

COUNTRY ANALYSIS BRIEFS

Indonesia

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General Background

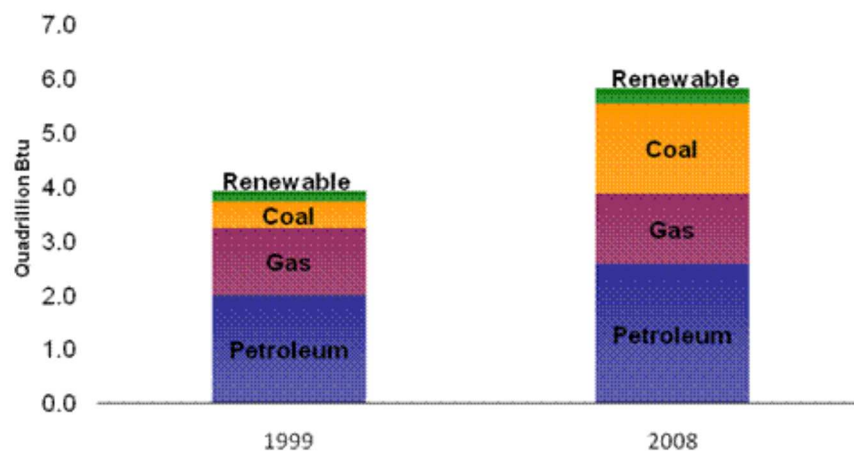
Though no longer a net exporter of oil, Indonesia is a leading exporter of both coal and natural gas. As domestic energy needs grow, Indonesia is increasingly trying to focus on securing energy sources for its domestic market.

Indonesia has the largest population in Southeast Asia and the fourth largest population in the world (behind China, India, and the United States). It is also the world's third-fastest growing economy. Although Indonesia has been a net importer of oil since 2004, it is the sixth largest net exporter of natural gas, and the second largest net exporter of coal. However, as a result of inadequate infrastructure and Indonesia's complex business environment, Indonesia has struggled to attract investment sufficient to meet its energy development goals.



Indonesia's total primary energy consumption grew by nearly 50 percent between 1999 and 2008. Oil continues to account for the most significant share of Indonesia's energy mix, at 44 percent in 2009. Coal consumption has tripled over the decade, accounting for 29 percent of total energy consumption in 2008, surpassing gas as the second most consumed fuel.

Total Primary Energy Consumption in Indonesia



Source: EIA International Energy Statistics

Indonesia is also a significant consumer of traditional biomass in its residential sector, particularly in the more remote areas that lack connection to Indonesia's energy transmission networks (power grids and pipelines, for example). The International Energy Agency estimates that combustible renewables and waste account for about a quarter of total primary energy supply.

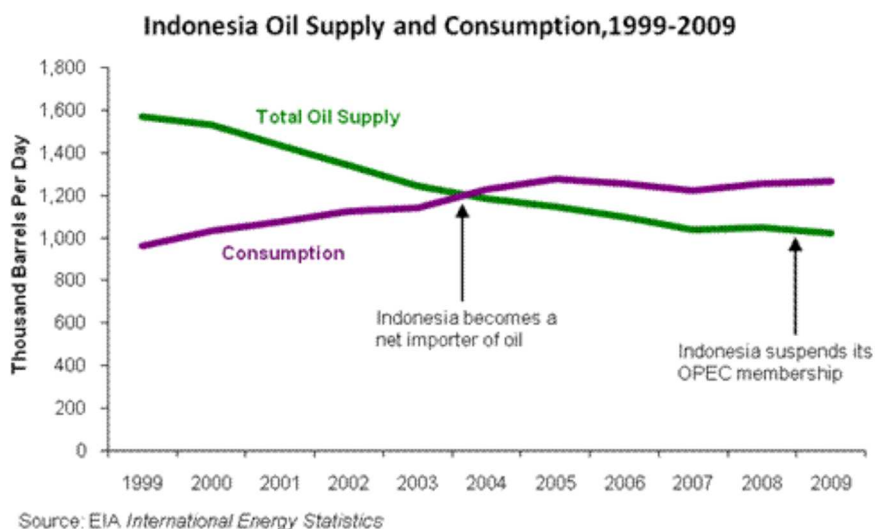
Oil

Indonesia's oil production has declined in recent years, as older fields

Indonesia is currently a net importer of both crude oil and refined products. Indonesia's crude oil production has been declining since 1998, due to the maturation of the country's largest oil fields and failure develop new, comparable resources. Indonesia was a member of the Organization of Petroleum Exporting Countries (OPEC) from 1962 to 2009. In 2004, the country became a net oil

decline and new projects fail to replace them.

importer and in January 2009, suspended its OPEC membership.



Sector Organization

Indonesia's upstream oil sector is dominated by several international oil companies - in particular Chevron, Total, Conoco Phillips, Exxon, and BP. Chevron is the largest single oil producer in Indonesia, accounting for more than 40 percent of the country's total crude production. PT Pertamina, Indonesia's state-owned integrated energy supply company, accounted for approximately 15 percent of 2009 crude and condensate production, making it the second largest producer in the country.

The Indonesia Ministry of Energy and Mineral Resources is responsible for entering into production sharing contracts (PSCs), while the state-owned legal entity BPMigas serves as the upstream regulator that manages and implements these agreements. Indonesia's 2001 Oil and Gas Law significantly restructured Indonesia's upstream oil and gas sector - most notably transferring the upstream regulatory role from PT Pertamina to BPMigas. Although PT Pertamina continues to be wholly state-owned, the 2001 law also led to its establishment as a limited liability corporation in 2003. Senior Pertamina officials have indicated plans to divest two of its subsidiaries by about 20 percent in an initial public offering, but details and timing have not been confirmed.

In addition to its upstream activities, PT Pertamina operates nearly all of Indonesia's refinery capacity, procures crude and products imports, and supplies products to the domestic market. While Pertamina's monopoly in the retail market ended in 2004, the company continued to be the sole distributor for subsidized fuels until early 2010. With the December 2010 decision to gradually remove fuel subsidies for private vehicles, Pertamina now competes more directly with product retailers.

Exploration and Production

According to Oil & Gas Journal, Indonesia had 3.9 billion barrels of proven oil reserves as of January 2011. In 2010, total oil supply averaged just over one million barrels per day (bbl/d). Of this total, about 943,000 bbl/d was crude oil and lease condensate production. Crude and condensate production has declined at an annual average rate of 4.1 percent between 2000 and 2010.

Indonesia's two largest producing oil fields are the Minas and Duri fields, located on the eastern coast of Sumatra. Chevron operates both fields with a 100 percent working interest under the Rokan Production Sharing Agreement. Producing since 1952 and 1955 respectively, production at both fields is in decline, even with the employment of enhanced oil recovery techniques at both fields to bolster production. Chevron uses steam injection enhanced oil recovery for 80 percent of the Duri field, one of the largest steamflood projects in the world.

The most significant recent discovery with the potential to counteract some of Indonesia's production decline is the Cepu Block of East and Central Java. Exxon Mobil is the operator of the Cepu PSC (45 percent interest), in a joint venture with PT Pertamina's E&P unit (45 percent working interest) and four local government companies (10 percent interest). Cepu is estimated to contain 600 million barrels of recoverable liquids, and to have a peak production of 165,000 bbl/d. Although discovered in 2001, the project has encountered several delays in the development process, and Exxon recently revised its goal for peak production from 2012 to 2014. Banyu Urip is currently the only producing field in the Cepu PSC, and as of January 2010, had reached a production level of about 18,000 bbl/d.

BPMigas and the Indonesian government have introduced policies aimed at increasing investment in the country's upstream sector – in particular via investment incentives and improving the flexibility of the PSC bidding process. However, the upstream investment environment is still considered to be risky, and 2009 and 2010 licensing rounds were disappointing. Recent events that caused particular concern were Parliament's attempts to mandate cost recovery caps for PSCs, as well as the government's cabotage rule – a shipping regulation requiring all marine vessels to carry the Indonesian flag. The government has since announced that cost recovery caps would be removed, and that implementation of the cabotage rule will except oil and gas vessels. However, Indonesia failed to meet its 2010 production goal of 965,000 bbl/d of crude and condensate production, and signed only 21 new oil and gas PSCs in 2010, relative to 34 in 2008.

Refining

Indonesia has a refinery capacity of just over one million bbl/d, according to Oil & Gas Journal. Spread across eight refineries owned by PT Pertamina, the majority of the country's refinery capacity is located on Java and Sumatra. The three largest refineries are Cilacap (348,000 bbl/d) in Central Java, Balikpapan (260,000 bbl/d) in East Kalimantan, and Bolongan (125,000 bbl/d) in West Java. Refinery output goes primarily to the domestic market, but meets only about 70 percent of domestic consumption. Pertamina plans to eliminate the need for product imports by 2017, and in the last few years has announced several refinery upgrade, expansion and greenfield projects in support of this goal. However, most of these projects have been delayed, as low refining margins and lack of government financial incentives have deterred investment from international partners.

Pertamina signed an agreement with Kuwait Petroleum Corporation in August of 2010 to study an upgrade to the Bolongan refinery in West Java. The company is also in discussion with Saudi Aramco to build a new 200,000-300,000 bbl/d refinery in East Java, though Saudi Aramco indicated late in 2010 that Indonesia's government would need to provide more incentives in order to secure the company's participation. Pertamina's planned 300,000 bbl/d Banten Bay refinery in Bojanegoro is currently administered by a joint venture with Iran's Oil Refining Industries Development Company and Malaysia's Petrofield Refining – but the project was recently evaluated as being "economically infeasible" by Pertamina leadership.

The above-mentioned projects would all be supported by some level of guaranteed crude supply from Kuwait Petroleum Corporation, Saudi Aramco, and the National Iranian Oil Company respectively. These sources are vital for project viability as Indonesia's domestic crude production continues to lag. However, after years of delays and failed partnerships, there is little confidence in the mid-term completion of any of these projects, and none are expected to be online prior to 2015. Upgrades to existing refineries may continue to move forward – for example, Cilicap's 62,000 bbl/d residual fluid catalytic cracking unit still appears to be on track for 2013 or 2014 completion.

Consumption

Consumption of refined products grew at a fairly steady 4.7 percent average annual growth rate between 1995 and 2005, but declined by about two percent in both 2006 and 2007, largely as a result of the 126 percent increase in the price of subsidized fuel implemented in 2005. The 2005 price increases - and the removal of fuel subsidies for large industrial consumers – were part of President Yudhoyono's early attempts to gradually eliminate fuel subsidies. Consumption increased in both 2008 and 2009, exceeding 1.3 million bbl/d in 2009.

Fuel subsidies will account for nearly ten billion dollars in 2010, or about ten percent of the government's tax revenues. In December of 2010 the Indonesian parliament approved a measure to remove fuel subsidies for all vehicles excluding motorcycles and public transportation vehicles. Cash transfers will be used to ease the impact on the economically disadvantaged. The policy was initially slated for April 2011 implementation in the greater Jakarta area, and nationwide by 2013. However, implementation was indefinitely delayed in March 2011 due to concerns over the effect on the rate of inflation.

Natural Gas

According to *Oil & Gas Journal*, Indonesia had 106 trillion cubic feet (Tcf) of proven natural gas reserves as of January 2011. Indonesia is the fourteenth largest holder of proven natural gas reserves in the world, and the third-largest in the Asia-Pacific Region. Although domestic consumption of natural gas has nearly doubled since 2004, Indonesia continues to be a major exporter of pipeline and liquefied natural gas (LNG).

Sector Organization

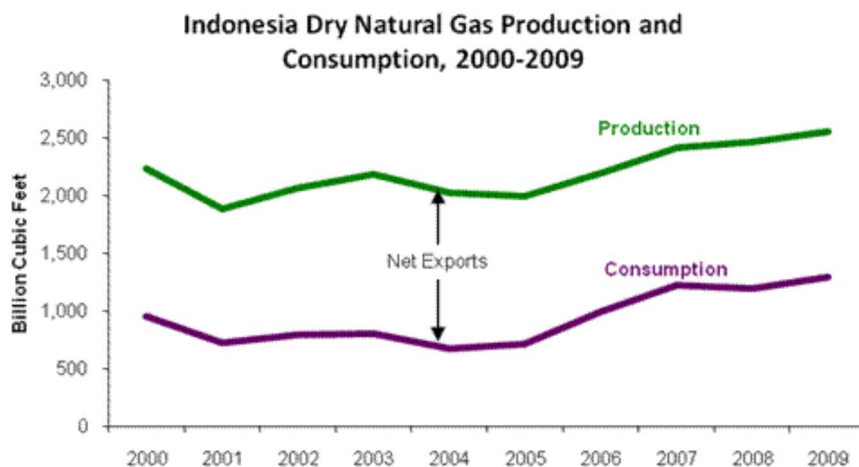
The regulatory structure that shapes Indonesia's upstream oil sector also forms the basis for the gas sector (see Oil: Sector Organization). BPMigas serves as the upstream regulator, and state-owned PT Pertamina - though still active in upstream exploration and production - no longer plays a regulatory role. Pertamina accounts for about 15 percent of natural gas production. International oil companies such as Total, ConocoPhillips, and ExxonMobil dominate the upstream gas sector, while natural gas transmission and distribution activities are carried out by the

Natural gas production has increased by more than a quarter since 2005. Indonesia exported about half of its natural gas consumption in 2009 – but the share of domestic consumption is expected to increase.

state-owned utility Perusahaan Gas Negara (PGN).

Production

In 2009, Indonesia produced 2.6 Tcf of dry natural gas. Production has grown at an average annual rate of about 1.5 percent over the previous two decades, and Indonesia's 2009 gas production was the eleventh-highest in the world. A little more than half of Indonesia's 2009 production came from offshore fields, although the government estimates that more than 70 percent of the country's conventional gas reserves may be located offshore. An increasingly large majority of Indonesia's natural gas production has come from non-associated fields in recent years, with associated gas accounting for about 18 percent of gross production in 2009.



Indonesia's geography presents a challenge to resource development, because the archipelago nation's most prolific blocks of conventional gas reserves are located far from its major demand markets. The most significant areas for current natural gas production are:

- East Kalimantan's offshore fields, particularly the Mahakam PSCs operated by Total
- South Sumatra, particularly the onshore Corridor PSC operated by Conoco Phillips
- Aceh and North Sumatra, including Exxon Mobil's declining offshore Arun field
- South Natuna Sea, offshore Block B operated by Conoco Phillips

In 2009, East Kalimantan's offshore Mahakam PSCs accounted for about a third of gross production.

In addition to expansion of current projects, there are several major new gas projects in development for the next decade. Total and Petronas (Malaysia) recently joined ExxonMobil and Pertamina to develop the Natuna D-Alpha field in the East Natuna Sea. Pertamina expects the project to start by 2021, and has estimated that East Natuna in total holds 46 Tcf of gas. However, the field contains about 70 percent carbon dioxide, significantly tightening production margins for its developers. Chevron is pursuing the deepwater Gendalo-Gehem project with partners Eni (Italy) and Sinopec (China). At its peak, the project – which spans four PSC blocks – may produce 400 Bcf per year. The project is Indonesia's first deepwater gas project. According to BPMigas, the first stage of the project will come from the Bangka field, and may commence as early as 2014. Inpex (Japan) received permission to begin development in its Masela block, which is estimated to hold about 14 Tcf of natural gas. This offshore block in the Arafura Sea will serve export markets through the planned associated LNG terminal (see LNG section), and is expected to begin production in 2016.

In addition to its considerable conventional gas resources, Indonesia also holds an estimated 453 Tcf of coalbed methane (CBM), a type of unconventional gas whereby methane – the primary component of natural gas – is extracted from coal beds. CBM reserves are located relatively close to Indonesia's population centers, primarily in South Sumatra and Kalimantan. The government began awarding PSC's in 2008, though all are still in exploration phase. However, first production is expected to begin in some of the PSCs held by local companies in late 2011 and 2012. Though local consortiums hold many of the existing CBM PSCs, foreign majors BP, Eni (Italy), and Dart Energy (Australia) also hold shares in Indonesia's CBM blocks.

Exports

Indonesia was the world's sixth largest net exporter of natural gas in 2009. Although the majority of Indonesia's gas exports are transported as LNG, Indonesia also exports about a quarter of its gas exports via pipeline to Singapore, with which it has two pipeline connections: one from its offshore

fields in the West Natuna Sea, and the other from the Grissik gas processing plant in Sumatra. These pipelines have a combined capacity of approximately 400 Bcf/y and deliver gas to Singapore under long-term contracts, both set to expire around 2020. However, as part of its efforts to secure its own domestic supply, the Indonesian government has expressed an interest in negotiating a reduction in the volumes of these contracts.

The remaining three-quarters of Indonesia's gas exports - excluding a small amount of pipeline exports to Malaysia - are exported as LNG. Japan is the major destination for Indonesia's LNG exports, accounting for about 65 percent of total LNG exports, but South Korea and Taiwan are also significant importers (see Liquefied Natural Gas for more information).

Consumption and Distribution

Indonesian gas production initially was geared towards exports, but the country's declining oil production has driven an effort to shift increasing volumes toward domestic consumption. In 2009, Indonesia consumed 1.3 Tcf of natural gas, or about half of its total dry gas production. Although the industrial sector accounts for the largest portion of domestic consumption, the power sector is expected to be the most significant driver of future consumption growth.

Indonesia's gas distribution utility Perusahaan Gas Negara (PGN) currently operates more than 3,500 miles of natural gas transmission and distribution pipelines. However, domestic distribution infrastructure is almost non-existent outside of PGN's Java and North Sumatra strategic business units. According to PGN, in 2009 there was over 400 Bcf of unmet demand for gas among domestic industrial and electric power consumers.

PGN began operations of the South Sumatra-West Java pipeline in 2008, providing an important link between the gas producing region of South Sumatra and the densely populated market of West Java. The Grissik-Duri pipeline is another important domestic transmission pipeline, as it provides gas to Chevron's Duri (see Oil: Exploration and Production) field for its steamflooding and power generation activities. A pipeline problem in September of 2010 resulted in a production outage, which has since been cited as a contributing factor to Indonesia's failure to meet its 2010 oil production goals.

Liquefied Natural Gas

Indonesia was the third-largest exporter of liquefied natural gas in 2009, following only Qatar and Malaysia. There are three operational liquefaction terminals in Indonesia, with a combined production capacity of about 1.6 Tcf (32 million metric tons (MMT)) per year. In 2009, Indonesia exported about 950 Bcf of LNG.

The Bontang LNG terminal in East Kalimantan is the largest in Indonesia at about 1.1 Tcf/y (22.6 MMT/y), and one of the largest in the world. Bontang delivered its first cargo in 1977, and was followed shortly thereafter (1978) by the Arun liquefaction terminal in Northern Sumatra. Due to a lack of sufficient additional gas reserves in the Arun field, LNG exports from the Arun plant have been declining in recent years, and are expected to stop altogether by 2014. The newest addition, BP-operated Tangguh in Western Papua, came online in July of 2009 and exported almost 330 Bcf in 2010. BP had originally intended to add a third train to Tangguh's first two trains, but has not yet proceeded with plans for this project.

Indonesia's Liquefaction Capacity			
	Location	Capacity (Bcf/y)	Commercial Operations
Operational			
Arun	Aceh	102	1978
Bontang	East Kalimantan	1101	1977
Tangguh	Papua	370	2009
Planned			
Donggi-Senoro	Sulawesi	102	2014
Masela	Arafura Sea, Maluku Province	122	2016+
Sources: FACTS Global Energy, BP, Inpex			

The next anticipated addition to Indonesia's liquefaction capacity is the Donggi-Senoro LNG plant in Central Sulawesi. The project developers (Mitsubishi, Kogas, Pertamina, and Medco) signed a final investment decision in early 2011, and the 370 Bcf/y (2.5 MMT/y) plant is expected to be commercial in 2014. Inpex, a Japanese company, received government approval at the end of 2010 for the Masela liquefaction terminal in the Arafura Sea, but has delayed the expected startup date of the floating terminal until 2018.

LNG exports have been a politically charged topic in Indonesia, due to the perception of LNG exports removing much-needed gas from the domestic market. The expected growth in gas

demand – in addition to the currently unmet demand, has led the government to pursue policies for securing domestic supplies for the local market. The Donggi-Senoro plans received government approval only after 30 percent of the output was designated for domestic consumption. Similarly, a third of the output from Inpex's planned Masela floating LNG liquefaction terminal will be designated for the domestic market, according to regulator BPMigas. Indonesia also plans to reorient the output from the Bontang LNG plant – which is relatively centrally located – into the domestic market over the next decade. Though the plant will remain operational, it will send LNG within Indonesia - and no longer serve export markets by 2020.

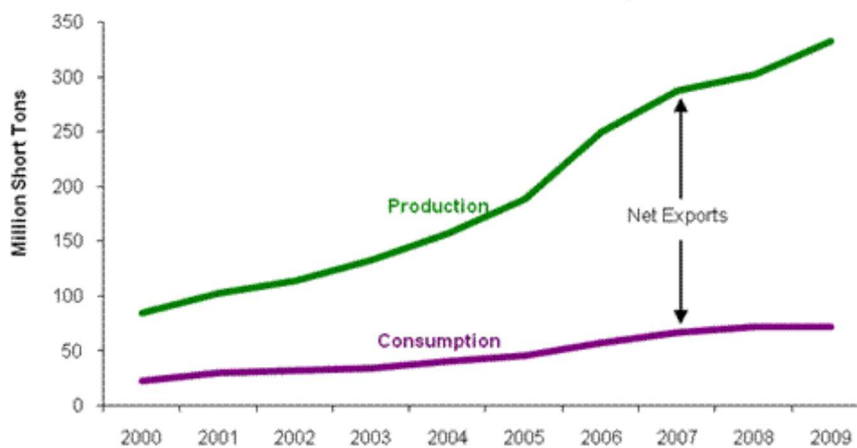
In order to have more flexibility to secure supplies of both domestic and foreign LNG, plans for several LNG receiving terminals are underway in Indonesia. The first regasification terminal, a 143 Bcf/y (3.0 MMT/y) joint-venture between Pertamina and PGN, will supply the Jakarta market starting in the first quarter of 2012. Pertamina also plans to invite bids for an additional receiving terminal of similar size to serve East Java. In addition, Pertamina and PLN (Indonesia's state electricity firm) have announced plans to develop eight LNG receiving "mini terminals" by 2015, with a total capacity of 67 Bcf/y (1.4 MMT/y). These terminals will be scattered throughout the eastern region of the island nation, and are intended to guarantee supply of natural gas for electricity plants.

Coal

Indonesia's coal exports have more than quadrupled in the last decade, making it the second-largest coal exporter in the world, and a critical player in Asian coal markets.

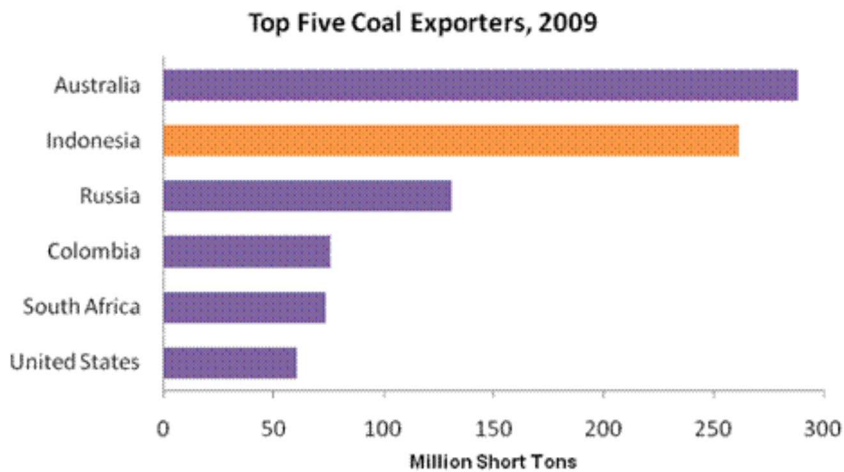
According to EIA estimates, Indonesia has 4.8 billion short tons of recoverable coal, of which the vast majority is located in Sumatra and East and South Kalimantan. Government and industry estimates suggest that the resource base may be considerably higher than this amount. Indonesian coal production – which is primarily bituminous or sub-bituminous in rank – has approximately quadrupled between 2000 and 2009, reaching 333 MMst in 2009. In the same year, Indonesia consumed 77 MMst of coal, which was less than a quarter of its production, but more than three times the consumption level in 2000. Power plants accounted for nearly two-thirds of 2009 total coal sales. Electricity sector demand for coal is expected to more than double by 2014 as a result of coal-fired generation capacity additions.

Indonesia Coal Production and Consumption, 2000-2009



Source: EIA, *International Energy Statistics*

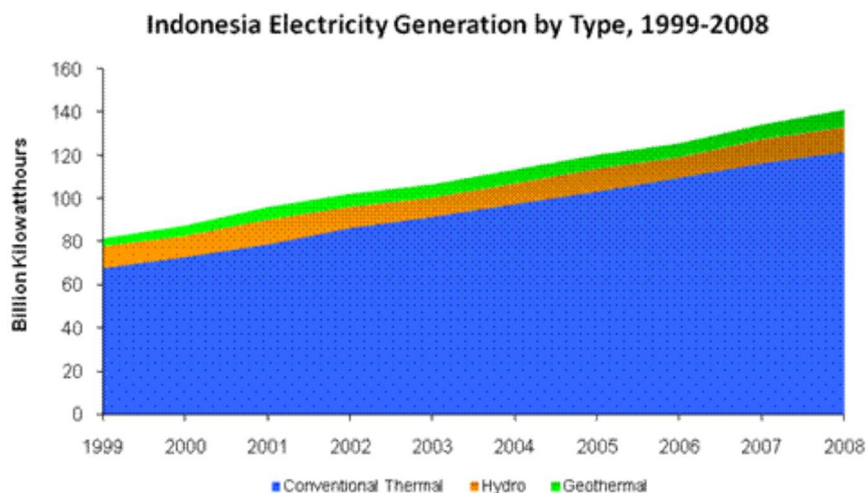
Although coal consumption has grown significantly in the last decade, the majority of additional production has gone towards exports. In order to guarantee sufficient domestic supply, the Indonesian government has set a domestic market obligation of 24 percent for producers. Indonesia is now the second-largest exporter of coal (after Australia) on the international market, and is the largest exporter of thermal coal used for power plants. Indonesia's coal exports primarily serve Asian markets, with about 70 percent of 2009 total exports being sent to China, Japan, Taiwan, and other Asian markets. In 2010, Indonesia was the leading source of Chinese coal imports.



Electricity

Although Indonesia generates 86 percent of its electricity from conventional thermal sources (coal, gas, and oil), it was the third-largest generator of geothermal power in 2009.

Indonesia had 27.8 gigawatts of installed generating capacity in 2008. Indonesia generated 122 billion kilowatthours (Bkwh) of electricity during 2008, of which 86 percent came from conventional thermal sources (oil, natural gas, and coal), eight percent came from hydroelectric, and six percent came from geothermal and other renewable sources. Of the conventional thermal total, coal accounts for the largest share at 47 percent, followed by gas at 33 percent, and oil at 19 percent.

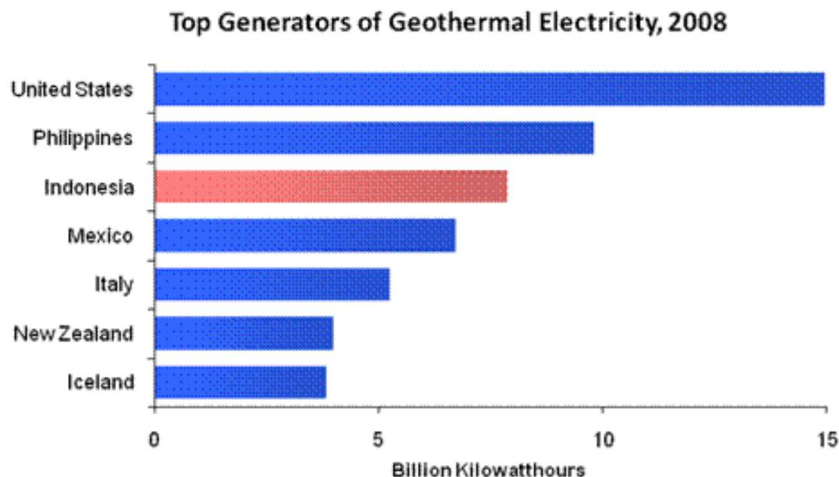


State-owned electric utility PT PLN (Perusahaan Listrik Negara) is the most significant company in the electric power sector. PLN owns and operates 86 percent of the country's generating capacity through its subsidiaries, and maintains an effective monopoly over distribution activities. Although the most recent 2009 Electricity Law ends PLN's distribution monopoly, sufficient implementing regulations to support this law have yet to come into effect.

Indonesia's generating capacity has increased by more than a quarter in the decade leading up to 2009. However, as of 2009, only 65 percent of Indonesia's population has access to electricity. In addition, because capacity growth has lagged behind the pace of electricity demand growth, grid-connected areas have also suffered from power shortages. Investment in Indonesia's power sector had lagged for several reasons, including inadequate supporting infrastructure, difficulty obtaining land-use permissions, subsidized tariffs, and an uncertain regulatory environment.

In order to address the capacity shortage, in 2006, the government embarked upon the first stage of its "fast track" plan, designed to add 20 additional gigawatts to the grid by 2014. The first stage, which includes 10 gigawatts of primarily coal-based generation, was initially set for completion in 2010 - though subsequent delays have led to a revised completion date of 2013. The second phase, which includes an additional 10 gigawatts to be completed by 2014, includes more cleaner sources of generation such as natural gas and renewables. Unlike in many other countries, Indonesia's government is encouraging an increased use of coal in the power sector, due to its

relatively abundant domestic supply, and in order to reduce the use of expensive diesel and fuel oil.



Source: EIA *International Energy Statistics*

Indonesia's power sector is notable for its significant level of geothermal power, and was the third-largest geothermal generator in the world in 2008. However, Indonesia's 2008 capacity of approximately one gigawatt falls substantially below its available resource, which the government has estimated to be sufficient to generate 28 gigawatts. Government plans to increase the use of renewable energy to 15 percent of the electricity portfolio by 2025 are centered on development of geothermal resources. The second phase of the fast track plan includes additional geothermal capacity of nearly four gigawatts by 2014, most of which will be operated by independent power producers.

Links

EIA Links

[EIA Country Information on Indonesia](#)

U.S. Government

[CIA World Factbook - Indonesia](#)

[U.S. State Department Background Notes on Indonesia](#)

Foreign Government Agencies

[BPMIGAS](#)

[Indonesian Ministry of Energy and Mineral Resources](#)

Oil and Natural Gas

[PT Pertamina](#)

[PT Pertamina - EP \(Exploration and Production subsidiary\)](#)

[PT Perusahaan Gas Negara \(PGN\)](#)

Electricity

[PT Perusahaan Listrik Negara \(PLN\)](#)

Sources

Bloomberg

BP

BMI Asia Pacific Oil and Gas Insights

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FACTS Global Energy

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