of the total capacity of the national power

system. Although Poland's potential hydroelectric energy generation capacity is high, only a small percentage of this capacity is presently utilized, and only 11 of the 21 hydroelectric power plants have capacities over 10 MW.

Aside from several small hydro power plants, no other significant renewable energy carriers are in use, although there is potential for geothermal and biomass energy. Geothermal resources are estimated to be significant, especially in the southern part of the country. Solid waste fuels and biomass fuels also are in marginal use.

Poland in the 21st Century

Poland has made great strides in improving its environment over the past 10 years. However, the country continues to rely heavily on dirty coal, and despite Poland's surging economy, a major concern is Poland's ability to finance cleanup projects. Toxic effluents continue to pour into Polish rivers, yet most polluters go unpunished, either for lack of legislation, or, where it exists, because it is badly enforced.

Margot Wallstrom, European Commissioner for the Environment, has estimated that Poland must still spend up to $120 billion cleaning up the environment in order to meet EU criteria for membership. Although Poles point out that, as a percentage share of GDP, they have consistently spent more than the Organization for Economic Cooperation and Development country average on environmental remediation, Poland still has a long way to go to catch up.

In order for Poland to meet the EU environmental criteria and accede to the union, however, it will take more than money. Although the shift is underway in Poland from coal mining and heavy industry to modern services and lighter, more precise branches of production, such as car manufacturing, Poland's State Inspectorate for Environmental Protection 1998 Report recognized that the locus of environmental threats is changing. In addition to the need to switch from coal to cleaner energy sources, the Report stated that "not the industry anymore, but rather the growing individual consumption of energy and fuels, as well as uninhibited motorization growth, is posing ever increasing threats to the

environment."

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Norway

Norway is a major non-OPEC source of oil and was the world's third largest net oil exporter in 2001. Norway is the second-largest natural gas exporter to western Europe.

Note: Information contained in this report is the best available as of September 2002 and is subject to change.

BACKGROUND

Norway's economy is characterized by substantial oil and natural gas revenues, growing government expenditures, a tight labor market, and closer linkage to international oil and gas prices than to the OECD business cycle. Norway is the third largest net oil exporter in the world, and the recent period of high oil prices have made for government budget and current account surpluses and rising disposable income. The petroleum sector represents over 20% of Norway's gross domestic product (GDP). Norway continues to record large trade surpluses, mostly due to hydrocarbon exports. Real GDP growth for 2002 is forecast at 2.3%, a solid rate. Trade surpluses are expected to decline from about 14% to 8% into the later part of this decade. The consumer price growth forecast is at 1.5% in 2002, though the Norwegian Central Bank recently said that core inflation of 2.7% year-on-year in June had been "somewhat higher" than the bank had projected, so the bank raised interest rates slightly. The phasing-in of revenue from the state Petroleum Fund through additional spending and reduced taxation is expected to stimulate consumer spending. As this change is implemented, the central government's non-oil deficit is expected to rise from 2% of mainland GDP in 2001 to 5.5% by 2010, increasing mainland GDP by 0.4% annually.

Norway has a small industrial base apart from its oil and gas, shipping, and

fishing industries, and its mainland (i.e. excluding oil and natural gas) economy is forecast to grow by 1.2% in 2002. Manufacturing activity was up 1.4% year-on-year for the second quarter of 2002. Norway's government is concerned about its economic welfare once its oil runs out, as is predicted by the end of the first half of the 21st century. Norway makes annual contributions to its Petroleum Fund, a financial safety net for the time when oil revenues decline (and a means of reducing the inflationary impact of oil revenues). The government was able to pay Norwegian krone (Nkr) 53.5 billion (about $7.1 billion) into the Petroleum Fund in the second quarter of 2002, for a total value of Nkr 605.4 billion.

A new center-right coalition took power in October 2001 after the Labor Party lost seats in the parliamentary election. The coalition consists of Prime Minister Kjell Magne Bondevik's Christian People's Party, the Conservative Party, and the Liberal Party. The government has sought to lessen government involvement in business and to lower taxes, though it remains quite involved in social and environmental policy. The government currently does not have plans to seek membership in the European Union.

Norway is part of the European Economic Area (EEA), but Norwegians have voted in two referenda against joining the European Union (EU). Recent polls have shown some increase in support for joining the EU. Norway has a history of state control over major industry, but this is beginning to change. Norway's reliance on oil revenues in the past resulted in a government preference for keeping Norwegian businesses under Norwegian control.

North Sea Oil and Natural Gas

North Sea oil and natural gas were first discovered in the 1960s. The North Sea did not emerge immediately as a key non-OPEC oil producing area. North Sea production grew as major discoveries continued throughout the 1980s and into the 1990s. Although the region is a relatively high cost oil producer (breakeven is about $12-$14 per barrel, vs. $3-$4 per barrel in Iran, for example), its political stability and proximity to major European consumer markets have allowed it to play a major role in world oil and gas markets.

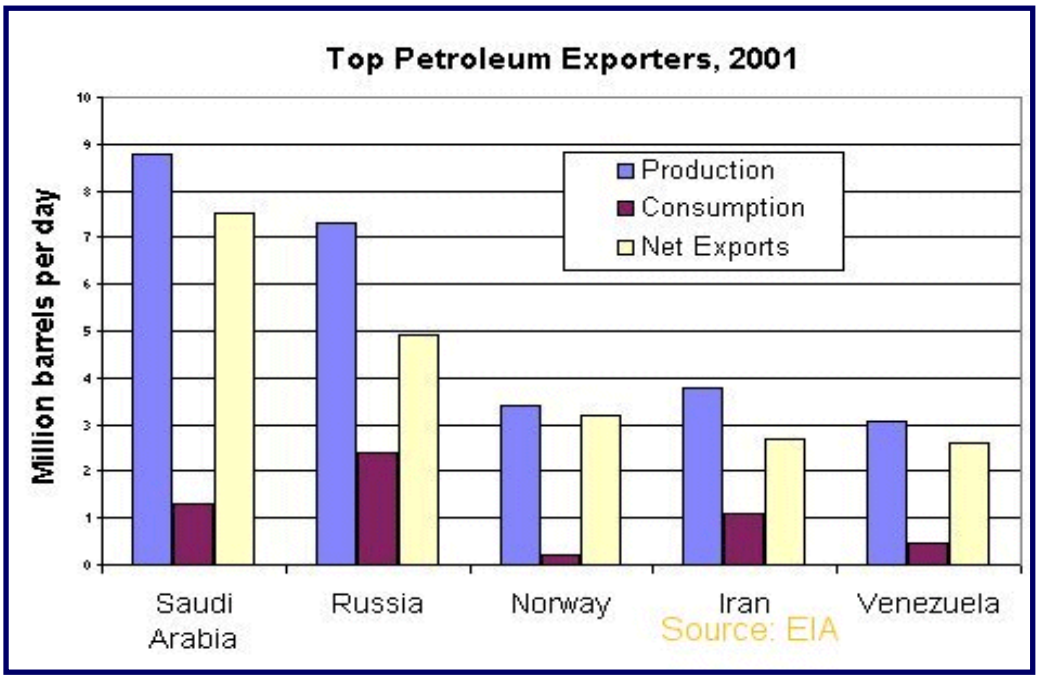
Many of the world's major crude oil prices are linked to the price of the North Sea's Brent crude oil - about $150 billion in annual petroleum trade. Brent crude is a blend of North Sea crude oils and does not come exclusively from the Brent field. Because Brent crude is traded on the International Petroleum Exchange in London, fluctuations in the market are reflected in the price of Brent. Therefore, all other crude oils linked to Brent can be priced according to the latest market conditions. Brent production is forecast to fall precipitously from its current 400,000 barrels per day (bbl/d) by 2005, making the Brent price marker increasingly dated. Liquidity has fallen to about 10 cargoes per delivery month compared with 300-400 deals per month in the early 1990s. In response to this, pricing service Platts made a change effective July 10, 2002 allowing for substitution - at seller's option - of UK Forties and Norwegian Oseberg for Brent in an attempt to increase potential volumes and reduce volatility resulting from traders "cornering the market." The change has not been universally accepted, and it remains to be seen whether it will be successful. The International Petroleum Exchange (IPE), which runs the Brent futures market, appears to be waiting to see whether the over-the-counter market adopts Brent-Forties-Oseberg (BFO). The first full BFO contract was sold on August 8.

The late 1997-1998 oil price collapse had an adverse effect on North Sea production. In 1997 and 1998, North Sea oil production remained stable, whereas previous years had shown average annual increases of 400,000 bbl/d. The 1999-2000 oil price increase had the opposite effect: North Sea oil and gas production reached new heights in 2000, with oil production exceeding 6 bbl/d for the first time. However, the North Sea area is considered to be increasingly "mature," with few additional large discoveries likely to be made. Some predict that the North Sea will reach peak production of about 7 million bbl/d in the next two or three years, although technology developments could delay this. The average recovery rate for Norwegian fields is expected to eventually reach 44%. Because the North Sea is believed to be nearing its peak production, in both of the major North Sea producing nations, Norway and the United Kingdom (UK), government and industry are

taking steps to restructure their oil and natural gas sectors to make them more internationally competitive and also are increasing cooperation between the two countries. On August 28, 2002, Norway and the UK released a joint plan to increase cooperation, cut costs, and raise output, especially on aging fields. However, taxation rates will remain unharmonized. Norway also signed a cooperation agreement with Russia that same day that opens energy dialogue on the Arctic Barents Sea shared by the two countries.

OIL

Norway has proven oil reserves of 9.44 billion barrels. In 2001, Norway was the world's third largest net oil exporter. Norway consumes very little of the oil it produces, and its oil exports are the country's greatest source of revenue. Norway's oil reserves are located exclusively offshore and mostly in the North Sea, with smaller deposits in the Norwegian Sea. The Barents Sea also is being explored. Oil production was about 3.4 million bbl/d in 2001, an increase of about 100,000 bbl/d over 2000. Production in the first half of 2002 was affected by a production cut agreement with OPEC.



In November 2001, Norway's Energy and Oil Minister announced that Norway would cooperate with OPEC and cut crude oil production for the first half of 2002 in an effort to shore up prices in the face of sagging demand. Norway later agreed to cut production by 150,000 bbl/d, with target production at 3.02 million bbl/d. Rather than cutting production steadily across the period, Norwegian production cuts were concentrated in the last month of each quarter, i.e., March and June. A preliminary estimate of crude

oil production for the first half of 2002 is 3.06 million barrels per day. In June, it was announced by the Oil and Energy Ministry that "The Norwegian government has decided not to extend the restriction on oil production into the second half of 2002." By this time, Brent prices were some $5 per barrel higher than they had been in November 2001. In late June, Norway informed operators that they could produce at 13% above field production limits in an effort to reach a government target of 3.02 million bbl/d of crude oil for 2002.

Oil service workers struck from July 5 until August 10, when the Norwegian oil industry association (OLF) and oil union Nopef arrived at a new agreement covering 3500 employees in oil service companies The oil industry reportedly suffered a loss of more than Nkr 330 million ($42.2 million) during the strike. A strike began September 10, 2002 by dock workers at Statoil's 205,000-barrels-per-day refinery in Mongstad, Norway, that would curb exports from one of Europe's key gasoline-producing plants. The strike could curb crude production from Norsk Hydro's Troll B and C platforms, which send their output to the terminal at the Mongstad refinery via pipelines.

Oil Sector Restructuring

The Norwegian oil sector has undergone massive restructuring during the past few years. Norway's oil sector had been characterized by extensive public ownership. Its largest oil company, Statoil, was 100% state-owned, while Norsk Hydro, the second largest oil company, was majority state-owned. The only completely privately-held company was Saga Petroleum. In addition, state-owned Statoil managed another entity even larger than itself, the State Direct Financial Interest (SDFI), which represented the state's holdings in 150 offshore oil and natural gas fields and about 40% of total production.

In late 1999, Norsk Hydro completed its acquisition of Saga, reducing its public ownership, originally 51%, to 44%. In April 2001, the Norwegian parliament approved plans to sell between 10% and 25% of Statoil to private investors and to sell 15% of the SDFI to Statoil prior to Statoil's listing on the New York and Oslo stock exchanges. Norsk Hydro (taking the largest share) and eight other Norwegian North Sea operators were sold another 6.5% of the

SDFI in March 2002. The remainder of the SDFI (78.5%) was reorganized into a new state company called Petoro. Petoro is the world's fifth largest oil and gas firm in terms of production, with estimated production of 1.4 million bbl/d of oil, though Petoro functions entirely as a management company, having no operations itself. Statoil completed its purchase of 15% of the SDFI in May 2001 for $4.24 billion, and on June 18, 2001, Norway sold 17.5% of its holding in Statoil in an initial public offering for $2.9 billion. These changes should introduce more efficiency into the system, as Statoil was uncompensated for managing the SDFI, and raise more capital for Statoil in order for it to compete globally as the company explores regions such as offshore west Africa and Venezuela.

Norsk Hydro sold two production licenses to Marathon Oil of the United States in July. There is speculation that Norsk Hydro may spin off its oil unit to focus on its aluminum and fertilizers businesses. Statoil is the most likely buyer, which would create a company with production approaching 1 million bbl/d of crude, condensate, and natural gas liquids. Statoil announced in May 2002 that it is selling its 7,000 bbl/d assets in the Danish North Sea to Denmark state oil company DONG for $127 million in order to concentrate on core areas.

Oil Production

Norway's major Norwegian North Sea production areas include: Ekofisk, Sleipner, Frigg, Statfjord, and Oseberg and Troll. There are also five fields producing in the Norwegian Sea. (The 62nd line of latitude separates the North Sea and the Norwegian Sea.)

Norwegian oil investment was about Nkr 56.9 billion ($7.5 billion) in 2001, an increase from the $6.2 billion invested in 2000, but down from the peak of NKr 80 billion ($10.6 billion) in 1998. Investment levels reflect expectations that Norway's oil production will remain roughly constant until 2004, and then begin a gradual decline. Oil fields and projects under development include: Fram West, Grane, Tune, and the Valhall Flanks and water injection. Three new offshore oil fields came on stream in the second half of 2001:

Tambar, Glitne, and Huldra. Some important oil discoveries offshore Norway in the past 12 months include: Staerne, near the Norne field, with estimated reserves of 30 million barrels; increased reserves in the Oseberg unit; and additional oil at the Goliat continental oil shelf in the Barents Sea (estimates of 75-107 million barrels increased to 91-250 million barrels). Overall, about 250 million barrels of oil and condensate were added to Norwegian reserves in 2001. A total of 32 blocks were offered at the 17th Norwegian Continental Shelf licensing round in June 2002. Eleven companies will share blocks that comprise six production licenses. This round focused on the Norwegian Sea.

Ekofisk, in the southern North Sea sector, was the first North Sea oil field to be discovered, in the late 1960s, and developed, with production beginning in 1971. Since 1975, oil has been piped from Ekofisk to the UK (Teesside, England). There are currently 29 platforms installed in the area, some of which are in the British North Sea. The most recent phase of development began in 1994, when the Phillips group (the U.S. company that leads the Ekofisk operating consortium, which includes TotalFinaElf, Norsk Agip, Norsk Hydro, and Statoil) installed two new platforms at "Ekofisk II". Ekofisk II came onstream in August 1998. The Phillips license runs through 2028. In December 2001, it was decided by the government that Phillips would remove 14 of the 29 Ekofisk platforms between 2003 and 2018, at an estimated cost of $1 billion (NKr 8 billion). About 10% of the removal cost will be paid by Phillips, 72% by the Norwegian government, and the remainder will be paid by the other members of the consortium. Phillips plans to bring the steel structures and the topside of the concrete Ekofisk tank ashore for recycling, to leave the rest of the concrete tank and barrier wall in place, and also to leave about 150 miles of pipelines buried. Ekofisk's production (including Eldfisk, Embla, and Tor) is expected to be about 381,000 barrels per day of crude oil in 2002. The Valhall field's production continues to decline, with expected production in 2002 at 72,000 bbl/d. However, the recently approved Valhall water injection and the Valhall flanks should improve recovery from the field. The Yme field has ceased production.

Sleipner West was discovered in 1974, but Sleipner East went into production first, in 1993. Sleipner West is tied back into Sleipner East, and the fields share the same operations organization. Sleipner is mostly important for natural gas production, including liquids and condensate (2002 condensate production in East and West is estimated at 3.7 million cubic meters), but the Varg field is estimated to produce 8,300 bbl/d crude oil in 2002. Varg is scheduled to cease production within the next few years.

Moving to the northern North Sea sector, the Frigg-Heimdal area is also mostly important as a natural gas producing area, though the Balder and Jotun fields together are expected to produce about 124,000 bbl/d of crude oil in 2002. Balder was proven as early as 1967, though production did not commence until 1999. Shuttle tankers are loaded from a production ship tied to subsea-completed walls. Several structures close to Balder are being developed by Ringhorne platform. Jotun also commenced production in 1999, from a floating production, storage, and offloading vessel (FPSO) that is serviced by shuttle tankers.

The Statfjord area is one of the largest oil producing areas in the North Sea. The Statfjord field itself was discovered by Mobil in 1974, and it extends into the British North Sea. Production began from Statfjord A in 1979, from Statfjord B in 1982, and from Statfjord C in 1985. Production from the Statfjord North and Stafjord East subsea installations are tied back into Stafjord C. Statoil took over the operations from Mobil in 1987. Three large concrete platforms with storage cells have been installed on Statfjord. Britain's 14.5% share goes by pipeline via the Brent field to Scotland. Statfjord's production has exceeded the most optimistic expectations, but all Statfjord fields are now in decline. Norway's share of Statfjord crude oil production in 2002 (including North and East) is expected to be 205,000 bbl/d. Statfjord should continue producing until 2020.

The Snorre field, with production rising, has become the largest single field in the area, with 2002 production estimated to be 228,000 barrels per day. It was discovered in 1979, and production commenced in 1992 (see above).

Norway's third largest field is Gullfaks, which, including West and South, is expected to produce 223,000 bbl/d in 2002. Gullfaks (including West) has declined by over 50% since its peak in 1995, but Gullfaks South (including Rimfaks and Gullveig) has had increasing production since it came online in 1998, to 70,000 bbl/d expected for 2002. Vigdis continues to decline from its peak in 1999, but Visund, which is east of Snorre, has had its production increase, with 2002 expected to be 43,000 bbl/d.

The various Oseberg fields (Oseberg, East, South, West) together are the largest oil producing fields in their area, whereas Troll is the largest gas field in the area. Oseberg began production in 1988, and peaked at about 500,000 bbl/d in 1996, and has declined since to about 176,000 bbl/d (including West), far below the capacity of the three platforms there. The surrounding East and South Oseberg fields have come online in 1999 and 2000, respectively, supplementing the declining production at Oseberg with 130,000 bbl/d expected for 2002. Both East and South peaked in 2001. There is a pipeline from Oseberg to the Sture terminal on the Norwegian coast, with tie-backs from East and South to Oseberg. A thin layer of oil underlies the entire Troll field, but it is only sufficiently thick for commercial recovery in the Troll West region. This is where Troll Phase II is expected to produce 316,000 bbl/d in 2002 - production has been relatively flat since 2000, though Troll achieved a daily record of 440,000 bbl in May 2002. There is a pipeline from Troll West to the Mongstad crude oil terminal on the Norwegian coast.

The Norwegian Sea has seen production increase at a higher rate than North Sea production in recent years, though it is in an earlier stage of development, the first field having come on stream in 1993. Total production for the area for 2002 is predicted to be 725,000 bbl/d. Much of the increase comes from the new Asgard field, which went into production in 1999, and now produces about 148,000 bbl/d. Norne's production also increased in 2001, though a slight decline is predicted for 2002. Heidrun's production has declined to less than that of the Norne field. Draugen's production has been flat in the past two years, but it is still has the highest production at about 200,000 bbl/d. Shuttle tankers are used to take oil from the platforms or production ships, as there is

currently not an oil pipeline from the Norwegian Sea.

NATURAL GAS

Norway holds 44 trillion cubic feet (Tcf) of natural gas reserves. Norway is not a major natural gas consumer, although its consumption is expected to increase in coming years as natural gas-fired power plants come online. It is estimated that just 16% of Norway's gas reserves have been extracted since output began, though Norway produced more gas than it discovered for the first time in 2001, as the increase in reserves was between 700-900 billion cubic feet (Bcf). Natural gas accounts for about 60% of Norway's overall offshore hydrocarbon reserves and is expected to account for an increasing portion of Norway's energy exports. Norway continues to be the second-largest natural gas exporter in Europe, with its growth outpacing that of Europe's largest natural gas exporter, Russia. Exports are forecast to be between 1.9-2.3 Tcf in 2002. Export volumes peaked at about 6.7 Bcf per day in the second quarter of this year, but will have to decline slightly if the forecast is correct. Norway's sub-sea natural gas export network is capable of transporting about 3 Tcf per year.

Natural Gas Exports

Norway, as a member of the European Economic Area (EEA), is bound by certain EU economic directives, and the EU recently has forced Norway to restructure the way it sells natural gas to other European countries. Prior to June 1, 2001, all Norwegian gas was sold through the Gassforhandlingsutvalget (GFU, meaning Gas sales negotiating committee). Although ownership of Norway's gas is held by many different companies and formerly the SDFI, now Petoro, the GFU consisted of just Norsk Hydro and Statoil. The GFU would set a price for all Norwegian gas available for purchase, instead of letting the various producers compete against each other. The EU claimed that this violated fair trading practices and threatened Statoil and Norsk Hydro with huge fines. In July 2002, Norway and the European Commission resolved this long-running dispute over the legality of long-term contracts negotiated by the defunct Gas Sales Negotiating Committee (GFU). The European Commission had threatened to take legal action against Statoil

and Norsk Hydro because long-term contracts already in place that account for about 20% of western Europe's gas imports were negotiated by means of the GFU and because many of these contracts have destination clauses (prohibition of resale). Under the negotiated deal, the Commission relented on its demand to have the long-term contracts revised in return for Statoil and Norsk Hydro agreeing to sell 530 Bcf over a four-year period to new European customers (customers without GFU-era contracts). In May 2002, most natural gas exporting companies agreed to coordinate ownership of their pipeline assets through shares in the new government-backed Gas-Led company. The state-owned company Gassco is the operator on all of Norway's natural gas pipelines (since January 1, 2002), as the partial privatization of the former operator, Statoil, created a conflict of interest.

The effects of all these changes are yet to be seen, though the expectation is that the price of Norwegian natural gas will be reduced, at least in the short to medium run. A major constraint for upstream gas companies competing for sales in the newly deregulated market will be limited infrastructure to take the gas out, because various companies share the same pipeline. Norwegian gas arrives in Europe through the following trunklines: the Europipe I and Statpipe/Norpipe systems to Germany; the Zeepipe trunkline to Zeebrugge in Belgium; the NorFra line to Dunkerque in northern France; and the Europipe II line from Kårstø north of Stavanger to Emden. These Norwegian trunklines provide a combined gas transport capacity of 2.7 Tcf per year. There are also pipelines to the UK, including the new Vesterled pipeline, which opened in October 2001, with volumes at about 138 million cubic feet per day. Marathon is exploring the potential demand for its proposed Symphony natural gas pipeline, which would bring additional Norwegian natural gas to the UK through a link between the Heimdal complex and the Brae/Miller complex in the UK sector.

Statoil expects Norway's share of natural gas deliveries to continental Europe to rise from 14% in 1996 to 20% by 2005. The following companies currently buy Norwegian gas: Ruhrgas, BEB, Meeg, Thyssengas and Verbundnetz Gas (Germany), Gaz de France (France), Gasunie, SEP (the Netherlands),

Distrigaz (Belgium), Enagas (Spain), Austria Ferngas, OMV (Austria), Snam (Italy), Energia (Italy), Polish Oil and Gas Company (Poland), Transgas (Czech Republic), and Centrica (UK). Germany is the largest natural gas market in continental Europe, and about 20% of the gas that Germany currently consumes comes from Norway. Ruhrgas expects Norway to supply 30% of Germany's imports. About half of the gas from the NorFra line transits through France to points in Italy and Spain, while the other half is consumed in France. By 2005, this pipeline is expected to supply one-third of France's total gas consumption.

In July 2001, Stoltenberg and Polish Prime Minister Jerzy Buzak signed a joint declaration for the deliveries of 177 billion cubic feet (Bcf) of natural gas from Norway annually. Existing Polish infrastructure cannot support significant imports from non-Russian sources, so a pipeline across the Baltic through either Sweden or Denmark was being planned, but it now appears unlikely that a natural gas pipeline to Poland will be built because of insufficient demand volumes. There is a competing plan to import liquefied natural gas (LNG) from Norway to a planned LNG terminal on Poland's Baltic Coast. Norway began piping a relatively small amount of gas through Germany in October 2000, based on an earlier contract signed in May 1999, for the delivery of 17.7 Bcf annually, under an agreement between Germany's Ruhrgas and Verbundnetz Gas and Poland's state-held gas monopoly.

The United Kingdom, the largest natural gas market in Europe, will also soon become an importer of Norwegian gas again. Norway had once supplied up to a quarter of British demand in the 1980s, but this dwindled as the Frigg field that supplied the gas was depleted. Vesterled will connect the existing Frigg pipeline with the Heimdale platform, which is already connected by pipeline to the Sleipner gasfields, and from there to other areas of the Norwegian North Sea such as the Ormen Lange gasfield that is scheduled to come on stream in 2006. In July 2001, BP announced a 15-year contract to buy 56.5 Bcf natural gas per year from Statoil. In June 2002, Centrica of the UK signed a 10-year deal with Statoil for the purchase of 483.5 million cubic feet per day, with prices linked to natural gas rather than oil.

Natural Gas Production

The Troll field (East and West) contains over half of Norwegian natural gas reserves and, as Norway's largest natural gas field, Troll produces over 72 Bcf per month. It has a production capacity of 100 million cubic meters (3.5 Bcf) per day, and estimated production in 2002 is expected to be 22.8 billion cubic meters (805 Bcf). The Troll Gas development Phase I in Troll East comprises the Troll A platform, the gas treatment plant at Kollsnes near Bergen, and pipelines linking these two installations. Troll East is thought to contain two-third's of Troll's natural gas reserves. Phase III (under development) will extract gas from Troll West. Troll A is the tallest structure ever moved by humans. Its concrete gravity base structure has been built for a lifetime of 70 years. The division of roles on the field has been controversial. Currently, Statoil and the new Petoro have about three-quarters of the shares and Statoil is the operator, followed by Norsk Hydro, Shell, TotalFinaElf, and Conoco. The gas is taken by the Zeepipe to Zeebrugge and Statpipe/Norpipe to Emden.

Troll is not the only active natural gas field in Norway's North Sea. Gas sales began in 1977 from Ekofisk and Frigg. Ekofisk, in the southern North Sea sector, supplies Ruhrgas, Gaz de France, Gasunie and Distrigaz. Ekofisk has declined from its peak in the late 1970s and a production spike in the 1990s, though it is still expected to produce 5.95 billion cubic meters (210 Bcf) in 2002. Frigg production is sold to British Gas, though Frigg has declined to the point that production is expected to cease sometime this year. Nearby Heimdal's declining production is also set to cease this year. Agreements on selling gas from Statfjord, Gullfaks and Heimdal were signed in 1981 and deliveries began in 1985 to Ruhrgas, BEB, Thyssengas, Gaz de France, Gasunie, Distrigaz, Elf and Meeg. Remaining commitments under these deals average six billion cubic meters per year (212 Bcf). Sleipner, East and West, is expected to produce 13.6 billion cubic meters (479 Bcf) in 2002; this gas is currently sold under the Troll gas sales agreements. Though Sleipner East is declining, most natural gas production is from Sleipner West, which continues to have sharply increasing production. The Norwegian share of gas from the field is piped through the Statpipe/Norpipe system to Emden in

Germany via Kårstø, north of Stavanger.

Huldra commenced production with an unmanned platform in November 2001, with natural gas production steadily rising and already at about 350 million cubic feet per day (total expected production 3.19 billion cubic meters or 113 Bcf for 2002). Huldra also produces condensate and about 28,000 bbl/d of crude oil. The crude and condensate are piped to Veslefrikk B, and the gas is piped to Heimdal.

The Åsgard field on the Halten Bank in the Norwegian Sea is one of Norway's most important new projects. The field has been developed as a chain of four interconnected projects: development of Åsgard itself, construction of the Åsgard Transport gas trunkline from the field to the Kårstø gas treatment plant north of Stavanger, the Kårstø development project, and the Europipe II gas trunkline from Kårstø to Dornum in northern Germany. Gas production from the floating platform began in October 2000, and is expected to be 8.9 billion cubic meters (314 Bcf) in 2001. Statoil is the operator of the project, which is one of Norway's giant offshore developments, on par with Ekofisk and Troll. Subsea production installations in the field are planned to be the most extensive in the world, embracing a total of 51 wells grouped in 17 seabed templates. It will link the Halten Bank area to Norway's gas transport system in the North Sea.

Statoil now is developing the Halten Bank South area of the Norwegian Sea, having taken over as operator in January 2000 (Saga had been the operator). Recoverable reserves of the Halten Bank South fields are estimated at 140 billion cubic meters (almost 5 Tcf) of gas and about 440 million barrels of oil and condensate - on par with Åsgard. The Kristin field of the Halten Bank has already secured sales of up to 31 billion cubic meters (1.1 Tcf) from 2005 to 2016. ExxonMobil made the largest discovery of 2000 in this area, the Bella Donna field, with estimated reserves between 60 and 125 billion cubic meters (2.1-4.4 Tcf).

In March 2002, the Norwegian parliament approved Statoil's plans to develop the $5 billion Snohvit project. If it is completed, Snohvit will be the largest sub-sea liquefied natural gas (LNG) project in the world, as well as the most northerly as it is located in the Barents Sea. Approximately 201 Bcf per year of natural gas would be piped to the coast, liquefied, and transported to customers in Spain and the United States by means of four carriers. In June 2002, El Paso of the United States, announced that it had final Norwegian and U.S. government approval for its plans to import 1.8 million metric tons of LNG to the United States from Snohvit. This is over 40% of the project's capacity, and much of the LNG may be delivered to El Paso's Cove Point, Maryland regasification facility. Construction of Snohvit restarted in June as well.

The huge Ormen Lange field in the Norwegian Sea, Norway's second largest natural gas discovery with estimated reserves of of 14.1 Tcf, has its blocks divided into three production licenses, with the unusual characteristic that Statoil/SDFI has only a 30% share of one of the licenses, such that non-Norwegian companies are the majority owners of one of the licenses. Norsk Hydro is the operator in the development phase, and Shell will be the operator in the production phase. Gas production is planned to commence in 2007.

COAL

Norway's coal production occurs on Spitsbergen of the Svalbard Islands, off the country's northern coast. This island also has Norway's only coal-fired power plant. In December 2001, the Norwegian Parliament voted to give a $16.9 million subsidy to state-owned coal monopoly Store Norske Sisbergen Kulkompani. Mining in Svalbard will be expanded and eventually, coal exports are planned. However, Norway is currently a net importer of coal, though overall consumption is small at 1.57 million short tons in 2000.

ELECTRICITY

In 2000, 99% of Norway's electricity generation came from its 27 million kilowatts of installed hydroelectric capacity. Norway has one of the highest rates of per-capita consumption of electricity in the world. In December 2001, state-owned Norwegian electricity company Statkraft purchased independent electricity company Trondheim Energiverk for $483 million. This makes Statkraft the second-largest electricity supplier in Scandinavia and gives the company over 50% of the Norwegian electricity market. Prime Minister Stoltenberg declared, in January 2001, that "the era of large-scale new hydropower is over" and that several large new hydro projects are to be abandoned, including Beiarn, Bjollaga, and Melfjord. A new hydro plant with greater capacity is being constructed to replace the exisiting one at Tyin.

Norway is planning to construct three new natural gas-fired power plants. Construction of two natural gas-fired power plants by Naturkraft appears set to go ahead sometime this year. Naturkraft recently asked the government to extend its license to build these plants beyond 2004. This issue, which has not

been completely resolved, is extremely important in Norway, as Prime Minister Bondevik's previous term of office ended in a vote of no confidence that overrode his opposition to the plants. Industrikraft Midt-Norge also plans to build a natural gas-fired plant, and has an allowance to emit 2.2 million tones of carbon dioxide per year. This 2X400 gas-fired combined heat and power plant in Skogn, central Norway is slated to begin construction in 2002. U.S.-based Mirant has bought 40% of five-member industrial consortium IMN, which will build, operate, and own the plant.

Norway has had a surplus of hydroelectric power in the past two years, but in drier years it must import electricity. In January 2001, E.On of Germany, Statkraft, and Elsam of Denmark agreed to free up capacity on key power cables linking the high tension electricity grids of Scandinavian countries to Germany, including the Skaggerrak cable, the only cable connecting western Denmark and Norway.

In May 2002, the European Free Trade Area (of which Norway is a member) informed the government that industry's exemption from taxation on electricity cannot continue. Consumers currently pay a 9% tax on electricity.

ENVIRONMENT

Norway is a proponent of "green power" from renewable sources and has made efforts to make its oil sector as environmentally friendly as possible. Under its Kyoto Protocol commitment, Norway has agreed to limit its carbon emissions to a 1% increase from 1990 levels by the 2008-2012 commitment period. In a dual effort to meet its Kyoto target and to further develop technologies to make oil and gas production less environmentally damaging, Norway has been a leader in alternatives for reducing carbon emissions. As a result of high activity in the oil and gas extraction sectors, Norway is relatively more energy-intensive than most OECD countries, and possesses one of the highest per capita energy consumption levels in the world. Air pollution in Oslo is not as severe as in other major world cities.

Sources for this report include: Economist Intelligence Unit, Financial Times, Hart's European Petroleum Finance Week, International Monetary Fund (IMF), Oil Daily, Norwegian Ministry of Oil and Energy, Petroleum Economist, Petroleum Intelligence Weekly, Platt's Oilgram News, Statoil, The Scotsman, DRI-WEFA, World Markets Energy .

COUNTRY OVERVIEW

Head of State: King Harald V
Prime Minister: Kjell Magne Bondevik (since October 2001)
Independence: October 26, 1905 (from Sweden)
Population (2001E): 4.5 million
Location/Size: Northern Europe, bordering the North Sea and the North Atlantic Ocean, west of Sweden/123,843 square miles (slightly larger than New Mexico)
Capital City: Oslo
Language: Norwegian (small Lapp- and Finnish-speaking minorities)
Ethnic Groups: Germanic (Nordic, Alpine, Baltic), Lapps (Sami) 20,000
Religions: Evangelical Lutheran 87.8% (state church), other Protestant and Roman Catholic 3.8%, none 3.2%, unknown 5.2%
Defense (8/98): Army, 28,900; Navy, 6,100; Air Force, 6,700 (including 16,500 conscripts)

ECONOMIC OVERVIEW

Finance Minister: Per-Kristian Foss
Minister of Trade and Industry: Ansgar Gabrielsen
Currency: Norwegian Krone (NKr)
Exchange Rate (9/09/02): 1 US Dollar = 7.52 Kroner
Gross Domestic Product (GDP, 2001E): $163.7 billion
Real GDP Growth Rate (2001E): 1.4% **(2002F):** 2.3%
Inflation Rate (consumer prices, 2001E): 3.0% **(2002F):** 1.5%
Unemployment Rate (2001E): 3.6% **(2002F):** 4%
Merchandise Exports (2001E): $58.6 billion
Merchandise Imports (2001E): $33.6 billion

Merchandise Trade Surplus (2001E): $25 billion
Major Trading Partners:UK, Germany, Sweden, Denmark, United States, other EU members
Major Exports: Fuels and other energy products; food and beverages; manufactured materials
Major Imports: Machinery and transport equipment, miscellaneous manufactures, food, beverages, and tobacco

ENERGY PROFILE

Minister of Petroleum and Energy: Einar Steensnaes
Proven Oil Reserves (1/1/02E): 9.4 billion barrels
Oil Production (2001E): 3.4 million barrels per day (bbl/d), of which 3.1 million bbl/d was crude oil
Oil Consumption (2001E): 0.2 million bbl/d
Net Oil Exports (2001E): 3.3 million bbl/d
Crude Oil Refining Capacity (1/1/02E): 310,000 bbl/d
Natural Gas Reserves (1/1/02E): 44 trillion cubic feet (Tcf)
Natural Gas Production (2000E): 1.81 Tcf
Natural Gas Consumption (2000E): 0.087 Tcf
Net Natural Gas Exports (2000E): 1.7 Tcf
Electrical Generation Capacity (1/1/00E): 27.2 gigawatts
Electricity Generation (2000E): 141 billion kilowatthours (bkwh)
Electricity Consumption (2000E): 112 bkwh
Recoverable Coal Reserves (12/31/99E): 1 million short tons (Mmst)
Coal Production (2000E): 0.55 Mmst
Coal Consumption (2000E): 1.57 Mmst
Major Systems: Statfjord, Oseberg, Gullfaks, Ekofisk
Major Companies: BP, ConocoPhillips, ExxonMobil, TotalFinaElf, Norsk Hydro, Shell, Statoil, Chevron, Petoro

ENVIRONMENTAL OVERVIEW

Minister of Environment: Borge Brende
Total Energy Consumption (2000E): 1.8 quadrillion Btu* (0.5% of world

total energy consumption)
Energy-Related Carbon Emissions (2000E): 10.3 million metric tons of carbon (0.2% of world total carbon emissions)
Per Capita Energy Consumption (2000E): 399.6 million Btu (vs. U.S. value of 348.9 million Btu)
Per Capita Carbon Emissions (2000E): 2.3 metric tons of carbon (vs. U.S. value of 5.7 metric tons of carbon)
Energy Intensity (2000E): 10,619 Btu/$1995 (vs U.S. value of 10,390 Btu/$1996)**
Carbon Intensity (2000E): 0.06 metric tons of carbon/thousand $1995 (vs U.S. value of 0.17 metric tons/thousand $1996)**
Sectoral Share of Energy Consumption (1998E): Industrial (52.1%), Residential (21.7%), Transportation (13.1%), Commercial (13.1%)
Sectoral Share of Carbon Emissions (1998E): Industrial (57.0%), Transportation (37.9%), Residential (2.6%), Commercial (2.5%)
Fuel Share of Energy Consumption (2000E): Oil (21.9%), Natural Gas (5.3%), Coal (2.2%)
Fuel Share of Carbon Emissions (2000E): Oil (72.7.1%), Natural Gas (16.7%), Coal (10.6%)
Renewable Energy Consumption (1998E): 1,248 trillion Btu* (5% increase from 1997)
Number of People per Motor Vehicle (1998): 2.0 (vs. U.S. value of 1.3)
Status in Climate Change Negotiations: Annex I country under the United Nations Framework Convention on Climate Change (July 9th, 1993). Signatory to the Kyoto Protocol (signed April 29th, 1998- not yet ratified). Under the Protocol, Norway has agreed to a 1% increase from 1990 emissions levels of a basket of greenhouse gases.
Major Environmental Issues: Water pollution; acid rain damaging forests and adversely affecting lakes, threatening fish stocks; air pollution from vehicle emissions.
Major International Environmental Agreements: A party to Conventions on Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds,

Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified: Air Pollution-Persistent Organic Pollutants.

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP based on EIA International Energy Annual 2000

LINKS

For more information from EIA on North Sea, please see:
EIA - Country Information on Norway

Links to other U.S. government sites:
CIA World Factbook - Norway
U.S. Department of Energy's Office of Fossil Energy's International section - Norway
U.S. State Department Consular Information Sheet - Norway
U.S. State Department Background Notes - Norway
U.S. Embassy in Oslo

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Norwegian Petroleum Directorate
Ministry of Petroleum and Energy
Statoil
Norsk Hydro
Ministry of the Environment
Statkraft
International Energy Agency Norway 1997 Review
The Washington Times International Supplement on the North Sea
Norwegian Embassy in Washington, D.C.
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