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South Korea

The Republic of Korea (South Korea) is important to world energy markets as the fifth largest oil importer, and the second largest importer of Liquefied Natural Gas (LNG).

Note: Information contained in this report is the best available as of December 2003 and can change.



GENERAL BACKGROUND

After posting real growth in gross domestic product (GDP) of 6.3% for 2002, South Korea's economy slipped into recession in the first half of 2003. The contraction was caused largely by a tightening of the availability of consumer credit, which reduced domestic demand. Real growth resumed in the third quarter, however, and the country is projected to show a real GDP growth rate of 2.5% overall for 2003, climbing to 6.0% in 2004. Growth in exports, particularly to the United States and China, has been strong in the second half of 2003.

In the wake of the Asian financial crisis of 1997-98, South Korea began an economic reform program designed to address some of the conditions which made its economy vulnerable. Most importantly, the South Korean government has begun to break

the hold of the chaebols (large, multi-industry conglomerates) over the financial sector. The lack of an "arms length" business relationship between borrowers and lenders had led to many South Korean financial institutions having a very large ratio of non-performing loans. While there is no intention of forcing the chaebols to divest their financial subsidiaries, the government has increased regulation to prevent chaebols from arbitrarily channeling money into other subsidiaries. Chaebols also have been pressed to spin off their non-core businesses and to rationalize their corporate structures. To stimulate domestic demand, the South Korean government under President Kim Dae-jung enacted a package of tax cuts directed at lower and middle-income workers.

The South Korean government has plans to privatize several large state-owned enterprises (SOEs), including the power generation assets of the state electricity utility, Korean Electric Power Corporation (KEPCO), and the natural gas monopoly Korea Gas Company (KOGAS). The

privatization program has moved at a slower pace than originally planned, due in part to strong opposition from labor unions to some of the privatizations and delays in passing implementing legislation. Both privatizations are now officially scheduled for 2004.

OIL

With no domestic oil reserves, South Korea must import all of its crude oil. Oil makes up the largest share of South Korea's total energy consumption, though its share has been declining in recent years. Petroleum accounted for 55% of South Korea's primary energy consumption in 2001. In that year, the country consumed around 2.1 million barrels a day (bbl/d) of oil, down from a high of nearly 2.3 million bbl/d in 1997, all of which was imported. South Korea is the seventh largest oil consumer and fifth largest net oil importer in the world.

South Korea's total reliance on oil imports has led to a policy of securing and diversifying the country's oil supply. South Korea has both a short-term and a long-term approach to fulfilling its oil needs. In the short-term, it has developed a strategic petroleum reserve, which is managed by the state-owned Korea National Oil Corporation (KNOC). Strategic stocks are roughly equivalent to a 90-day supply. The period of "import cover" was expanded from 60 days in early 2001, in part to meet the requirements for entry into the IEA. This reserve serves as a safety net against supply disruptions.

In the long term, KNOC is pursuing equity stakes in oil and gas exploration around the world. KNOC has 18 overseas exploration and production projects in 13 countries. This includes 4 producing fields in Yemen, Argentina, Peru, and the North Sea, and 4 fields under development in Yemen, Venezuela, Libya, and Vietnam. KNOC also is exploring domestic blocks offshore from South Korea. KNOC reported a new oil find in August 2001 at the Vung Tau site offshore from Vietnam, which is expected to be developed and in production by 2003. Recoverable reserves at Vung Tau are estimated at 420 million barrels. The South Korean government has stated that it plans for KNOC to provide for 10% of the country's oil needs by 2010.

The South Korean refining industry was strongly affected by the country's economic crisis in 1997-1998, especially because it already suffered from significant overcapacity before the downturn in demand. In September 1998, South Korea's four downstream oil companies raised the retail price of gasoline and diesel oil following a government tax hike. In October 1998, the South Korean government, under financial pressure, decided to fully deregulate the refining industry, accelerating this decision from the original January 1999 deadline in order to attract badly needed foreign investment. Foreign backing has proved critical in maintaining cash flows and preserving the creditworthiness of the refining industry.

Several corporate consolidations and selloffs occurred as a result. In September 1998, Hanwha's 270,000-bbl/d refinery in Incheon was taken over by Hyundai Oil Refinery Company, giving Hyundai the country's third largest refining capacity (after SK Corporation and LG-Caltex) with 580,000 bbl/d. In October 1999, Hyundai completed the sale of a 50% interest in its refining operation to the Abu Dhabi International Petroleum Investment Corporation, which was intended to reduce the company's highly leveraged debt-to-equity ratio. Ssangyong Group sold its 28.4% stake in Ssangyong Oil Refining Corporation to its majority shareholder, Saudi Aramco, in 2000. The firm's name was changed to S-Oil.

Despite the consolidation in South Korea's refining sector, it has yet to fully recover from the effects of the Asian financial crisis and the shock of the 1998 deregulation. Profit margins have remained very weak.

NATURAL GAS

South Korea currently relies on imported liquefied natural gas (LNG) for most of its natural gas, though it began producing a small quantity of natural gas from one offshore field in November 2003. Imports of LNG began in 1986, after the founding of the state-owned monopoly LNG importer Korea Gas Company (Kogas). South Korea currently gets most of its LNG from Qatar, Indonesia, Malaysia, and Oman, with a smaller volume coming from Brunei and occasional spot cargoes from elsewhere. The supplies from Qatar, which is now the largest exporter of LNG to South Korea, began in August 1999 under a contract with Qatar's new Ras Laffan LNG (RasGas) venture. The first shipment of Omani LNG was loaded in April 2000. In 2001, natural gas comprised around 10% of South Korea's primary energy consumption. South Korea is the second largest importer of LNG worldwide, importing 817 billion cubic feet (Bcf) of LNG in 2002. Imports of LNG grew by nearly 10% in 2002, continuing a pattern of rapid growth dating from the recovery from the Asian financial crisis of 1997-98. South Korean natural gas demand is split almost evenly between the electricity sector and the residential heating sector.

Despite the temporary downturn, Kogas is planning to push ahead with projects for the expansion of LNG receiving terminals. South Korea is increasing capacity at its existing terminals (Pyongtaek and Inchon). Also, Mitsubishi Corporation of Japan and Pohang Iron and Steel Corporation signed a letter of intent in October 1998 to build an LNG receiving terminal in South Korea at Kwangyang. Construction of the facility started in June 2002, and current plans call for it to be completed in the first half of 2005.

The South Korean government announced in 1999 that it intends to privatize Kogas. An initial public offering of 33% of Kogas equity was carried out in December 1999. Privatization plans initially stalled, however, due to questions about the structure of the companies which would result if Kogas were split for privatization, and opposition from labor unions representing Kogas employees. Legislation necessary to put the process in motion has not yet been passed by the South Korean legislature. The uncertainty over the future structure of the industry has led to delays in Kogas concluding agreements for new LNG supplies, even though additional volumes of LNG beyond current contracts are expected to be needed by 2004. In the short term, the increased demand can likely be satisfied with additional purchases on the spot market.

In addition to LNG imports, South Korea began producing a small amount of domestic natural gas in November 2003. KNOC's \$320 million Donghae-1 development project is developing a natural gas deposit offshore from Ulchin in southeastern South Korea estimated to contain 240 Bcf of reserves. Donghae-1 is a relatively minor development, however, and will satisfy only about 2% of South Korea's natural gas demand.

Meanwhile, South Korea also is exploring the possibility of a natural gas pipeline from the Kovykta natural gas deposit in the Irkutsk region of Eastern Siberia. The pipeline would supply China as well as South Korea. The project as currently envisioned would supply about 1 Bcf/d to South Korea, and a larger volume to China, possibly beginning in 2008. The two Koreas agreed in September 2001 to conduct a joint feasibility study of the pipeline project, which was approved by the companies backing the project in November 2003. Final approval of the pipeline route is scheduled for March 2004, with the conclusion of financing arrangements and commencement of construction slated for 2005. It now appears that the route will include a subsea section between China and South Korea, bypassing North Korea.

COAL

Coal supplies about 21% of South Korea's total energy requirements. Most of this coal is imported, since the only indigenous coal resources consist of low-quality anthracite used in home heating and

small boilers. Bituminous coal supplies (steam coal for power plants and industrial boilers and metallurgical coal for steelmaking) come mainly from Australia and China, with the United States also among the suppliers. State power company KEPCO has invested in several Australian coal mines. China has become a significant supplier of coal to South Korea only in the last three years, as its coal export volumes have increased, displacing some of the volume from Australia.

ELECTRIC POWER

South Korea uses a combination of thermal (oil, gas, and coal), nuclear, and hydroelectric capacity to meet its demand for electric power. Total power generation capacity was 52 gigawatts (GW) as of the beginning of 2001. The South Korean government estimates that its electricity demand will rise at an average annual rate of around 4% per year through 2015.

In September 1998, KEPCO officially dedicated its Ulchin Number 3 nuclear reactor and launched the construction of Ulchin Nuclear Power Plants Numbers 5 and 6. Ulchin Number 3 has a generating capacity of 1 GW and is the first nuclear power plant built completely with South Korean technology from design to construction. The Number 4 Ulchin nuclear plant was completed in late 1999, and Numbers 5 and 6 are targeted to be completed in 2004 and 2005.

The South Korean government is moving ahead with plans to break up and privatize most of the assets of KEPCO, albeit at a much slower pace than originally planned. The South Korean government plans to split KEPCO into separate generation, transmission, and distribution units. In early 2001, KEPCO split its power generation holdings into six separate subsidiaries, in a preliminary move to facilitate a split into competing companies. Five of the six operate thermal and hydroelectric facilities and are of roughly equal size in terms of installed generating capacity - between 7 and 8 GW. The sixth is comprised of all of KEPCO's nuclear plants, which will be kept together in one corporation under government ownership. The privatization plan has been controversial, with unions fearing layoffs by new management and some politicians opposing foreign ownership. Current plans call for the first initial public offerings (IPO) for Korea Southeast Power, to take place in June 2004. The others would follow in 2005.

While most of South Korea's generating capacity is still controlled by KEPCO, a few independent power producers (IPPs) exist. LG Power, owned by the LG Group conglomerate, operates a 540-megawatt (MW) independent power plant at Bugok near Asan Bay. The facility began operation in April 2001. LG Power purchased the existing Anyang and Puchon plants in June 2000, with a combined capacity of 950 MW, from KEPCO after a competitive tender. Tractebel is also investing in a new 519-MW IPP plant in Yulchon in partnership with Hyundai. In another significant development, South Korea's original IPP, Hanwha Energy was spun off from its chaebol parent company in June 2000, in a deal in which El Paso Energy acquired a 50% stake. Hanwha Energy operates a 1,800-MW plant at Incheon. In general, IPP project activity has been slowed down by the uncertainty over the timetable for the privatization of KEPCO's generation assets.

South Korea has ratified the Kyoto Protocol on greenhouse gas emissions, and while its status as a "non-Annex I state" means it has not undertaken to meet specific targets, its future plans emphasize the development of more nuclear power plants to reduce growth in carbon emissions. A dozen additional nuclear plants are planned before 2015.

ENVIRONMENT

South Korea's rapid growth has resulted in significant environmental side effects, as industrial emissions from factories have caused serious acid rain problems. Increased car ownership also has led to a corresponding rise in [carbon emissions](#) from the country's transportation sector, contributing to South Korea's [air pollution](#) problems. Transboundary pollution is a major concern in the region,

leading environmental ministers from South Korea, China and Japan to establish a joint commission to attempt to tackle the problem.

Although slowed by the Asian financial crisis, South Korea's [energy consumption](#) has rebounded and continues to increase as the country's economy grows. In 2001, South Korea consumed 8.1 quadrillion Btu's of energy. South Korea's [energy intensity](#) (energy consumption per \$1995 of GDP) increased from increased from 10,673 Btu per \$/1995 in 1980 to 11,943 Btu per \$1995 in 2001. The country's [per capita energy use](#) has increased with its economic growth, from 44.0 million Btu per person in 1980 to 170.2 million Btu per person in 2001, but South Korea's [per capita carbon emissions](#) unfortunately have increased at close to the same pace.

Thus far, there has been little emphasis on the development of [renewable energy](#) resources in South Korea, but that is changing as the 1997-1998 financial crisis focused attention on South Korea's dependence on imported oil to meet domestic energy demand. One of the country's stated goals in its National Vision for Environmental Policies in the 21st Century' is the promotion of green development schemes such as increased usage of photovoltaic power and fuel cells. South Korea's [environmental outlook](#) depends on its ability to shift its energy supply mix to cleaner-burning fuels and de-link the increase in carbon emissions from economic growth.

Sources for this report include: Asia Pulse; Asian Wall Street Journal; CIA World Factbook 2003; Dow Jones News Wire service; Economist Intelligence Unit ViewsWire; FT Energy - Power in Asia; Global Insight Asia Economic Outlook; Korea Economic Weekly; Korea Herald; Korea Times; U.S. Energy Information Administration; Petroleum Intelligence Weekly; Reuters News Wire; World Bank; World Gas Intelligence.

COUNTRY OVERVIEW

President: Roh Moo-Hyun

Independence: August 15, 1945

Population (7/03E): 48.3 million

Location/Size: Eastern Asia/(98,480 square kilometers 38,000 square miles), about the size of Indiana

Major Cities: Seoul (capital), Pusan, Taegu, Incheon, Kwangju

Language: Korean (English widely taught)

Ethnic Groups: Korean, with a small Chinese minority

Religions: Christianity, 49%; Buddhism, 47%; Confucianism, 3%; Other, 1%

ECONOMIC OVERVIEW

Currency: Won (W)

Exchange Rate (12/16/03): US\$1 = 1,181 Won

Real GDP Growth Rate (2003E): 2.5% **(2004F):** 6.0%

Inflation Rate (consumer prices) (2003E): 3.5% **(2004F)** 4.0%

Unemployment Rate (10/03E): 3.7%

Current Account Balance (2003E): \$20.7 billion

Merchandise Exports (2003E): \$240.4 billion

Merchandise Imports (2003E): \$214.0 billion

Merchandise Trade Balance (2003E): \$26.4 billion

Major Exports: Electronics, textiles, ships, automobiles, steel, computers, footwear

Major Imports: Crude oil, food, machinery and transportation equipment, chemicals and chemical products, base metals and articles.

Top Trading Partners: U.S., Japan, China, Germany

ENERGY OVERVIEW

Oil Consumption (2001E): 2.1 million barrels per day (bbl/d); all imported

Crude Oil Refining Capacity (1/1/03): 2.6 million bbl/d

Natural Gas Consumption (2001E): 739 billion cubic feet (bcf)

Recoverable Coal Reserves (2001E): 86 million short tons (Mmst)

Coal Production (2001E): 4.2 Mmst

Coal Consumption (2001E): 75.8 Mmst

Electric Generation Capacity (1/1/01E): 52.0 gigawatts

Electricity Generation (2001E): 273.6 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Minister of Environment: Kim Myung-ja

Total Energy Consumption (2001E): 8.1 quadrillion Btu* (2.0% of world total energy consumption)

Energy-Related Carbon Emissions (2001E): 120.8 million metric tons of carbon (1.8% of world carbon emissions)

Per Capita Energy Consumption (2001E): 170.2 million Btu (vs. U.S. value of 341.8 million Btu)

Per Capita Carbon Emissions (2001E): 2.6 metric tons of carbon (vs. U.S. value of 5.5 metric tons of carbon)

Energy Intensity (2001E): 11,943 Btu/\$1995 (vs U.S. value of 10,736 Btu/\$1995)**

Carbon Intensity (2001E): 0.18 metric tons of carbon/thousand \$1995 (vs U.S. value of 0.17 metric tons/thousand \$1995)**

Fuel Share of Energy Consumption (2001E): Oil (55.1%), Coal (21.1%), Natural Gas (10.3%)

Fuel Share of Carbon Emissions (2001E): Oil (55.3%), Coal (34.9%), Natural Gas (9.9%)

Status in Climate Change Negotiations: Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified December 1993). Signatory to the Kyoto Protocol (ratified November 2002.)

Major Environmental Issues: Air pollution in large cities; water pollution from the discharge of sewage and industrial effluents; drift net fishing.

Major International Environmental Agreements: A party to the Antarctic-Environmental Protocol, Antarctic Treaty, Biodiversity, Climate Change, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands and Whaling. Has signed, but not ratified, 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 OECD Purchasing Power Parity (PPP) figures

ENERGY INDUSTRY

State Energy Companies: Korea National Oil Corporation(KNOC); Daehan Oil Pipeline Corporation (DOPCO); Korea Electric Power Company (KEPCO); Korea Gas Corporation (KOGAS)

Major Oil Companies (Private): SK Corporation; LG-Caltex; S-Oil (formerly Ssangyong Oil); Hyundai Oil

Major Refineries (1/1/02 Capacity): Ulsan (817,000 bbl/d); Onsan (520,000 bbl/d); Yocheon

(633,600 bbl/d); Daesan (310,000 bbl/d); Incheon (270,000 bbl/d)

Major Ports: Pusan, Incheon, Kunsan, Mokpo, Ulsan

LNG Regasification Terminals: Pyongtaek, Incheon

LINKS

For more information from EIA on South Korea, please see:

[EIA - Country Information on South Korea](#)

Links to other U.S. government sites:

[CIA World Factbook - South Korea](#)

[U.S. Department of State, Country Commercial Guide - South Korea](#)

[U.S. Department of Energy - Office of Fossil Energy - South Korea](#)

[U.S. State Department Background Notes - South Korea](#)

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