

Indonesia Energy Profile: Reorienting Away From Exports To Serve Domestic Consumption – Analysis

By: EIA

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Indonesia is the most populous country in Southeast Asia and the fourth most populous country in the world (behind China, India, and the United States). Formerly a net oil exporter in the Organization of the Petroleum Exporting Countries (OPEC), Indonesia struggles to attract sufficient investment to meet growing domestic energy consumption because of inadequate infrastructure and a complex regulatory environment. At the same time, it was the world's largest exporter of coal by weight and the eighth largest exporter of natural gas in 2011. Increasingly, the government seeks to reorient domestic production away from exports to meet demand at home.

Indonesia's total primary energy consumption grew by over 50 percent between 2001 and 2010. Petroleum continues to account for the most significant, though decreasing, share of Indonesia's energy mix at less than 30 percent in 2011. In the past decade, coal consumption has tripled and surpassed natural gas as the second most consumed fuel in 2004.

Indonesia is also a significant consumer of traditional biomass in its residential sector, particularly in the more remote areas that lack connection to the country's energy transmission networks. In 2011, Indonesia consumed over 2 quadrillion British thermal units (BTUs) of biomass energy, and the government hopes to increase renewable energy production for the purpose of generating electricity for domestic consumption.



Indonesia

According to the International Monetary Fund (IMF), Indonesia sustained relatively strong economic performance throughout the global recession, with an average GDP growth rate of just under 6 percent per annum for the past five years. A combination of healthy growth, market reforms, and a stable government encouraged rapid investment, particularly in the commodity sector. Moody's and Fitch Ratings both upgraded Indonesia's Sovereign Risk Rating to "investment grade" status between late 2011 and early 2012.

On the other hand, investment in infrastructure lagged behind at around 3 percent of GDP, well below most of Indonesia's neighbors, according to IMF data. The government signed land reform legislation in late 2011 to pave the way for more private sector infrastructure development. It also unveiled a new

development strategy in 2011 (Master Plan for Economic Expansion and Acceleration 2011-2025) that emphasized more private sector involvement in infrastructure expansion, such as wider use of public-private partnerships in the oil and gas sector.

However, many projects continue to experience delays as the government struggles to attract enough investment to finance new plans. In addition, Western analysts are concerned that a recent decision by the Constitutional Court to dissolve the country's upstream oil and gas regulator BPMigas could slow down foreign investment.

Oil

Indonesia is a significant and well-established player in the international oil and gas industry, though production has failed to keep up with demand in recent years.

Indonesia ranked 20th among world oil producers in 2011 (21st for crude oil and condensate production), accounting for approximately 1 percent of the world's daily production of liquid fuels. With oil first discovered in 1885, the hydrocarbon sector became an important part of Indonesia's economy. The oil and gas industry, including refining, contributed approximately 7 percent to GDP in 2010, according to data from Indonesia's National Bureau of Statistics.

Indonesia was a member of OPEC from 1962 to 2009. However, the combination of growing domestic oil consumption, the natural maturing of Indonesia's oil fields, and limited investment into reserve replacement caused Indonesia to become a net importer of both crude oil and refined products by 2004. Indonesia suspended its OPEC membership in January 2009 to concentrate on meeting demand at home.

Sector organization

International oil companies, particularly Chevron, dominate Indonesia's upstream oil sector. State-owned energy company PT Pertamina must balance its needs as a corporation against its mandate as a national oil company to meet domestic demand.

Several international oil companies dominate Indonesia's upstream oil sector – in particular Chevron, Total, ConocoPhillips, Exxon, and BP. Other national oil companies (NOCs) such as the China National Offshore Oil Corporation (CNOOC) and South Korea's KNOC also have significant upstream stakes.

Chevron is the largest single oil producer in Indonesia, accounting for more than 45 percent of the country's total crude production in 2012. PT Pertamina, Indonesia's state-owned integrated energy supply company, accounted for approximately 17 percent of domestic crude and condensate production

as of March 2012 according to a PwC report on oil and gas in Indonesia. This makes it the second largest producer in the country, followed by Total and ConocoPhillips.

The Indonesia Ministry of Energy and Mineral Resources is responsible for entering into production sharing contracts (PSCs) with interested oil companies. Indonesia's 2001 Oil and Gas Law significantly restructured Indonesia's upstream oil and gas sector, transferring the upstream regulatory role from PT Pertamina to BPMigas, a state-owned legal entity that managed and implemented the PSCs. Although PT Pertamina continues to be wholly state-owned, the 2001 law also established it as a limited liability corporation in 2003. Senior Pertamina officials indicated plans to divest two of its subsidiaries, Pertamina Geothermal Energy and Pertamina Drilling Services, by 20 to 30 percent in an initial public offering, but they have not confirmed details and timing.

In addition to its upstream activities, PT Pertamina operates nearly all of Indonesia's refinery capacity, procures crude and products imports, and supplies petroleum products to the domestic market. Although 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 remove fuel subsidies gradually for private vehicles, the company now competes more directly with product retailers. Pertamina must balance its own needs as a corporation, including increasing export profits, against its mandate as a national oil company charged with meeting domestic demand.

In November 2012, Indonesia's Constitutional Court deemed upstream regulator BPMigas to be unconstitutional based on the 2001 Oil and Gas Law and ordered it to be dissolved. The Energy and Mineral Resources Ministry temporarily took over regulatory functions through a Special Working Unit called SKSP. The task force will operate until the government amends the 2001 legislation. So far, SKSP has honored existing contracts with foreign operators, although it is unclear what effect the ruling will have on future foreign investment.

Exploration and production

Indonesia has 3.9 billion barrels of proven oil reserves as of January 2012. Aging infrastructure and fields suggest the country struggle to meet production targets in the short term.

According to the Oil & Gas Journal (OGJ), Indonesia had 3.9 billion barrels of proven oil reserves as of January 2012. Total oil production continued to decline from a high of nearly 1.7 million barrels per day (bbl/d) in 1991 to just under 1.0 million bbl/d in 2011. Of this total, approximately 900,000 bbl/d was crude oil and lease condensate production. This fell short of the government's production goal of 945,000 bbl/d for that year (already reduced from an original target of 970,000 bbl/d). While production of refined petroleum products has increased since 1998, crude and condensate production has declined at an annual rate of 3.8 percent between 1998 and 2011.

Indonesia's two largest producing and oldest oil fields are Duri and Minas, located on the eastern coast of Sumatra in the South Sumatra Basin. Duri began producing in 1952 and currently averages around 185,000 bbl/d. The Minas field began production in 1955 and currently produces around 70,000 bbl/d. Chevron operates both fields with a 100 percent working interest. Production at both fields is in decline, even with enhanced oil recovery (EOR) techniques to bolster production. Chevron uses Steam Injection EOR for 80 percent of the Duri field, one of the largest steamflood projects in the world. Chevron announced plans to double oil production at the Minas field, through the use of EOR, to 140,000 bbl/d by 2014.

The most important recent discovery with the potential to counteract some of Indonesia's production decline is the Cepu Block of East and Central Java, which contains three significant fields—Banyu Urip, Jambaran, and Cendana. Moreover, in August 2011, ExxonMobil announced a new oil discovery at an exploration well in the block. ExxonMobil operates the Cepu production-sharing contract (PSC) with 45 percent interest in a joint venture with PT Pertamina's Exploration and Development (E&P) unit (45 percent working interest) and four local government companies (10 percent interest). The partners estimate that Cepu contains 600 million barrels of recoverable liquids and will have a peak production of 165,000 bbl/d.

Although discovered in 2001, the project encountered several delays in the development process. Banyu Urip is currently the only producing field in the Cepu PSC and as of August 2012 had reached a production level of about 20,000 bbl/d. BPMigas expects Cepu to start producing 90,000 bbl/d in mid-2014, gradually increasing to full capacity by late 2014.

Besides the Sumatra Basin, Indonesia produces significant quantities of oil from the East Java Basin with a joint operating agreement between PT Pertamina and PetroChina. This venture produced approximately 43,000 bbl/d at the end of 2011 and both companies announced plans to raise production by up to 10,000 bbl/d in the next few years.

Aging infrastructure and fields suggest that in the short-term, the country will continue to struggle to meet production targets. BPMigas and the Indonesian government introduced policies aimed at increasing investment in the country's upstream sector, in particular by creating investment incentives and improving the flexibility of the PSC bidding process. However, Western market analysts still consider the upstream investment environment to be risky, and licensing rounds from the past three years have been disappointing. The government only managed to award 21 of the 43 blocks offered in 2009, and 10 out of 36 blocks offered in 2011.

Recent events that caused particular concern to foreign investors 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 the cabotage rule will not apply to oil and gas vessels. Moody's listed the court's decision to dissolve BPMigas as "credit negative" for Indonesia, citing concerns about the government blocking future foreign investment.

Refining

Indonesia's refinery output primarily serves the growing domestic market.

Indonesia has a refinery capacity of just over one million bbl/d, according to OGI. Eight refineries owned by PT Pertamina make up the country's refinery capacity, the majority of which is located on Java and Sumatra Islands. 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. In 2011, Pertamina could only meet 54 percent of domestic gasoline demand and 86 percent of diesel demand. Pertamina plans to eliminate the need for product imports by 2019, 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 deterred investment from international partners.

The Minister of Energy and Mineral Resources unveiled plans to build two refineries in Bontang City, in East Kalimantan. On August 10, 2012, Indonesia's President approved plans for a third plant. Each plant will have a production capacity of 300,000 bbl/d. The ministry has also studied a possible 300,000 bbl/d plant in Sumatra to come onstream in 2018. If Indonesia is unable to reverse the decline in crude oil production, it may be able to invest in refineries to import crude and refine it domestically. If the government cannot find private investors to fund the multi-billion dollar projects, it stated that it will consider using state funds to complete these facilities.

Consumption and distribution

A strong economy, population growth, and continued state subsidies for fuels worked together to push domestic oil demand beyond supply. Consumption of refined products grew at a fairly steady 4.5 percent annual growth rate between 1991 and 2005.

BPMigas reported that fuel subsidies distort the efficient allocation of energy and resources and hinder investment in energy infrastructure. These subsidies cost the Indonesian government almost 100 trillion rupiah (IDR), or approximately \$10 billion in 2005, over 10 percent of the government's tax revenues. The Indonesian government implemented a 126 percent increase in the price of subsidized fuel in 2005, leading to consumption falling by an average of 2 percent in both 2006 and 2007.

After declining in 2006, consumption picked up again after 2008 and exceeded 1.3 million bbl/d in 2009. In December 2010, the Indonesian parliament approved a measure to remove fuel subsidies for all vehicles, excluding motorcycles and public transportation vehicles. The government planned to use cash transfers to ease the impact on the economically disadvantaged. Officials planned to pilot the program

starting April 2011 in the greater Jakarta area and gradually expand nationwide by 2013. However, public concerns over the policy's effects on the inflation rate indefinitely delayed the program in March 2011.

By the end of 2011, the Indonesian government spent a record 160 trillion IDR (~\$17 billion) on fuel subsidies, according to Ministry of Energy and Mineral Resources. In September 2012, the government reached a preliminary agreement to increase power prices in the coming year, but has not finalized the details of this increase.

Trade

Indonesia has no international oil pipelines and few domestic ones. The country exports some fuel oil, particularly to post-Fukushima Japan, as a power-generation fuel. Most petroleum trade is in the form of imports, chiefly motor gasoline and diesel for Indonesia's transport sector.

In 2011, Indonesia imported around 460 thousand bbl/d of crude oil and lease condensate, according to Lloyd's List Intelligence tanker tracking service. More than a quarter of imports came from Saudi Arabia. Other significant suppliers included Malaysia (13 percent), Nigeria (11 percent), and Australia (7 percent).

Natural gas

Natural gas production has increased by over a third since 2005. While Indonesia still exports about half of its natural gas, domestic consumption is increasing.

According to Oil & Gas Journal, Indonesia had 141 trillion cubic feet (Tcf) of proven natural gas reserves as of January 2012, making it the 14th largest holder of proven natural gas reserves in the world, and the third largest in the Asia-Pacific region. The country continues to be a major exporter of pipeline and liquefied natural gas (LNG). At the same time, domestic consumption of natural gas has nearly doubled since 2004. Natural gas shortages caused by production problems and rising consumption forced Indonesia to buy spot cargoes of LNG to meet export obligations. The government committed to constructing new LNG receiving terminals and gas transmission pipelines to address domestic gas needs, though this could reduce the natural gas available for export.

Sector organization

The regulatory structure that shapes Indonesia's upstream oil sector also forms the basis for the gas sector (see Oil: Sector Organization). Pertamina accounted for less than 15 percent of natural gas production in 2012, according to PwC. International oil companies such as Total, ConocoPhillips, and

ExxonMobil dominate the upstream gas sector, while the state-owned utility Perusahaan Gas Negara (PGN) carries out natural gas transmission and distribution activities. BPMigas served as the upstream regulator until its dissolution by the courts in November 2012. As of the end of 2012, the Energy and Mineral Resources Ministry has responsibility for regulating natural gas in the country until the government amends the 2001 Oil and Gas Law.

Exploration and production

In 2011, Indonesia produced 2.7 Tcf of dry natural gas. Production grew at an annual rate of about two percent over the previous two decades, and Indonesia's 2011 gas production was the eleventh-highest in the world. A little more than half of Indonesia's 2011 production came from offshore fields, according to the Ministry of Energy and Mineral Resources. The government estimates that more than 60 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 (purely natural gas) fields in recent years. According to IHS Global Insight, associated gas (found in oil fields) accounted for around 15 percent of gross production in 2010.

Indonesia's largest fields are located in the Aceh region of South Sumatra and East Kalimantan. In recent years, companies have shifted their attention away from traditionally important gas sources toward new parts of the country. For example, PT Pertamina entered into negotiations with Total, ExxonMobil, and Petronas in 2010 to develop a gas-rich block in the East Natuna Sea, though as of September 2012 the sides have not reached a finalized PSC. Bintuni Bay in West Papua and Central Sulawesi are emerging as new important offshore gas production areas. Finally, the Arafura Sea in eastern Indonesia is underexplored but promising for natural gas and contains the Abadi gas field, estimated to have reserves between 10 and 14 Tcf.

Still, increasing domestic demand reduces Indonesia's capacity for exports to the point where the country might not be able to meet its external obligations. In July 2012, the Ministry of Energy and Mineral Resources announced the government considered imposing a moratorium on gas exports because of domestic needs, though it later retracted the statement. Moreover, Indonesia's geography presents a challenge to resource development and the switch to natural gas for domestic consumption. The archipelago nation's most prolific blocks of conventional gas reserves are located far from its major demand markets.

Gas flaring

Natural gas associated with oil production is often flared when there is no infrastructure in place to make use of the gas. Indonesia ranks tenth in global natural gas flaring according to the Global Gas Flaring Reduction (GGFR) Initiative, but its flaring volume has dropped in recent years from a high of over 175 billion cubic feet (Bcf) in 1997 to around 80 Bcf in 2010, according to satellite data from the National Oceanic and Atmospheric Administration (NOAA). The government publicly committed to

reduce its emissions through the use of smaller-scale LNG projects, EOR techniques, and improved gas processing infrastructure.

Unconventional gas

Indonesia's government promotes exploration of unconventional gas alongside conventional crude oil and natural gas projects. The Ministry of Energy and Mineral Resources estimates that the country has coalbed methane (CBM) reserves of 453 Tcf based on preliminary studies. In 2007, the Indonesian government started awarding CBM blocks in the South and Central Sumatra basins on Sumatra Island and the Kutei and Barito basins in East Kalimantan. Singapore-based Dart Energy and Indonesian PT Energi Pasir Hitam plan to begin commercial CBM production in 2013 that would be sold via a pilot program to both power plants and the Bontang LNG facility.

Policy makers are also interested in exploring the country's shale oil and shale gas potential. In April 2012, the government initiated four shale gas study projects. However, as of December 2012, Indonesia had not awarded any shale gas blocks to investors and had no commercial production.

Consumption and distribution

Indonesian gas production initially oriented toward exports, but the country's declining oil production led producers to shift increasing gas volumes toward domestic consumption. In 2011, Indonesia consumed 1.3 Tcf of natural gas, or just under half of its total dry gas production. Although the industrial sector accounts for the largest portion of domestic consumption, industry analysts expect the power sector 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 Java and North Sumatra. PGN plans to develop city gas distribution to small and medium enterprises in the commercial and transportation sectors.

PGN began operating 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 oil field for its steamflooding and power generation activities.

Trade

Indonesia was the world's eighth largest net exporter of natural gas in 2011. The majority of exports go to Japan as LNG shipments and to Singapore via pipeline connections.

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Liquefied natural gas

Indonesia was the third-largest exporter of liquefied natural gas (LNG) in 2011, following Qatar and Malaysia. Expected growth in gas demand led the government to pursue policies that secure domestic LNG supplies for the local market.

Indonesia was the third-largest exporter of liquefied natural gas (LNG) in 2011, following Qatar and Malaysia, according to data from PFC Energy. By year end 2011, Indonesia exported over 1 Tcf of LNG, or about nine percent of the world's LNG exports. Mostly a regional supplier to Japan, South Korea, Taiwan, and China, Indonesia lost market share in recent years to LNG producers such as Qatar, Malaysia, Australia, and Algeria.

There are three operational liquefaction terminals in Indonesia, with a combined production capacity of about 1.6 trillion cubic feet per year (Tcf/y). The Bontang LNG terminal in East Kalimantan has a capacity of 1.1 Tcf/y; it is the largest in Indonesia and one of the largest in the world. Because of a lack of sufficient gas reserve additions in the Arun field, LNG exports from the Arun plant declined in recent years, and analysts expect the plant to stop operating by 2014. The newest addition, BP-operated Tangguh in Western Papua, came online in July of 2009 and exported almost 330 Bcf in 2010.

The next anticipated LNG facility in Indonesia will be the Donggi-Senoro liquefaction plant in Central Sulawesi. The project developers (Mitsubishi, Kogas, Pertamina, and Medco) signed a final investment decision in early 2011 expect the 370 Bcf/y plant 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 it has delayed the expected startup date of the floating terminal until 2018.

In addition, Pertamina and PLN (Indonesia's state electricity firm) announced plans to develop eight LNG receiving "mini terminals" by 2015, with a total capacity of 67 Bcf/y. These terminals will be scattered throughout Indonesia's eastern region. The government intends these facilities to supply natural gas to domestic electricity plants.

LNG exports are a politically charged topic in Indonesia, due to the perception that exports remove 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 that secure domestic supplies for the local market. For example, the Donggi-Senoro LNG plans received government approval only after the developers designated 30 percent of the output explicitly for domestic consumption. Similarly, Inpex designated a third of the output from the planned Masela floating LNG liquefaction terminal for the domestic market, according to a BPMigas statement. Indonesia also plans to reorient output from the Bontang LNG plant to the domestic market over the next decade, and the plant will stop serving export markets by 2020. Pertamina hopes to convert the Arun plant into a regasification terminal to begin serving the local market in 2013.

Coal

In 2011, Indonesia became the world's largest exporter of coal by weight.

Indonesia plays an important role in world coal markets, particularly as a regional supplier to Asian markets. It has been the largest exporter of thermal coal, typically used in power plants, for several years. In 2011, it overtook Australia as the world's largest exporter of coal by weight.

Sector organization

The government passed the 2009 Law on Mineral and Coal Mining No.4 to increase foreign investment into the mining sector. The law introduces more transparent and standardized tenders and licenses for mining blocks. As of 2012, the law is not fully implemented, though there has been some increase in investment levels since 2009.

Under the government's domestic obligation (DMO) program, larger coal companies in Indonesia must sell approximately 25 percent of their production domestically. According to industry press, around 70 percent of DMO coal goes to power plants operated by the country's state electricity company, PLN.

PT Kaltim Prima Coal (KPC) is the country's largest coal producer and owns one of the largest coal mines in the world. Other major producers in the country include PT Adaro, PT Kideco Jaya, PT Arutmin, and PT

Berau. The top six producers in Indonesia accounted for 75 percent of production in 2011, according to Patersons Indonesian Coal Review.

Exploration and production

Indonesia has 6.1 billion short tons of recoverable coal.

According to EIA estimates, Indonesia has 6.1 billion short tons of recoverable coal, located primarily 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 is primarily bituminous or sub-bituminous in rank.

Production more than quadrupled between 2001 and 2011 to reach 437 million short tons in 2011, while consumption remained relatively flat at 58 million short tons in 2011. Approximately two thirds of Indonesia coal production comes from East Kalimantan, according to industry estimates.

Consumption

Indonesia's government encourages the use of coal in the power sector, due to relatively abundant domestic supply and as a way to reduce the use of expensive diesel and fuel oil.

The electricity sector is the largest source of domestic consumption; power plants accounted for nearly two-thirds of 2010 total coal sales. EIA expects electricity sector demand for coal to more than double by 2014 as a result of coal-fired generation capacity additions.

Unlike many other countries, Indonesia's government encourages increased use of coal in the power sector, due to relatively abundant domestic supply and as a way to reduce the use of expensive diesel and fuel oil. Although coal consumption has grown significantly in the last decade, the majority of production has gone toward exports. In order to guarantee sufficient domestic supply, the Indonesian government set a 24 percent domestic market obligation for producers, which it revised down to 20 percent in October 2012 due to lower than expected consumption.

Trade

In 2011, Indonesia exported 341 million short tons of coal, making it the world's largest exporter of coal by weight. Indonesia's coal exports serve primarily Asian markets, with about 70 percent of total exports

being sent to India, China, South Korea, Japan, Taiwan, and other Asian markets. In 2010, Indonesia was the leading source of Chinese coal imports according to China Customs data.

Electricity

Generation capacity growth in Indonesia has lagged behind the pace of electricity demand growth, leading to power shortages and a low electrification ratio.

Although Indonesia's generating capacity has increased by more than a quarter in the last decade, the country has a low electrification ratio compared to similar income countries. In 2011, around 70 percent of Indonesia's population had access to electricity, according to electric utility PLN. Eastern Indonesia lags behind the west of the country, with some provinces only providing electricity to a third of the population. Because capacity growth has not kept up with the pace of electricity demand growth, grid-connected areas have also suffered from power shortages. Inadequate supporting infrastructure, difficulty obtaining land-use permissions, subsidized tariffs, and an uncertain regulatory environment all contribute to the insufficient generation.

Sector organization

State-owned electric utility PT PLN (Perusahaan Listrik Negara) is the most significant company in the electric power sector. PLN owns and operates about 90 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, there is a lack of sufficient regulations to enforce this law.

Generation

Indonesia had an estimated 44 gigawatts (GW) of installed capacity in 2011 and generated 192 billion kilowatt-hours (kWh), according to BPS-Statistics Indonesia. EIA estimates that 86 percent of the power came from conventional thermal sources, with the rest coming from hydroelectric (9 percent), geothermal (5 percent), and other renewable sources. Coal accounted for just over half of conventional thermal power.

The Indonesian government has set a goal of 90 percent national electricity coverage in households by 2020. In order to address the capacity shortage, the policy makers embarked upon a "fast track" plan in 2006, designed to add 20 additional GW to the grid by 2014. By 2010, the government hoped to complete the first phase, which includes 10 GW of primarily coal-based generation. Subsequent delays have revised the project's expected completion date to 2013. The second phase, which includes an

additional 10 GW to be completed by 2014, includes cleaner sources of generation such as natural gas, geothermal, and other renewables.

Geothermal

Indonesia was the third largest geothermal generator in the world in 2011.

Indonesia's power sector is notable for significant levels of geothermal power. The country was the third largest geothermal generator in the world in 2011 after the United States and the Philippines, according to the International Geothermal Association. However, Indonesia's 2011 capacity of approximately 1.2 GW falls substantially below its available resources, which the Ministry of Energy and Mineral Resources estimated to be capable of generating 28 GW.

Plans to increase the use of renewable energy to 15 percent of the electricity portfolio by 2025 center on developing the country's geothermal resources. According to the Ministry of Energy and Mineral Resources, the second phase of the "fast track plan" includes additional geothermal capacity of nearly 4 GW by 2014, most of which will be operated by independent power producers. To this end, Indonesia and New Zealand signed a cooperation agreement in April 2012 on geothermal energy joint development and regulation.

NOTE: Numbers cited in the text are EIA estimates unless otherwise noted.

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