2. Economic Environment

Size and State of the Indonesian Economy

Indonesia has a large domestic consumption base, and the country's middle class with increasing levels of disposable income and purchasing power has grown substantially from 38% of the population or 81 million in 2003 to 56.6% or 131 million in 2010. A World Bank report indicated that the middle class grew by 61.73% over this 7 year period, with over 7 million people being elevated to the middle class segment. Quite rightly, the definition of "middle class" is now being re-evaluated and debated, with numbers arrived at by market analysts and the World Bank ranging at various estimates between 44 million (18% of the population) to 146 million (59%). The World Bank's 44 million (18%) middle class "who no longer have to worry about their vulnerability" live on USD4.50 to USD22.50 a day and have consumption patterns starting to resemble those of a typical "middle class."

Controlled wage growth, provided accompanied by a sustained improving employment outlook, should support "the Indonesian consumer story." The large population and consumption base is a fundamental reason why many multinationals rank the country as the foreign investment destination of choice in South-east Asia. Comparisons of Indonesia having the same economic growth and investment potential as the "BRIC" countries are now not so relevant given the major economic downturns in Brazil and Russia and slow down in China. India is the only remaining BRIC country worthy of direct comparison. Indonesia is now being grouped with Mexico, Nigeria and Turkey as one of the MINT countries.

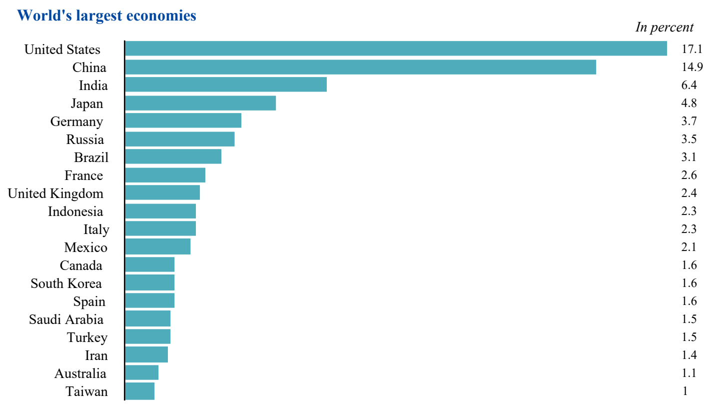
Indonesia's population grew at a rate of 15.8% from 2000 to reach 240 million in 2010 and was 250 million in 2014. It is forecast to be 263 million by 2020. The Central Statistics Agency (BPS) has estimated that between 2010 to 2035 the country's population will grow to over 305 million at 3 million per year. Another report refers to estimates of Indonesia's population exceeding the USA by 2043. The country is the most populous nation and is also the largest market in South-east Asia. Indonesia's 250 million people make up 40% of the 625 million of combined ASEAN countries.

Indonesia was ranked the world's 16th largest economy with GDP of USD978 billion in 2014 or IDR10,542.7 trillion with GDP per capital IDR41.8 million (USD3,532). Predictions are for Indonesia to be the 7th largest economy in the world by 2030 provided economic growth rates can be achieved by fully taking advantage of the rapidly expanding consumer class, which includes maximizing the country's attractiveness for foreign investment. An April 2014 World Bank report rated Indonesia as already having the 10th largest economy in the world, contributing 2.3% of global economic output. The report assessed economies based on purchasing power parity (PPP) with Indonesia moving up 6 places and passing more developed countries such as Canada, South Korea and Spain. The report found that middle income economies of Indonesia, China, India, Russia, Brazil and Mexico accounted for 32.3% of world GDP compared to a 32.9% contribution of the six largest high income economies: USA, Japan, Germany, France, the UK and Italy. However based on Real GDP, the country ranks 16th with output of USD795 billion in 2014. Other observations referred to an uneven growth rate and widening gap between rich and poor, with real consumption rates in a selected 7 year period for the poorest 40% of households being just over 1% compared to nearly 6% for the richest 20%.

In terms of the financial sector, bank loans were the equivalent of 26% of Indonesia's GDP as at 3Q2013. This is similar to the Philippines, but low compared to China, Singapore, South Korea, Malaysia and Thailand where average debt to GDP in 2012 ran at 99% to 127%. India is 51%. As at 3Q2014, Indonesia's national debt was 34.8% of GDP.

	2010	2013	2018E
Income and market size			
Population (mn)	243	251	263
GDP (Nominal, USD bn)	709	868	1,657
GDP per head (USD)	2,919	3,460	6,300
Private consumption (USD bn)	401	485	964
Private consumption per head (USD)	1,650	1,930	3,660
GDP (International $ bn at PPP)	1,026	1,293	1,931
GDP per head (International $ at PPP)	4,220	5,160	7,340
Export of goods & services (USD bn)	175	206	371
Imports of goods & service (USD bn)	154	212	345
Memorandum items			
Share of world populations (%)	4.15	4.16	4.18
Share of world GDP (Nominal, %)	1.13	1.19	1.72
Share of world GDP (PPP, %)	1.35	1.46	1.63
Share of world exports of goods & services (%)	0.96	0.92	1.20

Source: The Economist Intelligence Unit, June 2014



A historical perspective: 1997 - 2014

1997 Asian Economic Crisis and 2008 GFC

Following the 1997 Asian Economic Crisis, Indonesia experienced a period of severe economic and political instability that was compounded by the collapse of the banking system, a function of unrestrained lending and other practices. Ten years later however, following a period of political stability as well as sound economic and financial policy which lowered the national debt from 89% of GDP in 2000 to less than 30% in 2011, Indonesia was less affected by the GFC compared to many neighboring economies, its resilience underpinned by strong domestic spending and relatively low dependence on exports which made up a small 1.7% proportion of the country's GDP.

An important factor underpinning the above is that the Indonesian banking industry had become one of the most open and tightly regulated in the world, having undergone dramatic transformation and consolidation. Following the Asian economic crisis, Indonesia liberated its banking system as part of an IMF mandated structural adjustment reform, where USD 39 billion was spent to bail out lenders.

What happened in 2013?

In 2013 the country's strong key economic fundamentals enabled it to ride out a temporary economic "blip" caused by a combination of declines in demand and pricing of key commodity exports and further pressures on economic growth from a series of economic events and outcomes that "collided": lifting fuel subsidies and electricity tariffs, resulting inflation and interest rate increases, weakening of the IDR and pressures on unemployment. Bankers and economists referred to this as a necessary correction to stabilize or "cool" what had been record economic growth levels and a rapidly growing economy, the condition being a temporary one supported by the country's key, unchanged economic fundamentals. In November 2013 the World Bank gave Indonesia a "vote of confidence" on the basis the country "has what it takes to rise above the current economic uncertainty."

A key outcome of 2013 was that the growing middle class, whose domestic consumption had been driving the greater part of economic growth, started to look a bit "fragile." The Government sent clear messages that consumer spending could no longer be relied on to achieve forecast economic growth and GDP levels, with increases in FDI inflows needed. Industry commentators called for significant efforts to improve the investment climate if sustained economic growth is to be achieved.

Inflation and exchange rate (2008 - 2015F)

Source : The Economist Intelligence Unit, June 2014

In 2014 we saw GDP growth slip to 5.1%, at its lowest levels since 2009, and a year characterized by continued falling global commodity prices including oil, lifting of fuel subsidies and electricity tariff increases, inflationary and other upwards pressures on corporate cost structures, a depreciating IDR and increasing costs of imported goods. Despite further statutory increases in minimum wages, household consumption declined. Indonesia had entered a period through 2017 where economic growth was forecast by the World Bank to be lower than in recent prior years. It is relevant however that many of the world's other emerging economies were also growing slower. In Indonesia:

- An economic downswing in China and the resulting trend in declining global commodity prices continued to adversely impact Indonesian exports: coal and palm oil account for 60% of these. Declining international commodity prices in recent years is considered to be solid evidence of a break in the cycle of rising prices. A mineral export ban from January 2014 compounded the problem.
- Administered price inflation increased in line with the lifting of fuel price subsidies, higher land freight costs and increases in electricity tariffs to more economic rates. Government structural reform policy to reallocate the fuel subsidy to productive sectors including infrastructure was designed to promote more sustainable economic growth. International oil prices dropping significantly (with the trend expected to continue in 2015) favoured the Indonesian economy in terms of balance of payments with the country a net importer of oil. International oil prices have fallen around 50% since mid-June 2014.
- Typically to keep inflationary pressures under control, interest rates rose. The BI (% period average) for 2015 was forecast to be 7.22% at 31 March 2015, about the same as the average rate of 7.54% in 2014.
- Intense depreciation pressures on the IDR against the USD occurred but relative to currencies in many other South-east Asian countries, the rate of depreciation in 2014 was low or otherwise in line.
- Optimism around the new Government translated to positive sentiment towards improving economic fundamentals in 2015.

Fuel Price

	2005		2008	2013	2014	2015	
IDR/litre	March	October	May	June	November	1 January	19 January
Gasoline	2,400	4,500	6,000	6,500	8,500	7,600	6,600
Diesel	2,100	4,300	5,500	5,500	7,500	7,250	6,400

Source : Media reports

Average selling price of electricity by type of customers					
IDR/kWh	2009	2010	2011	2012	2013
Residential	589	616	618	632	692
Industrial	644	661	695	710	796
Business	891	934	951	965	1,117
Social	578	624	646	678	757
Government office building	870	953	940	969	1,092
Public street lighting	663	746	792	803	911

Source : PLN Statistics 2013

Provincial minimum wages						
in IDR '000	2010	2011	2012	2013	2014	2015
DKI Jakarta	1,118	1,290	1,529	2,200	2,441	2,700

Source : Directorate General of Industrial Relations and Social

In November 2014, 29 of the 34 provinces published new regional minimum wages for 2015. The overall average Indonesian minimum wage increased 12.8% in 2015, a lower rate of increase than 2014 of 19.10%. Each province sets a minimum wage taking into account assumed needs based on a Decent Living Index: see also Chapter 9 on Labor and Employment.

Note that the minimum wages and Decent Living Indices were set prior to a 30% plus increase in fuel price on 18 November 2014 when the new government removed subsidies for petrol, allowing "prices at the pump" to follow market crude oil price fluctuations. Whether wage levels are actually in line with the real "cost of living" has been at times hotly contested.

Outlook: 2015 and beyond

Indonesia is not totally immune from spillovers from international developments through both financial and trade channels. Downside risks remain due to ongoing external uncertainties, including the extent and impact of the slowdowns in China's and Japan's economies and, to a lesser degree, the ongoing recession in the Euro Area. The "flip side" of the Euro recession is investors switching attention from affected European countries to Indonesia. Much of Indonesia's historical growth has been built on rising commodity prices and strong domestic consumption. Whilst the manufacturing sector is growing, it still lags behind Thailand, Malaysia, Brazil and Turkey in terms of size and sophistication. Labor laws complicate doing business and discourage value added, labor intensive manufacturing and diversified industrials investments. Infrastructure is inadequate:

- The World Bank has cut its projection for economic growth in 2015 from 5.6 to 5.2%, has made reference to 5.6% GDP growth in 2016.
- BI has projected economic growth in a range of 5.4 –5.8% in 2015 and higher in the medium to longer term provided macroeconomic and financial system stability is maintained.
- The Ministry of Finance expects inflation to be between 4.5 – 5% in 2015, compared to an annual inflation rate of 7.9% estimated by BI for 2014, and that Indonesia can lift economic growth to 7% in 2016 providing no unforeseen "turbulence" occurs for 2015.

The economic outlook as a whole is subject to potential impacts of a number of factors referred to in this Chapter, including an IDR that has weakened more rapidly relative to most global currencies. A reasonable conclusion is that the current outlook for 2015 could be considered as challenging or "mixed," with a longer term outlook more positive underpinned by the power of optimism and positive sentiment, notwithstanding the likehood of economic policy quirks and political "hiccups" along the way. Indonesia is located in South-east Asia and the fastest growing of the world's three main regions, something that should hold it in good stead going forward.

Ease of Doing Business Indicators

Indonesia ranked 100th out of 183 in a 2011 Transparency International's Corruption Perception Index. Excessive bureaucracy and a lack of coordination at the ministerial level was considered to be undermining the country's business environment. Also in 2011 World Bank and IFC "Ease of doing business" and "Ease of starting a business" measurements, Indonesia ranked 128th (behind Ethiopia) and 155th out of 185 countries, well below East Asia & Pacific regional averages. On contract enforcement, the country ranked 144th, tied with Malawi.

In the World Bank's "Doing Business 2014" report Indonesia ranked 120th out of 189 countries, up from 128th. The country continued to lag behind nearby developing countries PNG (113th), Pakistan (110th), Sri Lanka (85th) and China (96th). Malaysia ranked 6th on the back of ease of procedures for company registration and permits. Singapore ranked first, other South-east Asian countries included Thailand (18th), Vietnam (99th) and the Philippines 108th up from 138th.

According to the World Bank's "Doing Business 2015," Indonesia is now ranked 114th out of 189 countries. Indonesia is ahead of only India, Brazil and Argentina of the G20 nations, and in South-east Asia is behind Malaysia (18th), Brunei Darussalam (101st), Vietnam (78th), the Philippines (95th) as well as PNG. Again, a primary factor for Indonesia's low ranking is difficulty in establishing and starting a business against a backdrop of inefficiency and a complicated and frustrating bureaucracy.

Investors establishing a company and business in Indonesia need to undertake an average of 10 processes taking on average around two months (52.5 days). The Asia Pacific average is 34.4 days, countries like Singapore and Malaysia running at less than 6 days. In Indonesia there is a need to have dealings with four different ministries and a range of different business licenses, permits and certifications from: 1) Ministry of Law & Human Rights; 2) State Treasury; 3) Ministry of Trade; and 4) Ministry of Manpower.

The long awaited implementation of an on-line data base system and "one-stop shop" at BKPM appears to have partly come to fruition, with the Indonesia Investment Coordinating Board (BKPM) announcing that effective 26 January 2015, it had sealed arrangements with 22 Government ministers for all Foreign Investment or "PMA" Company licensing and establishment to be made entirely by BKPM. The above and other similar indicators however do not measure all aspects of a business environment that matter to companies and investors. Related discussion is in Chapter 6 on Business Structures and Establishment and Chapter 5 on Investment, as well as other chapters throughout this publication.

Investment Rating

In 2012 Global rating agency Fitch Ratings upgraded the country's sovereign debt to BBB- Investment Grade, an achievement considered to augment Indonesia's ability to attract foreign capital and also stabilize its debt market.

Investment Rating		
Fitch	Moody's	S&P
AAA	Aaa	AAA
AA+	Aa1	AA+
AA	Aa2	AA
AA-	Aa3	AA-
A+	A1	A+
A	A2	A
A-	A3	A-
BBB+	Baa1	BBB+
BBB	Baa2	BBB
BBB-	Baa3	BBB-
BB+	Ba1	BB+
BB	Ba2	BB
BB-	Ba3	BB-
B+	B1	B+
B	B2	B
B-	B3	B-

Note : Indonesia current investment rating, June 2014

Source: Fitch Ratings, Moody's, Standard & Poors

In November 2014 Fitch Ratings confirmed Indonesia's Sovereign Credit Rating at Investment Grade (BBB-/stable outlook) in recognition of Indonesia's economic stability amid globally uncertain times: underpinning this was the government's decision for macroeconomic stability over higher economic growth. Further improved credit ratings are contingent on strengthening of the investment climate which requires reducing dependency on commodity exports, increase FDI inflows and implementation of structural reforms to promote infrastructure development, eradicating or reducing bureaucratic red tape and aligning minimum wage and productivity growth.

3. Infrastructure

Overview

Recognizing the pressing need for infrastructure development, the Indonesian government has increased its focus on improving the regulatory environment and stimulating infrastructure spending. Over the past 5 years, infrastructure spending has more than doubled, and more spending is expected over the next few years with the removal of the fuel subsidy allowing reallocation of funds to infrastructure.

Indonesia has a huge task ahead. The World Economic Forum ranks Indonesia's infrastructure as 72nd out of 144 countries, and 4th in the ASEAN region, below Singapore, Malaysia and Thailand.

Infrastructure						
Road	6	19	50	72	87	104
Railway	N/A	12	74	41	80	52
Port	2	19	54	77	101	88
Airport	1	19	37	64	108	87
Power	6	39	58	84	87	88

Infrastructure spending in Indonesia (both public and private) remained subdued following the 1997 Asian economic crisis. As a result, Indonesia has poor basic infrastructure and remains under-invested, holding back not only Indonesia's growth potential but also progress in poverty reduction. The symptoms of close to two decades of limited infrastructure investment include increasing road congestion, over utilized airports, weak rail connectivity, an underdeveloped port sector, high inter-island cargo costs, electricity blackouts and poor access to improved sanitation. Population pressures and strong foreign interest in Indonesian commodities give rise to a significant need for infrastructure development in the country.

Unless progress is made, this will be a major barrier to sustained longer term economic growth and development across many industries, as well as to foreign investment. Indonesia's low infrastructure ranking is consistently identified by companies as a constraint on their operations and investment.

Indonesia infrastructure	
Road network	508,000 kilometres of which 56.7% is paved
Toll Roads	• 820.2 kilometres (operated) • 936.4 kilometres (construction/land acquisition) • 334.4 kilometres (tender preparation/ process)
Railway network	5,107.8 kilometres, of which 235 kilometres are electrified
Air	296 airports, of which 27 are international airports 5 airports > 3,001 m runway
Maritime	111 ports managed under Pelindo I-IV with 436.5 million ton/m3 loading/unloading
Clean water	• 350 regional water supply companies (PDAMs) • 39 non-regional water supply (non-PDAM) of which 18 are limited liability companies • 3,347 million m3 clean water production per year. • 20-40% Non-Revenue Water
Power	• 82% electrification ratio • 49.7 GW/year of which 16% is installed by IPP • 41,749 kmc transmission lines • 878,926 kmc distribution lines

Road Network and Toll Roads

Indonesia's road network amounts to 508,000km, of which 287,926km (56.7%) are paved or sealed and 820km are operational toll roads. It is estimated that 90% of all domestic passenger transport and 50% of cargo traffic is carried by road. Indonesia has experienced a rapid increase in the numbers of cars in circulation, with virtually no major investment in toll and other road infrastructure. The rise of the Indonesian economy over the past decade has boosted the number of vehicles by 13.7% (two wheel) / 9.6% (four wheel) % p.a. (CAGR) vs. a 2.9% p.a. growth of paved roads.

The road network is most developed on the islands and main population centres of Java, Sumatra and Bali where over 80% of Indonesia's population live. Mining-related transport (road, rail) infrastructure is more developed in Kalimantan compared to Sumatra.

Despite being given a high priority in government spending programs, road building in Indonesia has progressed at a slow pace due mainly to land acquisition challenges. Only 135km of new toll roads have been developed since 1997-98, although a further 936.4km of new toll roads are being constructed or are in progress of design and land acquisition. Land acquisition challenges are commented on overleaf.

Toll road traffic volume has climbed around 7% over the past 7 years based on the 576km operated by PT Jasa Marga (Persero). A further 244km are operated privately through Toll Road Concession Agreements awarded/supervised by the Toll Road Regulatory Agency (BPJT).

The Government has plans to build 4,621km of additional toll roads, of which 60% are on Sumatera Island as part of its Trans Java and Trans Sumatra highway program.

Railway Network

The railway system covers 5,107.8km, all of which is narrow gauge; and 235km of which is electrified.

Most of the Indonesian rail network is operated by the state-owned enterprise/PT Kereta Api (Persero), while some freight railways are privately owned and operated in Sumatera and Kalimantan. 220 million people and 27 million tonnes of cargo (of which 60% is coal) travel by rail each year on Sumatera and Java Islands. The development rate of rail tracks over the past 5 years was 1.52% vs 1.57% for passenger movements. Recognizing the importance of rail transport, the Government's plans include improving the quality of track, e.g., double-tracking of the southern rail line from Jakarta to Surabaya; and connectivity through its "Trans-rail" projects for Java, Sumatra, Sulawesi, Kalimantan and Irian Jaya.

Air

In February 2015, there were 296 airports, of which 27 are international airports, and 5 airports have runways of more than 3,001m; operated by Angkasa Pura I, Angkasa Pura II and the Directorate General for Aviation.

Key annual statistics include, 173 million passengers, 1,160,818 tons of cargo, and 1.7 million aircraft movements both domestic and international. The growth rate of passengers, cargo and aircraft movements over the past 5 years were 13.7%, 10%, and 11% p.a. respectively. To keep up with the demand, new airports are expected to be constructed (either privately or by AP I/II). Both AP I and II have successfully built and expanded some of the major airports in Indonesia such as Kualanamu International Airport (Medan), which began operations in March 2013, Sultan Hasanuddin International Airport (Makassar), Sepinggan International Airport (East Kalimantan), and Ngurah Rai International Airport (Bali).

Maritime

As an archipelago comprising more than 17,000 islands, covering an area of over 2 million square kilometers astride the main trade routes between the Indian Ocean and the Pacific Ocean, air and maritime connections are vital to Indonesia and its economy. There are 21,579km of navigable waterways among the larger islands that represent over 90% of Indonesia's land, Sumatra, Java, Madura, Kalimantan, Sulawesi and Irian Jaya.

There are 111 ports operated by the state-owned port corporations, Pelindo I, II, III, and IV under KM 17/2004 and 534 ports managed by the government under KM 63/2002. Of these 645 ports 4 are classified as "Prime" (Jakarta, Surabaya, Medan and Makassar) and 14 are classified as "Class I" including Semarang and Banjarmasin. Prime and Class I ports are defined as suitable for international shipping. The country's largest port, Tanjung Priok, in North Jakarta, is expected to complete the building of Terminal 1 of its Phase I expansion program, in the first half of 2015, increasing maximum draft from 11.5m to 16m and expanding its cargo handling capacity to 6.5 milion TEU p.a.

In 2013, marine fleets operating in Indonesia amounted to 17,838 vessels, consisting of 13,120 national vessels, 354 foreign chartered vessels and 4,364 foreign agency vessels. The average growth rate of container handling by terminal yards in Indonesia handled by Pelindo I - IV ports corporations was 35% over the past 5 years. The new President, who made his acceptance speech on a traditional sailing ship in Sunda Kelapa harbor, Jakarta's historical trading port, has stated that the target of Tanjung Priok port in 2017 is approximately 15 million TEUs a year. In addition, the new Government is expected to improve and build 24 seaports and deep seaports as the main component of the "sea toll road" that is one of the main priorities of the new Government.

Tonnage through Indonesian ports amounted to 71,915,789 DWT in 2013, having dropped an average 13.6% p.a. since 2009. This decrease was due to a decrease in international cargo: with domestic cargo growing by 10.9% p.a. over the same period.

Indonesian ports are among the least efficient in South-east Asia in terms of lead times, which are 3 days compared to those of most ASEAN countries, which are only 1 day. Logistics costs from factories to Tanjung Priok ports) for a 40ft dry container is USD 579: far higher than logistics costs from factories in Myanmar to port, which are USD 323, Cambodia is in the same range. Corresponding costs in Vietnam are lower again at USD 237.

Clean Water

Installed capacity of the 350 Regional Water Companies (with USD 1.3 Billion of total assets) is 159,043.5 l/s (litres per second) and produce 117,225 l/s for only 55 million people in their serviced areas, which contain an estimated 140 million people. That means only 40% of the population have direct access to clean water. Although there are 8.3 million water connections in Indonesia, half of Regional Water Companies are not considered as being in a "healthy" condition. In addition to that, 70% of Regional Water Companies do not apply Full Cost Recovery (FCR), which makes it difficult for the industry to improve profitability performance. In addition, only 32 Regional Water Companies have a Non-Revenue Water ratio below 20%

The average tariff of the 350 Regional Water Companies is estimated to be around IDR 3,273/m3 and their average cost of goods sold excluding depreciation and interest is estimated at IDR 3,099/m3, which results in an operating surplus of only IDR 174/m3. Water tariffs need to use a FCR mechanism both for the 350 Regional Water Companies and the non-Regional Water Companies.

Power

Growth in the demand for electricity over the next ten years is estimated 8.7% p.a., from 219.1TWh in 2014 to 464.2TWh in 2024. As of mid-2014, Indonesia's electrification ratio was 82%, above the Philippines (70%) but below Malaysia (100%), Thailand (99%) and Vietnam (96%), although some progress has been made since 2008 (62% electrification ratio). The slow progress of the Government's Fast Track Program (FTP) I and II is one of the main reasons for the low electrification ratio. FTP I and II were enacted through Presidential Regulations in 2006 and 2010. The new Government has introduced a new 35GW program as part of its total target for the next five years, of which 24.9GW will be awarded as IPPs.

The progress of FTP I (10,000 MW) was estimated at around 77% as of November 2014 since its enactment in 2006. Most of the delays were caused by contractor performance and permit and land acquisition issues, despite irrevocable and unconditional guarantees on loans (both interest and principle) for FTP I provided by the Government. As part of a strategy to reduce two step loans and in accordance with Presidential Regulation No. 48/2011, the Government is required to provide business viability guarantee letters ("BVGLs") on FTP II projects. However, FTP II progress is also slow due to projects struggling in their preparation stage. For FTP II (17,458MW), under Presidential Regulation No. 48/2011 revised by Minister of Energy and Minerals Resources Regulation No. 21/2013, PLN is responsible for investing in 32% of capacity with the remaining 68% to be available through public bidding by experienced and proven IPP investors under BOT/BOOT/BLT and lease schemes. PLN (a Fortune 500 company) is the main off-taker for the power industry.

There are 40 IPPs in operation (7,743 MW) and 173 (9,584 MW) under development, mainly in Java and Sumatra with coal as the main fuel source. PLN planning is being updated for a 35GW fast track program with an estimated US$62.8 billion of investment needed over the next 10 years.

Equally important, transmission and distribution grids need to be well prepared and developed. To balance generator construction, PLN estimates that 59,000kmc of transmission and 164,400kmc distribution grids will be required, with estimated costs of USD20.6 billion and USD14.5 billion, respectively.