

*September 2003*

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Finland

Finland is moving to integrate its energy sector with the Nordic and Baltic regions as deregulation and European integration move forward.

Note: The information contained in this report is the best available as of September 2003 and can change.



GENERAL BACKGROUND

Finland is a member of the European Union and uses the euro as its unit of currency. The country has a highly industrialized, largely free-market economy, with per capita gross domestic product (GDP) roughly that of the United Kingdom, France, Germany, or Italy. Finland's key economic sector is manufacturing - principally forestry, metals, engineering, telecommunications, and electronics industries. Trade is important, with exports equaling more than one-third of GDP. Except for timber and several minerals, Finland depends on imports of raw materials, energy, and some components for manufactured goods. Because of the country's northern climate, agricultural development is limited to maintaining self-sufficiency in basic products. Forestry, an important export earner, provides a secondary occupation for the rural population.

Finland's GDP grew by 1.6% in 2002, and is forecast at 1.8% growth for 2003. The country has a relatively high unemployment rate of around 9.7%, but low inflation of only 1.0%. Finland experienced a deep recession in the early 1990s caused by the collapse of trade with the former Soviet Union. At its worst, unemployment reached 20%, but eventually the economy restructured itself, moving heavily into telecommunications, particularly Nokia, one of the world's largest mobile

phone companies. With the collapse of the technology bubble in 2000, Finland's economy experienced another shock, however, and unemployment has risen once again.

Finland has been a member of the European Union (EU) since 1995, and helped to develop the EU's "Northern Dimension Initiative," which focuses on regional cooperation. In addition, Finland's Northern European Program promotes the country as a gateway to Russia, the Baltics, and the EU. In 2004, Finland will face competition from Estonia, Latvia, and Lithuania when those countries join the EU.

OIL

Finland does not produce crude oil, and so must import crude oil for its refineries or import products. Fortum, which is 71% owned by the state, and is Finland's leading energy company (formed in 1998 when state-owned oil and gas company Neste merged with IVO), does own production shares in several large Norwegian fields, however. The Former Soviet Union (mainly Russia) is Finland's most important source for crude oil. Denmark and the UK are also important sources for crude oil imports. Finland imported about 211,000 barrels of crude oil per day in 2002.

Fortum owns Finland's two refineries, Porvoo and Naantali, with crude refining capacities of 200,000 and 51,800 barrels per day, respectively. Fortum's refineries' output competes with imported products in the downstream market and the refineries export some products as well.

On August 1, 2003, Fortum said that it had completed the sale of its bitumen operations in Finland and nearby areas to Sweden's Nynas Oy, a subsidiary of Swedish energy group AB Nynas Petroleum. Fortum owns 50% of AB Nynas Petroleum. In July 2003, Fortum signed a preliminary agreement on selling its oil terminal in Tallinn, Estonia. Also, in November 2002, Fortum reportedly agreed to sell Norwegian and North Sea oil and gas assets to Italy's Eni for \$420 million as Fortum shifts its focus away from oil and towards the Nordic

electricity market.

In March 2003, Finland's competition authority (Kilpailuvirasto) said that it had found no evidence of any domestic price manipulations for gasoline and diesel oil. Finland's trucking and bus associations had asked for an investigation on this matter, but Kilpailuvirasto concluded that price changes were due to world oil price fluctuations and normal competitive forces.

NATURAL GAS

Finland does not produce natural gas and is reliant upon natural gas exports that arrive by pipeline from Russia under long-term contracts with Gazprom. Finland is not connected to the European natural gas grid. Finland imported about 161 billion cubic feet in 2001.

In November 2002, German utility Ruhrgas announced that it would buy upstream natural gas assets from Fortum for \$1.5-\$2 billion. This move came as Russia's Gazprom discussed building the \$2.9 billion North European Gas Pipeline (NEGP) through Finnish territorial waters in the Baltic Sea to Scandinavia and Germany. A decision on the NEGP is expected in the fall of 2003.

COAL

Finland does not produce any coal, but consumers around 7 million short tons per year. The country imports its hard coal from Russia, Poland, and the United States. Finland also produces peat, about 12 million tons, which is used for heating and power, and which is classified as a slowly renewable biomass fuel in Finland. In May 2003, Finland's Environment Minister, Jan-Erik Enestam, said that if Finland closed down all its coal-fired power plants for environmental reasons, "we can't get enough domestic energy." Enestam added that even if Finland consumed no coal at all, "that will not solve the world climate problems." Also, with a hydropower shortage in the winter of 2002, backup coal-fired power plants had to be utilized, contributing to an increase in Finland's carbon emissions, which were 17% above Kyoto target levels in 2002.

ELECTRICITY

Finland, with per capita electricity consumption of about 15,000 kilowatthours (Kwh) in 2000, was among the highest in the world (U.S. was about 10 thousand kilowatt hours.) This is attributed to the extreme winter temperatures, a high degree of industrialization, a relative preponderance of energy intensive industries (i.e., timber, paper, pulp), and a high standard of living. All fuel for thermal electric power plants must be imported, although Finland has attempted to diversify by emphasizing the use of nuclear, hydroelectric, wind, and biomass.

In 2001, total Finnish power generating capacity was 16.2 million kilowatthours. Of this, more than half was oil and natural-gas fired, with 18% hydroelectric, 16% nuclear, around 13% coal (mainly combined heat and power), and 0.2% "other" renewables (wind, solar, biomass, etc.). Finland reportedly is looking to move away from coal for environmental reasons, but currently, there is relatively little investment in renewable energy sources besides wood-based biofuels. Also, in June 2003, plans to build a major new hydro plant in Lapland were shelved due to environmental opposition, increasing calls for the country to build more nuclear power instead.

In early January 2003, Finland broke its previous record for electricity consumption, at 13,928 megawatthours, due to an extreme cold spell. At the same time, Finland was struggling to produce enough power after a drought that left hydroelectric plant reservoirs at 50-year lows. In June 2003, Finland passed a new Electricity Market Act (EMA), under which power customers will be able to change suppliers "without financial penalty" or "account transfer" charges. Since 2000, however, only 5% of Finnish households are reported to have changed power suppliers.

Under the EMA, power network operators and vendors must, as a rule, keep power sales, network and generation operations from each other and from other business activities. The country's Energy Market Authority also is supposed to supervise pricing in power operations that function as natural

monopolies. However, in practice, guidelines as to how separation and supervision are to be carried out have been relatively unclear and not necessarily completely binding in all cases. There have, therefore, been calls to strengthen the EMA accordingly.

Finland's electric transmission company, Fingrid, is integrated with the Nordic electricity spot market Nordpool, allowing for significant electricity imports, mainly from Sweden. In addition, Finland imports a small amount of electricity from Norway and exports small amounts of electricity to both of those countries. Finland also has an interconnection capacity with Russia, and is expected to import 10 Bkwh in 2003, up from 7.8 Bkwh in 2002. Overall, total Finnish electricity consumption was about 76.2 Bkwh in 2001, of which about 15% was imported. In December 2002, Russian utility Kolenergo reportedly signed a deal to export 650 megawatthours of power to Finland and Norway. Overall, Finland would like to diversify its power sources and reduce its reliance on any one supplier, like Russia.

In April 2003, power companies from Estonia, Latvia, and Finland signed an agreement on laying an 315-MW underwater power cable linking Finland and Estonia. The line, known as "Estlink," is expected to cost \$117 million and to be ready by 2005. Estlink should enable better electricity integration of the Baltics and Nordic region. In January 2003, Fortum announced that it was buying a 45% share in Tartu Energy, Estonia's regional heat producer, with the rights to purchase a majority stake in the company during 2004.

Finland's largest generation company is Fortum subsidiary IVO. Vattanfall of Sweden is also important in Finland, having bought several companies in Finland. TXU of the United States' subsidiary TXU Nordic Energy is the third-largest electricity supplier in Finland. The government is planning to sell off 9% of Fortum shares to the private sector, reducing its stake to 61%.

Fortum is planning a major push into expanding its power generation and distribution reach in the Nordic and Baltic countries prior to the region's power sector being deregulated in 2007. Currently, the Nordic power market

remains highly fragmented, and there is an ongoing debate in the region whether or not consolidation would be in the interest of consumers. In December 2002, this debate intensified when Nordic power prices reached their highest levels since deregulation and competition began in 1995. Also, in the spring of 2003, major Finnish power suppliers raised prices to consumers by as much as 30% over a year earlier, in part due to a prolonged period of low rainfall causing low levels of hydropower production. Still, Finnish power prices reportedly are around 35% lower than in other European Union countries.

Fortum is selling its oil assets in Norway (see above) for 1.1 billion euro in order to better compete with other companies, like Spain's Endesa and Germany's E.ON, in this area. Currently, there are 300 companies in the Nordic region's power sector, with a customer base of 14 million people. Fortum's market share is approximately 15% at the present time. In February 2003, Fortum said it would acquire an additional 9.3% stake in Russia's power utility Lenenergo as part of an asset swap with Germany's E.ON. Fortum already had owned a 7.4% share in Lenenergo, which serves the St. Petersburg area and is 49% owned by Russia's Unified Energy Systems. Fortum also announced that it would take over Norway's second largest power producer, Hafslund.

Nuclear and Renewables

Finland has two nuclear power plants (each with two units). One plant is owned by IVO and the other by private power company TVO. Combined capacity at the four units is 2.64 million kilowatts, supplying 16% of Finland's electricity consumption. Finland, unlike some other EU countries, has proposed increased use of nuclear power as a means of reducing greenhouse gas emissions and also in order to meet growing power demand.

In 2002, for instance, Finland's parliament approved the construction of a fifth nuclear reactor, the first to be built in a EU country in over 10 years. This decision prompted the exodus of the Green Party from the government coalition as well as the environment minister. TVO is soliciting bids for the

new 1.0-1.6 gigawatt reactor, which will most likely be either a boiling water or pressurized water design, is likely to cost \$1.8-\$2.6 billion. So far, General Electric and Russia's Atomstroieksport have submitted bids on the project, which is scheduled to be completed by 2008 or 2009.

In addition, Finland reportedly is considering construction of a sixth nuclear power unit, particularly if coal and hydroelectric plants are ruled out for environmental reasons.

Also in 2002, Finland's Parliament agreed to support the use of renewable energy sources and to encourage energy conservation. However, Finnish "green" power generally continues to be priced at a standard differential rate above the general rate. This led to anger in the winter of 2002, when prices were raised to Finnish consumers of wind and bio-energy power even though the prices of producing power from those sources did not increase. Under the current system, however, "green power" prices are not tied directly to production costs, so they are subject to increases when general power prices go up for reasons unrelated to the "green power" sources themselves. As a result of this system, growth in Finnish renewable power consumption has been slow, with wind currently making up only about 0.1% of the country's power market.

Sources for this report include: Agence France Presse; Associated Press; Baltic News Service; CIA World Factbook; Dow Jones News Wire service; Economist Intelligence Unit ViewsWire; Europe Energy; Financial Times; Global Insight; InfoProd; Investment Report; Lloyd's List; New York Times; News Bulletin; Nordic Business Report; Platt's International Coal Report; Power Engineering International; Project Finance; TASS; U.S. Energy Information Administration; Utility Week; World Markets Research Centre.

COUNTRY OVERVIEW

President: Tarja Halonen

Prime Minister: Matti Taneli Vanhanen

Independence: December 6, 1917 (from Russia)

Population (2003E): 5.2 million

Location/Size: Northern Europe, bordering the Baltic Sea, Gulf of Bothnia, and Gulf of Finland, between Sweden and Russia

Major City: Helsinki (capital)

Religions: Evangelical Lutheran 89%, Russian Orthodox 1%, none 9%, other 1%

Languages: Finnish 93.4% (official), Swedish 5.9% (official), small Sami- and Russian-speaking minorities

ECONOMIC OVERVIEW

Minister of Trade and Industry: Mauri Pekkarinen

Currency: Euro (EUR) US\$1 = 0.91996 EUR

Gross Domestic Product (GDP) (2002E) - market exchange rate: \$132.1 billion

Real GDP Growth Rate (2002E): 1.6% **(2003F):** 1.8%

Consumer Price Inflation (2002E): 1.6% **(2003F):** 1.0%

Unemployment Rate (2002E): 9.1% **(2003F):** 9.7%

Current Account Surplus (2002E): \$9.7 billion (7.4% of GDP)

Exports of Goods (2002E): \$44.7 billion

Imports of Goods (2002E): \$31.5 billion

Net Exports of Goods (2002E): \$13.2 billion

Major Trading Partners: Germany, Russia, Sweden, United States, United Kingdom

Major Export Products: Machinery and equipment, chemicals, timber, paper, pulp

Major Import Products: Foodstuffs, petroleum and petroleum products, chemicals, transport equipment, iron and steel, machinery, textile yarn and fabrics, grains

Foreign Exchange Reserves excluding gold (2002E): \$9.3 billion

ENERGY OVERVIEW

Proven Oil Reserves (1/1/03): None

Oil Production (2002E): None **Oil Consumption (2002E):** 211,000 bbl/d (all imported)

Crude Oil Refining Capacity (1/1/03): 251,800 bbl/d

Natural Gas Reserves (1/1/03): None

Natural Gas Production (2001E): None

Natural Gas Consumption (2001E): 161 billion cubic feet (all imported)

Coal Production (2001E): None

Coal Consumption (2001E): 7.3 million short tons (all imported)

Electric Generating Capacity (1/1/02): 16.2 gigawatts (66% thermal, 18% hydro, 16% nuclear, 0.2% "other")

Net Electricity Generation (2001E): 71.2 billion kilowatthours

ENVIRONMENTAL OVERVIEW

Minister of Environment and Nordic Cooperation: Jan-Erik Enestam

Total Energy Consumption (2001E): 1.33 quadrillion Btu* (0.3% of world total energy consumption)

Energy-Related Carbon Emissions (2001E): 14.4 million metric tons of carbon (0.2% of world carbon emissions)

Per Capita Energy Consumption (2001E): 255.5 million Btu (vs. U.S. value of 341.8 million Btu)

Per Capita Carbon Emissions (2001E): 2.8 metric tons of carbon (vs. U.S. value of 5.5 metric tons of carbon)

Energy Intensity (2001E; Purchasing Power Parity exchange rates): 7,851 Btu/thousand \$1990 (vs U.S. value of 12,068 Btu/thousand \$1990)**

Carbon Intensity (2001E; Purchasing Power Parity exchange rates): 0.09 metric tons of carbon/thousand \$1990 (vs U.S. value of 0.19 metric tons/thousand \$1990)**

Fuel Share of Energy Consumption (2001E): Oil (33.1%), Nuclear (16.5%), Coal (12.8%), Natural Gas (12.0%), Hydro (10.5%)

Fuel Share of Carbon Emissions (2001E): Oil (53.8%); Coal (29.9%), Natural Gas (16.3%)

Status in Climate Change Negotiations: Annex I country under the United

Nations Framework Convention on Climate Change (ratified February 21st, 1996). Signatory to the Kyoto Protocol.

Major Environmental Issues: Air pollution from manufacturing and power plants contributing to acid rain; water pollution from industrial wastes, agricultural chemicals; habitat loss threatens wildlife populations

Major International Environmental Agreements: Party to: Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Treaty, Biodiversity, Climate Change, Desertification, 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, Whaling

Signed, but not ratified: Air Pollution-Persistent Organic Pollutants, Climate Change-Kyoto Protocol

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, and 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 estimates from Global Insight

LINKS

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Links to other U.S. government sites:

[CIA World Factbook - Finland](#)

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

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