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# Singapore

*Singapore is a major refining center for Southeast Asia, with refining capacity of nearly double its rate of petroleum products consumption. It also is located strategically near the Strait of Malacca, a major route for oil tankers.*

*Note: The information contained in this report is the best available as of June 2005 .*



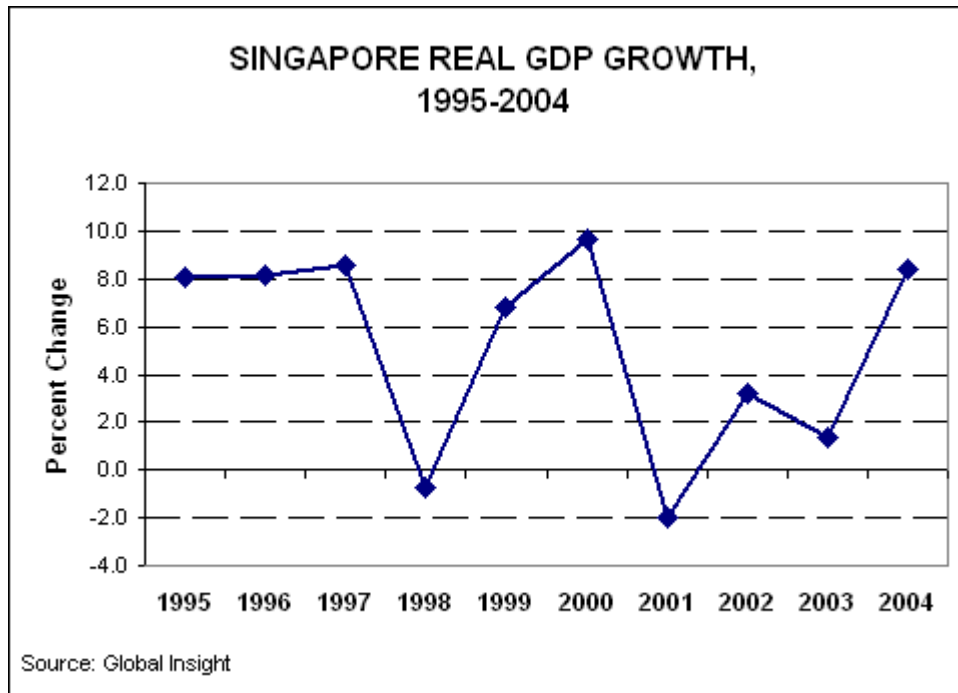
## GENERAL BACKGROUND

Singapore's strategic location at the entrance to the Strait of Malacca has helped it become one of the most important shipping centers in Asia. The Port of Singapore, the world's busiest in terms of shipping tonnage, is a key component of Singapore's prosperity and economic health. Singapore is also a leader in new biotechnologies, petroleum refining, and the manufacture of computer components.

Recognizing that Singapore's future growth depends on overcoming resource limitations and a small domestic market, the government of Singapore has vigorously encouraged local firms to regionalize their operations and to invest abroad. The government also has undertaken efforts to attract additional foreign investors to Singapore. China, India, and the fellow Association of Southeast Asian Nations

(ASEAN) have been identified as priority countries in Singapore's regionalization drive. During his May 2003 visit to Washington, Former Prime Minister Goh Chok Tong signed a Free Trade Agreement, which came into effect on January 1, 2004, as well as a Memorandum of Intent of Cooperation in Environmental Matters. Also in 2003, the United States and Singapore announced a cooperation agreement to enhance joint action in tackling security threats by terrorist groups and the spread of weapons of mass destruction. Trade between Singapore and the United States traditionally has been strong. The United States is Singapore's second largest trading partner, while Singapore is the United State's fifteenth largest partner, with total U.S. exports to the country valued at \$17.8 billion in 2004. Over 1,300 American companies have a presence or regional business headquarters in Singapore.

Singapore's economy has recovered from the lingering effects of the 2001 recession, the near-recession of 2002 and the slowdown of 2003. While Singapore's real GDP rose by only 1.4% in 2003, it increased by 8.4% in 2004 thanks to the recovery of the tourism sector, double-digit retail sales gains, rising investment rates, increased manufacturing production and the construction industry's recovery from a two-year slump, among other factors. More moderate growth (4.1%) is expected in 2005, largely due to a looming global electronics downturn and the cooling U.S. economy.



## OIL

While Singapore has no domestic oil reserves, local companies have become active in overseas exploration and production. In April 2004, Singapore Petroleum Company Ltd. (SPC) acquired a 10% participating interest in Blocks 102 and 106, covering approximately 5,405 square miles, in the Song Hong Basin in the Gulf of Tonkin, Vietnam. In October 2004, an oil and gas

discovery was made in the first exploitation well, Yentu-1X, in Block 106. SPC further expanded its upstream assets in 2004 through the purchase of El Paso Production Oil & Gas' stake in the Coastal Indonesia Sampang Ltd., which subsequently was renamed Singapore Petroleum Sampang Ltd.. The stake includes a 40% interest in the Sampang Production Sharing Contract, which contains the under-development Oyung oil and gas field off the coast of East Java, Indonesia.

A strategic location, sound financial system, excellent infrastructure, transparent legal system and skilled workforce have helped Singapore establish itself as one of the top three global oil trading hubs, as well as one of the top three global refining hubs. Singapore has a total crude oil refining capacity of approximately 1.3 million barrels per day (bbl/d) from its three main refineries: ExxonMobil's 605,000-bbl/d refinery; Royal Dutch/Shell's 458,000-bbl/d refinery on Pulau Bukom island; and the Singapore Refining Corporation's (SRC) 273,000-bbl/d refinery. In 2004, Singapore's average refinery utilization rate reached 91.5% of total capacity, the highest rate since early 1999.

Nevertheless, regional rivals increasingly challenge Singapore's leading position in the Asian market. New refineries in India, particularly the 540,000-bbl/d Reliance Petroleum refinery at Jamnagar, which began production in 2000, have reduced Indian demand for imports of refined products. The Melaka refining complex in Malaysia also has become a competitor. In early 2004, Thailand made clear its intentions to become a regional energy hub with the completion of its Sri Racha oil center and the implementation of generous tax incentives. Thailand has also proposed a \$700 million pipeline across southern Thailand as an alternative to shipment through the Malacca Straits. China has been working to liberalize its oil market as well. To counter the growing

competition to its energy hub status in the region, Singapore announced plans in February 2004 to lower by 50% corporate income taxes on oil companies that do business in the country.

In April 2004, Singapore Petroleum Company Ltd.'s (SPC) \$140 million bid to acquire the refinery assets of BP Singapore was thwarted by fellow shareholder ChevronTexaco subsidiary, Caltex Singapore. In July 2004, a revised agreement was announced under which SPC will pay \$70 million for half of BP's refinery stake in the 285,000-bbl/d SRC, with Caltex purchasing the other half.

Singapore has been working to increase its ties to the Middle East. In April 2004, following a 29-year hiatus, a delegation led by Singapore's Trade and Industry Minister made an official trip to Iran, aiming to build stronger political and business ties between the two nations. The trip followed visits in February and March 2004 by various Singapore officials to Egypt, Jordan, Bahrain, Qatar and the U.A.E. The general stated purposes of the trips included the establishment of joint free-trade agreements with several of the visited Middle Eastern countries and the development of potential markets for Singaporean companies in the energy-rich region.

A shortage of oil storage space in Singapore has spurred expansion of the country's independent storage facilities. While the major refineries hold the majority of the storage capacity (88 million barrels), the facilities of Singapore's three independent storage operators - Vopak, Oiltanking and Tankstore - reportedly have been running at above 90% capacity for the past five years (total independent capacity - 22.3 million barrels). Projects for two new petroleum terminals are underway. In September 2004, Vopak began construction of its Banyan terminal, which will have 16 oil and 12 chemical tanks, with the option to expand capacity further in the future. The second terminal is a planned joint venture between China Aviation Oil and Horizon, a subsidiary of Dubai-based Emirates National Oil Corporation (ENOC). Upon completion in mid-2006, the \$200 million facility on Jurong Island will increase Singapore's independent storage capacity by 5.3 million barrels. In March 2005, Titan Petrochemicals Group confirmed that it was also considering building an oil storage facility in Singapore. Underground storage facilities, which are particularly suitable for strategic reserves, are a final option under consideration. From 2003 to 2004, detailed studies were made of the business and geological aspects of such a project. According to the plans, 32 caverns on Jurong Island could provide 141 million cubic feet of additional storage space at a cost of \$470 million.

### **Petrochemicals**

The rapid growth of Singapore's petrochemical industry has been a direct result of the country's strong base in petroleum refining. A large project to reclaim seven small offshore islands to form a 12-square mile petrochemical complex on Jurong Island is in progress. The project will link Jurong to Singapore Island by a 1.62-mile causeway. The main oil companies involved with the facility include Esso (in Palau Ayer Chawan), Mobil Oil (in Palau Pesek) and Singapore Refinery Company (in Palau Merlimau). Singapore's petrochemical industry also benefits from its proximity to major markets like China.

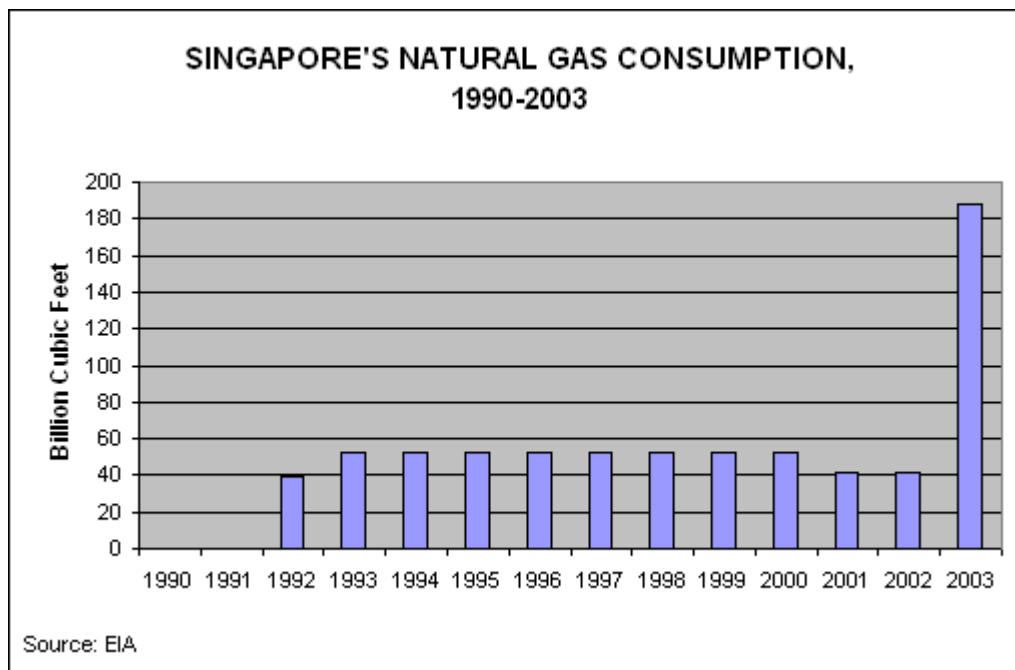
In late 2002, a second naphtha cracker owned by the Petrochemical Corporation of Singapore and its downstream partners, Phillips Petroleum, the Polyolefin Company, Hoechst, and Seraya Chemicals became operational. In early 2002, Germany's Messer Group and U.S.-based Texaco built a \$200 million synthetic gas plant on Jurong Island. The synthetic gas is being used for industrial purposes and as feedstock for petrochemical and refining customers on Jurong Island.

In January 2005, ExxonMobil announced plans to expand its petrochemical complex with investment in a second ethylene cracker in order to meet strong regional demand. The upgrade, which is expected to be completed in 2006, will expand output from 75,000 tons/ year to more than

900,000 tons/year. Royal Dutch/Shell also is moving ahead with a new naphtha cracker for its Jurong Island facility. The new plant is expected to produce 900,000 tons/ year of ethylene when it becomes operational in 2009. Ethylene is a chemical feedstock for plastics.

## NATURAL GAS

Singapore imports all of its natural gas, which is mainly used for power generation and petrochemical production. Natural gas use is rising rapidly, as the government promotes policies aimed at reducing carbon dioxide and sulfur emissions, ensuring energy security, and promoting the country as a regional hub for an integrated gas pipeline network. In 2002, the government set a target of 60% of the country's electricity to be generated from natural gas by 2012. By 2003, this goal had already been met. Singapore's Senoko Power currently imports 155 million cubic feet per day (Mmcf/d) of natural gas through a pipeline from Malaysia, its first natural gas supplier. This pipeline was the first transnational natural gas pipeline built in East Asia. With the contract for gas supplies from Malaysia scheduled to expire in 2007, Senoko Power spent the early part of 2004 in discussions with Malaysia's Petronas to extend the agreement.



Singapore has embarked on a diversification strategy to avoid becoming dependent on a single source for gas imports. In January 1999, the Singaporean gas consortium, SembGas, (which consists of SembCorp Engineering, Tuas Power, EDB International, and Belgium's Tractebel) signed

an agreement to purchase West Natuna gas from Indonesian state energy company Pertamina. Indonesian gas to Singapore comes via pipelines from two separate fields. Since January 2001, West Natuna has supplied 325 Mmcf/d as part of a 22-year deal, while Asamera in Sumatra is expected to supply 350 Mmcf/d by 2005. Another 100 Mmcf/d of natural gas is expected to be delivered via the Asamera pipeline from the ConocoPhillips field to Singapore's Island Power company in 2006. By the end of the decade, Singapore may be importing as much as 800 Mmcf/d of natural gas from Indonesia.

In December 2003, a month-long interruption of natural gas supplied from Indonesia's West Natuna fields, caused by an undersea pipeline leak, was successfully fixed, and gas deliveries restored. However, on June 29, 2004, power to 30% of the country (approximately 300,000 households) was interrupted due to a tripped valve at a natural gas receiving station for Indonesia's Natuna fields. This was the country's fifth power outage in less than two years, raising new concerns about the reliability of Singapore's natural gas supply.

Singapore currently has plans under discussion to build a liquefied natural gas (LNG) import



terminal, thereby freeing itself from dependence on neighboring states for its gas supply. In September 1999, the Singaporean government announced that land at Tuas View had been set aside for the project, but the plans were stalled for several years due to the \$500 million cost of the terminal, which was thought to make LNG more expensive than piped gas. However, the project has been revived over the past year following rising oil prices and the recent unreliability of piped Indonesian gas. In September 2004, Singapore's Energy Market Authority (EMA) received 26 bids to conduct a \$300,000, year-long feasibility study for the construction of the LNG terminal. In February 2005, Tokyo Gas Engineering (TGE) was appointed to carry out the three-part study. The first portion of the study, which covers the economics of LNG and the business model of an LNG terminal, was presented at a conference in May 2005. With the completion of the remainder of the study, which will cover site selection and capacity recommendations (part two), as well as regulatory considerations and competition in the LNG industry (part three), the EMA will be able to advise the Singaporean government on the project. LNG would have obvious energy-security benefits for Singapore, creating a reliable back up for piped gas. Should the government decide to proceed, the terminal could be operational by 2012. The government is reportedly looking into the possibility of constructing a larger terminal in order to store and export LNG to nearby countries, making Singapore a regional hub. The establishment of a futures market, where gas and LNG contracts could be traded, is also under consideration.

Singapore may eventually become important as a regional natural gas hub for Southeast Asia. The idea of a regional gas grid for members of the ASEAN has been under discussion for several years. International links already exist or are under construction between Burma and Thailand, Malaysia and Thailand, and Indonesia and Singapore. Singapore has an ideal location to function as the hub of such a system if it comes to fruition.

## **ELECTRIC POWER**

State-owned companies continue to hold a monopoly over Singapore's electricity sector, although the restructuring and privatization process has begun. The three main generation companies - PowerSeraya, Senoko Power and Tuas Power - which are subsidiaries of Singapore Power, together generate 90% of Singapore's electricity. In 2001, natural gas importer SembCorp entered the power generation business as an independent power producer (IPP), completing the construction of a 815-megawatt (MW) gas-fired plant under the name SembCorp Cogen. PowerGrid, another Singapore Power subsidiary, maintains and operates the country's electricity transmission and distribution system.

A regulatory agency for Singapore's electric utility sector, the Energy Markets Authority (EMA), was created in April 2001. The EMA has worked on details of the electricity sector privatization, as well as efforts to maintain a secure and reliable electricity industry. Liberalization of the electricity market began in January 2003, when, for the first time, power could be sold directly to industrial customers. Plans to extend the liberalization to residential users have been delayed until the end of 2006 in order to develop the retail market and the systems needed to ensure a smooth transition. In 2004, the EMA also began allowing large electricity consumers to sell their power offtake back to suppliers for profits. Although privatization has been delayed, Tuas Power, the newest and smallest of the three generating companies, which in 2003 achieved the highest profit per megawatt of installed capacity, as well as the lowest outage rate, appears to be the prime candidate for divestment. The sale of all three generation companies could come in late 2005. Following the end of the final phase of privatization, the primary retailers of electricity in Singapore will be Keppel Electric, Sembcorp Power, Tuas Power Supply, Senoko Energy Supply, Seraya Energy and Marubeni International Petroleum.

Reliability has become a large concern for Singapore's electricity market. Although it is a mature

market, characterized by overcapacity - the combined installed capacity of Senoko, Seraya, Tuas and Sembcorp exceeds peak load demand by 80% - Singapore recently experienced five power outages in under two years. As a result, a high-level Energy System Review Committee has been established to evaluate options for improving the reliability of the market. Short-term solutions include the use of gas-fired generation plants that can operate with diesel in the event of a prolonged gas disruption (cogeneration plants), the installation of additional independent power producers, and the establishment of two gas sources for each power plant. LNG imports are a longer-term solution.

Despite overcapacity, two new independent power producers are poised to enter the market: Island Power and Keppel. In 2003, Malaysia's Sime Darby Berhad (SDB) purchased a 50% share in Island Power's \$900 million, 715-MW natural gas fired combined cycle power project to be built by 2006 in Singapore. Island Power is a wholly-owned subsidiary of InterGen - a venture of Royal Dutch/Shell and Bechtel - however, Shell has announced plans to sell InterGen, as part of its divestment program. In March 2005, construction began on the 500-MW Keppel Merlimau Cogen power plant on Jurong Island. The plant is expected to become operational in the first quarter of 2007.

Most of the state-owned utilities' generating capacity has been converted from fuel oil to natural gas as it has become available. Much of the new planned capacity also will burn natural gas. Tuas Power awarded a contract to Mitsubishi in 2001 for two 367-MW combined cycle generating units, which are to be completed in 2006. In June 2004, Tuas Power signed a \$1 billion, 18-year contract to import natural gas from South Sumatra to power two plants, giving the company a total of four gas-powered plants. In 2004, Senoko Power unveiled a new combined-cycle, gas-turbine 360 MW power plant as part of its plans to convert from fuel oil to gas. The \$348 million project will bring 1,080 MW online, with the latest unit to be completed in 2005. Senoko expects the move to natural gas to reduce its carbon emissions by 2.5 million tons. In May 2005, Petrochemical Corp of Singapore, Anhydride Manufacturing and Elba Eastern all made requests to the EMA to expand the cogeneration capacities of their plants.

In March 2004, Singapore's biggest electricity producer Senoko Power signed a deal to extend the effective life of its generators for 12 years. The deal with Germany's Siemens involves retrofitting two 425-MW generators with improved technology and carrying out a major upgrade to reduce emissions by 2006.

In July 2004, Singapore Power acquired TXU Australia, thereby renamed SPI Australia Group, which has over 1 million customers predominantly in Victoria and South Australia. In March 2005, Singapore Power signed an agreement to sell the merchant energy business of SPI Australia to CLP Power Australia Energy Holdings in order to focus on power transmission and distribution.

In August 2004, work began on a 2.8-mile submarine cable to connect the mainland to Pulau Tekong, the largest offshore island, which currently relies on diesel generators. Connecting the electricity grid will improve the reliability of the power supply to the island and save an estimated \$800,000 per year. Work is expected to be completed in 2006.

## **ENVIRONMENT**

A large group of major refineries in Asia jointly agreed to launch a long-term dialogue with governments on measures to improve environmental conditions. Among some of the growing concerns among East Asian oil importers and producers are the conditions of the transport tankers ferrying fuel deliveries in regional waters. Particular attention in recent years has been devoted to the conditions of the aging Russian and Eastern European ships crossing the waters of East Asia. In 2002, the Singaporean government created a ten-year environmental initiative known as the

Singapore Green Plan 2012. Among other targets, the government set out to generate 60% of the country's electricity from natural gas - a target it has already met. The plan is currently undergoing a three year review.

*Sources for this report include: CIA World Factbook; Dow Jones News Wire; Economic Survey of Singapore 2003; Economist Intelligence Unit; Global Insight Asia Economic Outlook; Government of Australia Singapore Statistical Fact Sheet; International Monetary Fund; Oil & Gas Journal; Petroleum Economist; Reuters News Wire; The Straits Times (Singapore); U.S. Department of State; U.S. Energy Information Administration.*

## **COUNTRY OVERVIEW**

**President:** Sellapan Rama Nathan (since September 1, 1999)

**Prime Minister:** Lee Hsien Loong (since August 12, 2004)

**Deputy Prime Ministers:** Shunmugan Jayakumar (since August 12, 2004) and Tan Keng Yam Tony (since August 1, 1995)

Unicameral Parliament (84 seats, members elected by popular vote to serve five-year term)

**Independence:** August 9, 1965

Total Area: 267.5 sq. miles (slightly more than 3.5 times the size of Washington, DC)

**Population (July 2005E):** 4.4 million

**Location/Size:** Singapore lies in Southeast Asia, with Peninsular Malaysia to the north, East Malaysia to the east, and Indonesia to the south. The country consists of one main island and 54 islets located approximately 77 miles north of the equator.

**Major Cities:** Singapore

**Language:** Chinese, English, Malay, and Tamil

**Ethnic Groups:** Chinese (77%); Malay (14%); Indian (8%)

## **ECONOMIC OVERVIEW**

**Currency:** Singapore dollar

**Exchange Rate (5/31/2005):** 1.67 Singapore dollars = 1 U.S Dollar

**Real GDP Growth Rate (2004E):** 8.4% (2005F): 4.1%

**Inflation Rate (consumer prices): (2004E):** 1.7% (2005F): 1.0%

**Current Account Balance (2005F):** \$32.9 billion

**Merchandise Trade Balance (2005F):** \$25.1 billion

**Major Exports:** Machinery, petroleum and petroleum products, chemicals, telecommunications equipment, computer equipment, food and live animals, crude rubber, beverages, tobacco, clothing.

**Major Imports:** Machinery and transportation equipment, petroleum and petroleum products, crude materials, foodstuffs, tobacco, textiles, iron and steel, aircraft.

**Major Trading Partners:** Hong Kong, Japan, Malaysia, Taiwan, Thailand, United States.

**Total External Debt (2004E):** \$19.4 billion

**Unemployment Rate (2004E):** 3.4%

## **ENERGY OVERVIEW**

**Oil Consumption (2004E):** 749,000 barrels per day (bbl/d) (all imported)

**Natural Gas Production (2003E):** None

**Natural Gas Consumption (2003E):** 188 billion cubic feet (Bcf) (all imported)

**Crude Oil Refining Capacity (1/1/05E):** 1.3 million bbl/d

**Electric Generation Capacity (2002E):** 7.7 gigawatts (all thermal)

**Electricity Consumption (2002E):** 29.9 Billion kilowatthours (Bkwh)

**Electricity Generation (2002E):** 32.2 Bkwh

## **ENVIRONMENTAL OVERVIEW**

**Minister for the Environment and Water Resources:** Dr. Yaacob Ibrahim

**Total Energy Consumption (2002E):** 1.6 quadrillion Btu\* (0.4% of world total energy consumption)

**Energy-Related Carbon Dioxide Emissions (2002E):** 113.8 million metric tons (0.5% of world carbon dioxide emissions)

**Per Capita Energy Consumption (2002E):** 393.6 million Btu (vs. U.S. value of 339.1 million Btu)

**Per Capita Carbon Dioxide Emissions (2002E):** 27.2 metric tons (vs. U.S. value of 20.0 metric tons of carbon dioxide)

**Energy Intensity (2002E):** 14,370 Btu/\$1995 (vs U.S. value of 10,575 Btu/\$1995)\*\*

**Carbon Dioxide Intensity (2002E):** 0.99 metric tons/thousand \$1995 (vs U.S. value of 0.62 metric tons/thousand \$1995)\*\*

**Fuel Share of Energy Consumption (2002E):** Oil (97.3%), Natural Gas (2.7%), Coal (0.0%)

**Fuel Share of Carbon Dioxide Emissions (2002E):** Oil (98.0%), Natural Gas (2.0%), Coal (0.0%)

**Status in Climate Change Negotiations:** Non-Annex I country under the United Nations Framework Convention on Climate Change (ratified May 29th, 1997). Not a signatory to the Kyoto Protocol.

**Major Environmental Issues:** Industrial pollution; limited natural fresh water resources; limited land availability presents waste disposal problems; seasonal smoke/haze resulting from forest fires in Indonesia.

**Major International Environmental Agreements:** A party to Conventions on Biodiversity, Climate Change, Endangered Species, Hazardous Wastes, Law of the Sea, Nuclear Test Ban, Ozone Layer Protection and Ship Pollution.

\* 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 figures from OECD estimates based on purchasing power parity (PPP) exchange rates

## ENERGY INDUSTRY

**State Energy Companies:** Singapore National Oil Company; Singapore Petroleum Company; Singapore Power Company; PowerSeraya; PowerSenoko; Tuas Power; PowerGas

**Major Refineries (1/1/05E Capacity):** Singapore Petroleum Co. Ltd. (273,000 bbl/d); ExxonMobil Refining and Supply Co. (605,000 bbl/d); Shell Eastern Petroleum (Pte.) Ltd. (458,000 bbl/d)

**Major Ports:** Singapore

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