

COUNTRY ANALYSIS BRIEFS

Singapore

Last Updated: July 2006

Background

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.

Singapore's strategic location at the entrance to the [Strait of Malacca](#), through which roughly one-third of global sea commerce passes each year, has helped it become one of the most important shipping centers in Asia. The Port of Singapore, one of 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 energy 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. Trade between Singapore and the United States traditionally has been strong. The United States is Singapore's second largest trading partner, and Singapore is the United State's eleventh largest export market, receiving \$20.6 billion in U.S. exports in 2005.

Singapore's economy has recovered from the lingering effects of the 2001-2003 global recession and an outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003 that curbed tourism and consumer spending. In 2005, Singapore's real gross domestic product (GDP) grew at a rate of 6.4 percent, lower than the 8.4 percent rate in 2004. Economic forecasts suggest Singapore's real GDP will grow at 5.3 percent in 2006 and 4.9 percent in 2007.

Oil

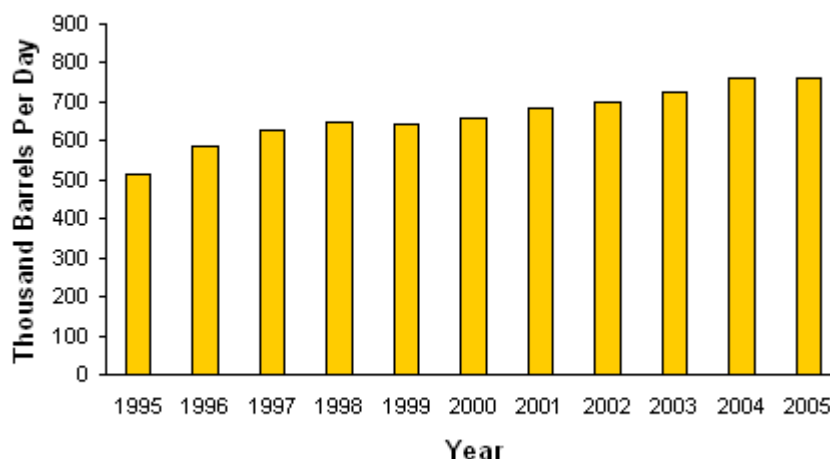
Although Singapore does not produce any

Singapore has no domestic oil reserves. The country consumed 763,000 barrels per day (bbl/d) of

oil domestically, it is an important oil trading and refining hub.

oil in 2005, flat from the previous year. Oil consumption in Singapore has increased 15 percent since 2000. Despite its lack of domestic oil resources, Singapore is a major oil refining and trading hub.

Singapore's Total Oil Consumption, 1995-2005



Source: International Energy Annual; Internal EIA Estimates

Exploration and Production

Although Singapore does not produce oil domestically, local companies have become active in overseas exploration and production. Singapore Petroleum Company Ltd. (SPC), which has been publicly traded on the Singapore Stock Exchange since October 1990, currently holds a 20 percent participating interest in Blocks 102 and 106, located offshore in the Song Hong Basin in the Gulf of Tonkin, [Vietnam](#). In October 2004, the company discovered oil and gas in the first exploration well, Yentu-1X, in Block 106. In June 2006 SPC and its partners began exploratory drilling in the HaLong-1X well, also in Block 106.

SPC owns a 36 percent working interest in the Sampang PSC, located offshore East Java, [Indonesia](#). The Sampang PSC contains the Oyong oil and gas field, the Jeruk oil discovery, and several exploration prospects. In April 2006, SPC and its partners in the Sampang PSC began drilling the Dukuh-1 exploration well. Also in Indonesia, SPC owns a 15 percent equity stake in the Kakap PSC, an oil and gas producing asset located offshore Indonesia in the West Natuna Sea. In May 2006, SPC announced that it successfully tested natural gas and condensate production at the Lukah-1X exploration well in the Kakap PSC.

In August 2005, SPC entered into an agreement with the government of Cambodia for a 30 percent interest in the Block B Petroleum Agreement in the Gulf of Thailand, where SPC and its partners plan to initiate a three-year exploration program beginning in late 2006.

Downstream Activities

According to *Oil and Gas Journal (OGJ)*, Singapore had a total crude oil refining capacity of approximately 1.3 million barrels per day (bbl/d) as of January 2006. The country's three refineries are ExxonMobil's Jurong/Pulau Ayer Chawan 605,000-bbl/d facility; Royal Dutch Shell's Pulau Bukom 458,000-bbl/d complex; and the Singapore Petroleum Company's Pulau Merlimau 273,600-bbl/d refinery. Because of Singapore's strategic location at the crossroads of the Indian and Pacific Oceans, its deep-water berths, and well-established infrastructure including oil refineries and storage terminals, the country has become an important oil trading and refining hub.

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 that 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 try to become a regional energy hub with the completion of its Sri Racha oil center and the implementation of generous tax incentives. The Thai government

has examined the possibility of cutting a canal through the narrowest part of Kra Isthmus, north of its border with Malaysia, as an alternative shipping route to the Malacca Strait. The estimated \$20 billion project would shorten the passage from the Indian to the Pacific Ocean by up to 700 nautical miles, but the plan has not received sufficient backing from the Thai leadership. To counter the growing competition to its energy hub status in the region, Singapore announced plans in February 2004 to lower by 50 percent corporate income taxes on oil companies that do business in the country.

In February-March 2004, various Singaporean officials traveled throughout the Middle East to promote stronger business ties between Singapore and the region. 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 2004 trips helped solidify the Singapore-Jordan Free Trade Area (FTA), and also helped initiate ongoing FTA negotiations with the Gulf Cooperation Council (GCC), which includes [Bahrain](#), [Kuwait](#), [Oman](#), [Qatar](#), [Saudi Arabia](#), and the [United Arab Emirates](#). Since 2004, Singapore has continued to reach out to the Middle East. Senior Minister Goh Chok Tong, the former Prime Minister, visited Saudi Arabia in February 2005, the first trip to the country by a senior-level Singaporean official in 20 years. In March 2006 Minister Mentor Lee Kuan Yew traveled to Riyadh, which was followed in April with a trip to Singapore by Crown Prince Sultan Bin Abdulaziz al-Saud, the deputy premier of Saudi Arabia.

Storage

A shortage of oil storage space in Singapore has spurred expansion of the country's independent storage facilities. Singapore's major oil refineries hold 88 million barrels of storage capacity, or 88 percent of the country's total storage capacity. Singapore's independent storage operators have a total current capacity of 24.4 million barrels, although this number will grow as companies bring new facilities on line. Over the last five years Singapore's independent storage providers have reportedly been running at above 90 percent capacity. In May 2006 Vopak began operations at its fourth storage terminal in Singapore, adding 2.1 million barrels of capacity at its Banyan site on Jurong Island. Oiltanking expects to complete a new facility in August 2006, also at Banyan, that would add 1.5 million barrels of storage capacity. Oiltanking anticipates that the new site would store clean petroleum products and will be linked by pipeline to its existing storage terminal on the island and also Shell's Bukom refinery. Another new storage project comes from Horizon Terminals, a subsidiary of Dubai-based Emirates National Oil Corporation (ENOC), which expects to finish constructing a 5.3 million barrel storage terminal on Jurong Island by the end of 2006, likely adding a second phase in mid-2007.

While this growth in petroleum storage in Singapore is driven by high regional oil demand, some independent analysts have expressed concern that the new terminals may lead to excess capacity. In 2006, construction began on the joint Hin Leong Trading/PetroChina Universal Terminal on Jurong Island, which will reportedly have a storage capacity of 14.2 million barrels. In April 2006, Singapore also greenlighted the development of storage facilities in underground rock caverns on Jurong Island with a potential capacity of up to 20.1 million barrels. Phase 1 of the project is scheduled to begin in late 2006 and add 8.8 million barrels of new storage capacity by 2009, with a possible Phase 2 adding an additional 11.3 million barrels in future years if there is sufficient demand. The underground caverns will store petroleum liquids and products like naphtha and gasoil.

Petrochemicals

The rapid growth of Singapore's petrochemical industry has been a direct result of the country's strong base in petroleum refining. Jurong Island is the center of Singapore's expanding petrochemicals industry. Companies on the island have benefited from lower operating costs through creating synergistic relationships, sharing facilities, integrated utilities, tax incentives, and proximity to important regional markets.

ExxonMobil, which already operates a 25,400 bbl/d (800,000 metric tons/year) ethylene cracker on the island, has plans to build another cracker of comparable size. Petrochemical Corporation of Singapore (PCS), a joint venture between Shell and a Japanese consortium led by Sumitomo Chemical, operates two other ethylene crackers on Jurong, with a total capacity of 44,500 bbl/d (1.4 million metric tons/year). PCS is also slated to bring a 6,400 bbl/d (200,000 metric tons/year) propylene cracker onstream on Jurong Island by year-end 2006. Shell is carrying out a detailed engineering study for a planned steam cracker at Palau Bukom and is expected to reach a final decision on whether or not to build the facility in 2006. The new plant would reportedly produce 28,600 bbl/d (900,000 metric tons/year) of ethylene when it becomes operational in 2009. ExxonMobil Chemical is also evaluating plans to build a second naphtha cracker in Singapore,

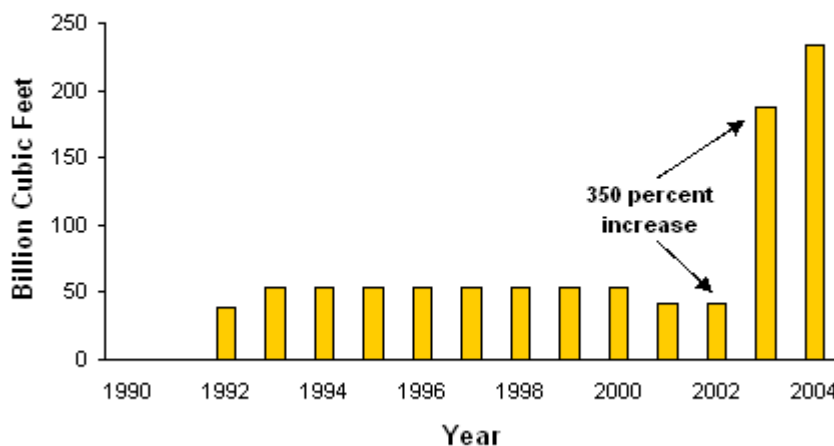
which would reportedly have a 22,500 bbl/d (one million metric tons/year) capacity. Royal Dutch Shell also is moving ahead with a new naphtha cracker for its Jurong Island facility. The new plant is expected to produce 28,600 bbl/d (900,000 metric tons/year) of ethylene when it becomes operational in 2009. Several other firms also plan to build new smaller petrochemical facilities in Singapore or upgrade preexisting facilities in the coming years.

Natural Gas

Singapore imports all of its natural gas, which is mainly used for power generation and petrochemical production. In 2004 Singapore consumed 233 billion cubic feet (Bcf) of natural gas, a greater than five-fold increase from the 2002 level of 41 Bcf.

Natural gas consumption has ballooned in recent years in Singapore, owing mostly to government programs that encourage the use of natural gas for electricity generation.

Singapore's Natural Gas Consumption, 1990-2004



Source: EIA International Energy Annual

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 percent of the country's electricity to be generated from natural gas by 2012. By 2003, this goal had already been met, and the Singapore's Energy Market Authority (EMA) reports that about 80 percent of the country's electricity demand comes from natural gas today. In November 2003 and June 2004, Singapore experienced power outages that were the result of natural gas supply disruptions. After the June 2004 incident, the government set up the Energy System Review Committee (ESRC) to study the root causes of the gas disruptions and propose measures to strengthen the energy system's reliability. Among other recommendations, the ESRC called upon Singapore to diversify its sources of natural gas, as it has historically relied on Indonesia for its natural gas imports.

Pipelines

Singapore's Senoko Power currently imports 155 million cubic feet per day (Mmcf/d) of natural gas through a pipeline from Malaysian national oil and gas company Petronas. The Senoko-Petronas deal is set to expire in mid-2008, though news reports suggest the two firms are working to extend the contract. In June 2005, Singapore conglomerate Keppel Energy reached an agreement to purchase 115 Mmcf/d of natural gas over 18 years from Petronas. To transport the natural gas, Keppel and Petronas are jointly constructing a 3 mile pipeline between Plentong in the southern Malaysian state of Johor to the Senoko area in the north of Singapore. However, the Plentong pipeline will have a capacity to transport up to 290 Mmcf/d of natural gas, which could provide for increased sales of natural gas to Singapore in the future.

In January 1999, the Singaporean consortium SembGas signed an agreement to purchase West Natuna natural gas from Indonesian state energy company Pertamina. Indonesian natural 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 a pipeline from Asamera in Sumatra began supplying 350 Mmcf/d in 2006. Another 100 Mmcf/d of natural gas is anticipated to be delivered via the Asamera pipeline from the ConocoPhillips field to power Singapore's planned Island

Power station, although the project has experienced numerous delays.

Liquefied Natural Gas (LNG)

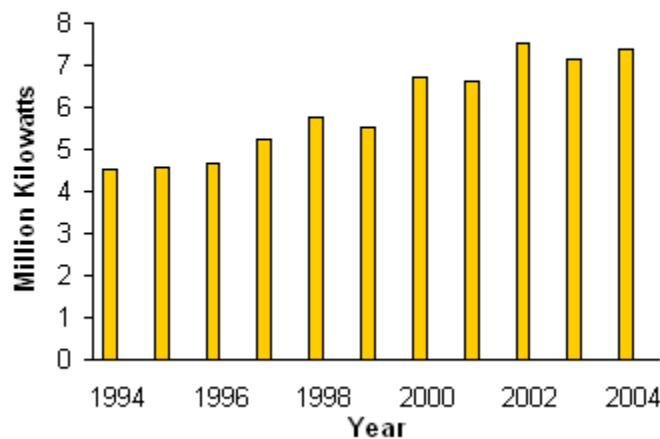
Singapore is currently studying the viability of building a liquefied natural gas (LNG) import terminal, thereby freeing itself from dependence on neighboring states for its natural gas supply. Currently all of Singapore's piped natural gas imports come from Indonesia and Malaysia. The government set aside land for the terminal in September 1999 at Tuas View, but the project was stalled for several years because the estimated \$500 million cost of the terminal was thought to make LNG more expensive than piped gas. The project has been revived over the past two years following rising oil prices and the natural gas disruptions in 2003 and 2004 that led to power outages. In February 2005, Singapore's Energy Market Authority (EMA) awarded a \$300,000 year-long feasibility study to Tokyo Gas Engineering (TGE) to advise the Singaporean government on the project. The results of the study have yet to be released. If approved, the project would be Southeast Asia's first LNG import terminal.

Electricity

Singapore generates the majority of its electric power from natural gas-fired plants.

In 2004, Singapore had 7.4 gigawatts (GW) of installed generation capacity, all of which came from conventional thermal sources (primarily natural gas). More recent figures from the Singaporean government show that total installed generation capacity will surpass 10 GW by year-end 2006. State-owned companies continue to dominate Singapore's electricity sector, although the restructuring and privatization process has begun. The three main generation companies – PowerSeraya, Senoko Power, and Tuas Power – together represent 90 percent of Singapore's electricity generation capacity.

Singapore's Total Installed Electricity Generation Capacity, 1994-2004



Source: EIA International Energy Annual

In April 2001, the government of Singapore created the Energy Markets Authority (EMA), a regulatory agency for Singapore's electric utility sector. The EMA has worked on details of the electricity sector privatization, as well as efforts to maintain a secure and reliable electricity industry. Although liberalization has been delayed, the three big generation companies - PowerSeraya, Senoko Power, and Tuas Power – have all been divested to the Singapore government's investment arm, Temasek Holdings, in preparation for privatization. Temasek will proceed with the sale of the three once liberalization of the gas market, including adoption of a new Gas Market Code, is completed. This could come as early as year-end 2006. Liberalization of the electricity market began in January 2003, when, for the first time, power could be sold directly to industrial customers.

Reliability has become a large concern for Singapore's electricity market. Singapore recently experienced five power outages in less than two years, which resulted mainly from natural gas supply disruptions. These outages occurred even though Singapore's electricity market has abundant reserve margins. According to the EMA, the combined installed electricity generating capacity in the country will reach more than 10,200 MW by the end of 2006, almost double the

peak demand of 5,200 MW. The government of Singapore established a high-level Energy System Review Committee (ESRC) to evaluate options for improving the reliability of the market. Short-term solutions include the use of natural gas-fired generation plants that can operate with diesel in the event of a prolonged natural gas disruption (cogeneration plants), the installation of additional independent power producers, and the establishment of two natural gas sources for each power plant. LNG imports are a longer-term option.

Despite overcapacity, new power stations have been introduced or are under construction. This appears to be an effort to introduce newer, more reliable power plants that burn natural gas rather than coal. The newest player in the electricity generating sector is SembCorp Cogen, which built an 815-MW power station in early 2002 that consists solely of natural gas-fired combined cycle gas turbine (CCGT) technology. Since that time, all new power plants in Singapore have been cogeneration CCGT facilities. Keppel Energy plans to commence operations at a 500-MW cogeneration CCGT plant by the end of 2006. In 2005, Tuas Power commissioned two new 360-MW CCGT units. Senoko Power, Singapore's largest generating company, produces only 60 percent of its power from CCGT plants and has been the slowest to bring new cogeneration units on-stream.

Environment

Singapore is taking steps to reduce its carbon intensity and improve the country's energy efficiency.

On 12 April 2006, Environment and Water Resources Minister Yaacob Ibrahim announced that Singapore had ratified the Kyoto Protocol to help tackle global greenhouse gas (GHG) emissions. However, Singapore is a non-Annex I party to the agreement and therefore is not legally bound to a specific emissions target. Singapore has established its own targets as part of its National Climate Change Strategy (NCCS). The country aims to reduce its carbon intensity by 25 percent compared to 1990 levels. In 2005, Singapore's carbon intensity was at 22 percent below 1990 levels. The NCCS is part of a larger ten-year environmental initiative known as the Singapore Green Plan 2012. Aside from its GHG emissions targets, the government has set out to introduce energy efficiency labels for home appliances, reduce per capita water consumption, improve waste management services, and other goals.

Profile

Country Overview

Chief of State	President S. R. Nathan (since September 1, 1999)
Head of Government	Prime Minister Lee Hsien Loong (since August 12, 2004)
Location	Southeastern Asia, islands between Malaysia and Indonesia
Independence	9 August 1965 (from Malaysian Federation)
Population (2005E)	4,425,720
Languages	Mandarin 35%, English 23%, Malay 14.1%, Hokkien 11.4%, Cantonese 5.7%, Teochew 4.9%, Tamil 3.2%, other Chinese dialects 1.8%, other 0.9% (2000 census)
Religion	Buddhist 42.5%, Muslim 14.9%, Taoist 8.5%, Hindu 4%, Catholic 4.8%, other Christian 9.8%, other 0.7%, none 14.8% (2000 census)
Ethnic Group(s)	Chinese 76.8%, Malay 13.9%, Indian 7.9%, other 1.4% (2000 census)

Economic Overview

Currency/Exchange Rate (June 28, 2006)	1 Singapore Dollar (SGD) = 0.625 USD
Inflation Rate (2004E, 2005E, 2006F)	1.7%, 0.5%, 1.4%
Gross Domestic Product (2005E)	\$116.8 billion
Real GDP Growth Rate (2004E, 2005E, 2006F)	8.7%, 6.4%, 5.3%
Unemployment Rate (2005E)	3.3%
External Debt (2005E)	\$24.67 billion
Exports (2005E)	\$226.9 billion
Exports - Commodities	machinery and equipment (including electronics), consumer goods, chemicals, mineral fuels
Exports - Partners (2004E)	Malaysia 15.2%, US 13%, Hong Kong 9.8%, China 8.6%, Japan 6.4%, Taiwan

	4.6%, Thailand 4.3%, South Korea 4.1%
Imports (2005E)	\$186.9 billion
Imports - Commodities	machinery and equipment, mineral fuels, chemicals, foodstuffs
Imports - Partners (2004E)	Malaysia 15.3%, US 12.7%, Japan 11.7%, China 9.9%, Taiwan 5.7%, South Korea 4.3%, Thailand 4.1%
Current Account Balance (2005E)	\$33.2 billion

Energy Overview

Proven Oil Reserves (January 1, 2006E)	None
Oil Production (2006E)	8,300 barrels per day, of which 0% was crude oil.
Oil Consumption (2005E)	779.4 thousand barrels per day
Crude Oil Distillation Capacity (2006E)	1,336.6 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2006E)	None
Natural Gas Production (2004E)	None
Natural Gas Consumption (2004E)	233.4 billion cubic feet
Recoverable Coal Reserves (2003E)	None
Coal Production (2004E)	None
Coal Consumption (2004E)	None
Electricity Installed Capacity (2004E)	7.4 gigawatts
Electricity Production (2004E)	32.6 billion kilowatt hours
Electricity Consumption (2004E)	30.4 billion kilowatt hours
Total Energy Consumption (2004E)	1.9 quadrillion Btus*, of which Oil (89%), Natural Gas (11%), Coal (0%), Nuclear (0%), Hydroelectricity (0%), Other Renewables (0%)
Total Per Capita Energy Consumption (2003E)	413.4 million Btus
Energy Intensity (2003E)	17,873.6 Btu per \$2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2003E)	118.5 million metric tons, of which Oil (91%), Natural Gas (9%), Coal (0%)
Per-Capita, Energy-Related Carbon Dioxide Emissions (2003E)	27.9 metric tons
Carbon Dioxide Intensity (2003E)	1.2 Metric tons per thousand \$2000-PPP**
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 Environmental Agreements	party to: Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Ozone Layer Protection, Ship Pollution signed, but not ratified: none of the selected agreements

Oil and Gas Industry

Organization	Singapore National Oil Company; Singapore Petroleum Company; Singapore Power Company; PowerSeraya; Senoko Power; Tuas Power
Major Ports	Singapore
Foreign Company Involvement	ExxonMobil, Royal Dutch Shell, Chevron, BP, Total, Marubeni, Mitsui
Major Refineries (capacity, bbl/d)	Singapore Petroleum Co. Ltd. (273,600); ExxonMobil Refining and Supply Co. (605,000); Shell Eastern Petroleum Ltd. (458,000)

* 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.

Links

EIA Links

[EIA - Country Information on Singapore](#)

U.S. Government

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

[U.S. State Department Consular Information Sheet - Singapore](#)

[CIA World Factbook - Singapore](#)

[U.S. Embassy in Singapore](#)

Foreign Government Agencies

[Singapore - Energy Market Authority \(EMA\)](#)

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[Singapore Department of Statistics](#)

Electricity

[Singapore Power Company](#)

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Government of Singapore

U.S. Census Bureau Foreign Trade Statistics Division

The Business Times (Singapore)

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