

Powering the Nation:

Indonesian Power Industry Survey 2017

May 2017







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Foreword



Ali Herman

Chairman of APLSI

The development of energy and resources as a whole - and the electric power industry in particular - holds major importance in the growth of a country. As an organization which represents more than thirty members operating various power plant projects in Indonesia, the Independent Power Producers Association of Indonesia (“APLSI”) has been delighted to work with PwC Indonesia on this report, “Powering the Nation: Indonesian Power Industry Survey 2017” with the purpose of comprehending the current condition of the electric power industry in Indonesia, and the opportunities and challenges for the future.

In furtherance of the development of the country’s power industry, this report is also aimed at acknowledging the role of the private sector in supporting the growth and reliability of the Indonesian electric power sector. This is in line with the country’s agenda of achieving an electrification target of 99.7% by 2025, under which at least 80.5 GW of power plants need to be constructed.¹

Along with Perusahaan Perseroan (Persero) PT Perusahaan Listrik Negara (“PLN”), the private sector will definitely take a significant role in achieving such goals set by the Government. It should, however, also be noted that Indonesia still faces many challenges which may hinder these goals, including on technical aspects, legal aspects, as well as socio-economic and cultural aspects. APLSI is eager and committed to work hand-in-hand as a partner with the Government and all stakeholders involved in the power sector to respond to such obstacles.

We hope that this report will serve as a positive contribution from the private sector. It is also our wish that this report may serve as constructive input for stakeholders in making decisions for the positive development of the Indonesian power industry. We thank PwC Indonesia for their work on the survey, and look forward to future cooperation.

¹ The 2016 – 2025 Electricity Supply Business Plan (*Rencana Umum Penyediaan Tenaga Listrik* or RUPTL) issued by the Minister of Energy and Mineral Resources of the Republic of Indonesia in June 2016.

Glossary

Term	Definition
APLSI	The Independent Power Producers Association (<i>Asosiasi Produsen Listrik Swasta Indonesia</i>)
BOOT	Build-Own-Operate-Transfer
BI	Bank Indonesia
BPP	Generation Costs (<i>Biaya Pokok Pembangkitan</i>)
BKPM	Investment Coordinating Board (<i>Badan Koordinasi Penanaman Modal</i>)
DPR	House of Representatives (<i>Dewan Perwakilan Rakyat</i>)
FiT	Feed-in Tariff
GDP	Gross Domestic Product
GoI/Government	Government of Indonesia
GR	Government Regulation (<i>PP or Peraturan Pemerintah</i>)
GW	Gigawatt (1,000 MW)
IEA	International Energy Agency
IO	Operating Permit for Generating Electricity for Own Use (<i>Izin Operasi</i> , sometimes referred to as <i>Izin untuk Mengoperasikan Instalasi Penyediaan Tenaga Listrik untuk Kepentingan Sendiri - "IUKS"</i>)
IPP	Independent Power Producer
IUPTL	Electricity Supply Business Permit (<i>Izin Usaha Penyediaan Tenaga Listrik</i> sometimes referred to as <i>Izin untuk Melakukan Usaha Penyediaan Tenaga Listrik untuk Kepentingan Umum - "IUKU"</i>)
kW	Kilowatt
kWh	Kilowatt hour
NEP	National Energy Policy
MoEMR	Ministry of Energy and Mineral Resources (<i>Kementerian Energi dan Sumberdaya Mineral</i>)
MoF	Ministry of Finance (<i>Kementerian Keuangan</i>)
MW	Megawatt (1,000 kW)
MWh	Megawatt hour
PLN	The state-owned electricity company (<i>Perusahaan Perseroan (Persero) PT Perusahaan Listrik Negara</i>)
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PPU	Private Power Utility (electricity generated for own use)
PR	Presidential Regulation (<i>Perpres or Peraturan Presiden</i>)
PSO	Public Service Obligation
PV	Photovoltaic
RUKD	Regional Electricity Plan (<i>Rencana Umum Ketenagalistrikan Daerah</i>)
RUKN	National Electricity Plan (<i>Rencana Umum Ketenagalistrikan Nasional</i>)
RUPTL	Electricity Supply Business Plan (<i>Rencana Usaha Penyediaan Tenaga Listrik</i>)
SOE	State-owned Enterprise
T&D	Transmission and distribution
TKDN	Local content (<i>Tingkat Komponen Dalam Negeri</i>)
TWh	Terawatt hour

Introduction

Welcome to the first edition of the PwC Indonesia Power Industry Survey –"Powering the Nation"–, in association with the APLSI. The survey goes to the heart of boardroom thinking in utility companies and other sector stakeholders. It supplements our Global Power & Utilities Survey with a deeper dive into the Indonesian power sector.

In our report, we look ahead to the future world of electricity in Indonesia as well as taking a hard look at the key challenges the power sector faces today. The changes that lie ahead are of great potential significance – new technologies, unforeseen possibilities and different ways of generating, distributing, storing and using electricity will all play their part.

However, equally important, and more urgent, is how the companies in the sector, the national utility companies, governments and policymakers address the many pressing challenges that constrain existing power systems. The investment requirement is substantial, and the private sector will play an indispensable role. The road of market reform remains long, and the scope for improvement within power companies themselves is significant.

In this report, we look at these and other issues from the point of view of industry players. There is much that we can be optimistic about and the results of our survey point the way to improvements ahead. However, the development of an effective frameworks and the ability of Indonesia to attract adequate investment continue to be the top priorities. Until they are resolved, power systems will remain constrained in Indonesia.

Methodology

This is the first edition of the Indonesian Power Industry survey. The purpose of the survey is to help inform the public and private sectors in Indonesia and abroad about Indonesia's power industry and to highlight some of the challenges in the country attracting optimal investment and achieving its full potential.

The survey questionnaire, jointly designed by PwC and APLSI based on PwC's Global Power & Utilities Survey, was distributed to over 50 Independent Power Producer ("IPP") owners and investors, power developers, suppliers, PLN, and Government agencies in late 2016 and early 2017. The survey questionnaire included sections on both quantitative and qualitative data. Because of the incomplete nature of certain quantitative responses, we have only used this data where meaningful in this report.

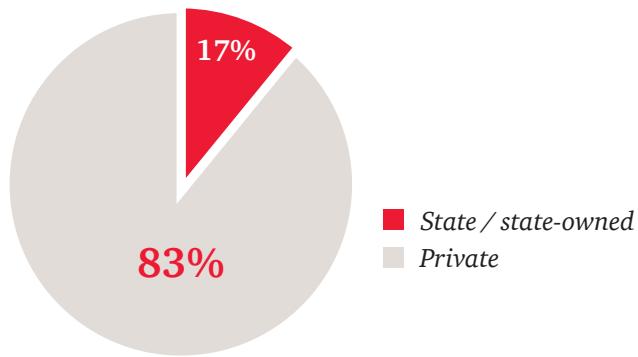
We received 30 responses from a range of domestic and international market participants, representing 30 unique companies or Government agencies. Over 80% were from the private sector (see chart below).

Some responses were gathered face-to-face, with clarifying questions asked in order to interpret results. A follow-up workshop was held with several APLSI members before finalizing this report in order to re-confirm results and discuss new regulations released in early 2017.

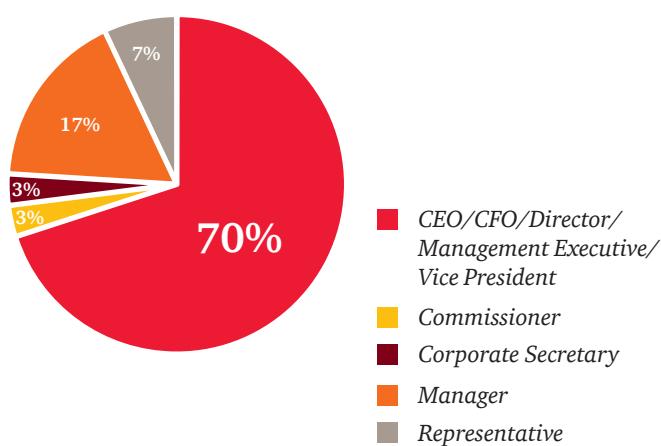
Note in many cases throughout the text we compare responses considering the situation "today" and how the situation might change "in five years" or "in ten years".

Survey respondents' backgrounds

Private vs. State/State-Owned Institutions



Job Title



Top Five Results: Challenges

- 83% of respondents think that regulatory uncertainty is a major barrier to investing in new large-scale power generation
- 73% think that the main barrier to improving electrification rates in Indonesia is the funding of Transmission and Distribution (“T&D”) infrastructure
- 70% think that management of the 35 GW program is the biggest challenge in the Indonesian power industry

Opportunities

- 69% stressed a more reliable Public-Private Partnership (“PPP”) policy and more balanced risk-allocation in Power Purchase Agreements (“PPAs”) would have a positive effect on increasing electrification and supply reliability
- 69% also stressed that the unbundling and liberalisation of the power market would have a positive effect on increasing electrification and supply reliability

Indonesia is facing a huge electricity demand challenge. Per capita power consumption and the electrification ratio have risen rapidly in recent years. However, the existing infrastructure is insufficient to meet all current demand, before even considering growth in the coming decade.

In late 2014, the Government of Indonesia (the “GoI”) launched an ambitious 35 Gigawatt (“GW”) new capacity target to meet the challenge. However, implementation has been slow, and the original 2019 deadline is widely expected to be delayed. The question therefore remains: “How can the GoI and Industry work together to meet Indonesia’s electricity system development goals as fast as possible?”

Our report examines industry opinion on this question as well as a range of other important challenges facing the sector in the near term. Some of the key findings of our survey are as follows:

Demand and technology shaping the landscape

PwC has identified a number of global megatrends shaping the economy, business and society. Three of these were considered critical influencers of the Indonesian Power Sector by more than half of survey participants, namely: population growth, megacities and disruptive technologies.

The first two trends are demand-driven. Simultaneous population growth and urbanization lead to a ‘double whammy’ of a rising number of power customers and rising per customer demand. Both regulators and power producers are therefore focused on how to meet this demand, especially when the existing power infrastructure is already under strain.

At the same time, survey participants are conscious that the way in which we produce and distribute power is changing. Renewable technologies are undergoing fundamental reductions in cost profiles, and battery storage looms on the horizon as a game-changer. The necessity of centralized generation, transmission and distribution is being questioned globally, and Indonesia is no exception.

Mini-grid and off-grid solutions are increasingly viable as solutions to rural electrification, adding further impetus to renewables solutions. This is particularly relevant for a wide-spread archipelago nation such as Indonesia. Even so, several issues relating to tariffs, scalability, location, and local community acceptance still make this solution uncertain.

Stakeholder priorities

Governments and industry are well aware of the ‘Energy Trilemma’ – the trade-off between security, affordability and sustainability of supply. PLN has increased its target for the renewables share of generation to 19% by 2025 in its 2016 - 2025 Electricity Supply Business Plan (*Rencana Usaha Penyediaan Tenaga Listrik* – the “RUPTL”), (although still lower than the National Energy Policy (the “NEP”) national energy mix target of 23% of generation from renewables by 2025), while at the same time aspiring to lower end-user tariffs. However, PLN cannot be expected to bear the cost of meeting renewables targets alone, and the GoI’s targets must be consistent with funding and subsidy arrangements. Clearly, something must give, and the House of Representatives (“DPR”) did not accept renewables subsidies for PLN in 2016.

Survey participants ranked security of supply as their foremost priority in 2016, followed closely by affordability, then sustainability (clean energy). This is perhaps unsurprising in Indonesia, which is still industrializing, and for which self-sufficiency has always been a policy priority. Given these priorities, we would expect the policy focus to remain on coal (which is abundant and cheap in Indonesia) in the short-term.

Interestingly, however, looking to the future, survey participants expect that in 10 years’ time sustainability will become more of a priority than security of supply. As one respondent said, “coal resources are diminishing rapidly – alternative means of supplying electricity to become self-sufficient are crucial for Indonesia’s future”. This again hints at a potential broader shift towards renewable sources of energy over the next decade.

Challenges

In addition to the general challenge of reconciling the trilemma above, we also asked survey participants to identify other major areas of concern.

Topping the list of specific concerns was “management of the 35 GW program (70%)”. As one respondent noted, “it will require a quantum leap for all stakeholders to expedite and follow through in the development of power projects”. This concern is likely to be driven by: (a) overall limited progress on the 35 GW contracting; and, (b) high-profile reversals/uncertainty on specific projects including the Java 5, Sumsel 8, 9/10, and Java-Sumatera High Voltage Direct Current (“HVDC”) projects. Also historical capacity installation has lagged behind target capacity installation (see Figure 2 below). Interviews with survey participants suggested that 57% of industry players are also concerned about cost-reflective user tariffs and, similarly, 53% are concerned about the speed of delivering supporting T&D infrastructure, which PLN has retained responsibility for.

Figure 1 - Progress of 35 GW programme, as of March 2017

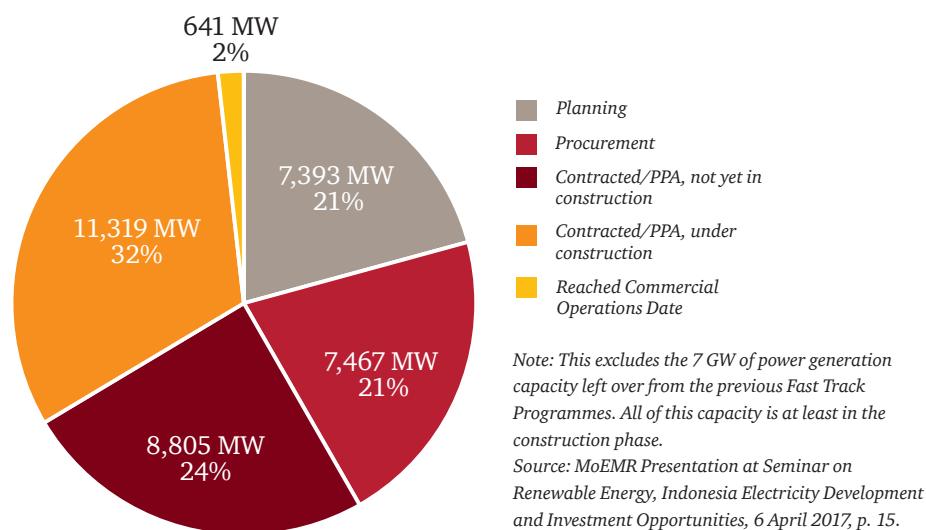
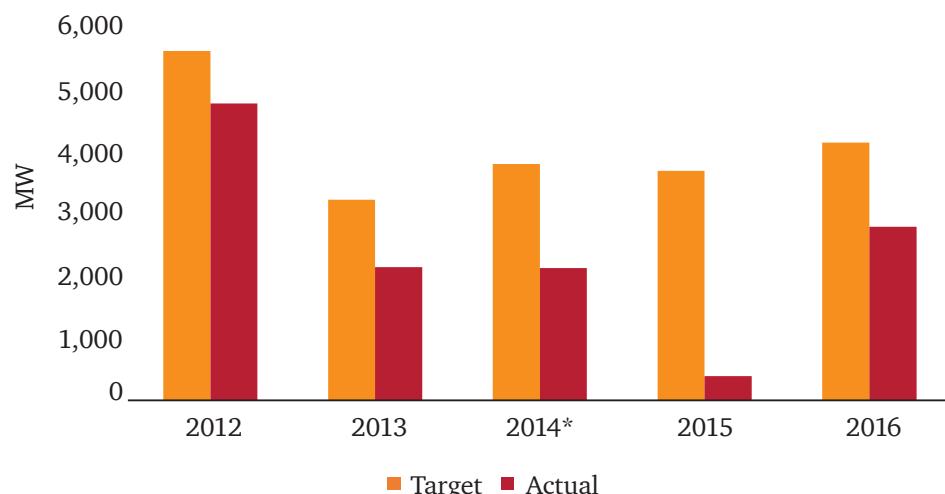


Figure 2 – Actual vs. target capacity installation for 2012 - 2016



To some extent, the overwhelming pressure to deliver 35 GW of capacity is being passed on to industry (i.e., private sector developers and investors), as procurement cycles are tightening. There is a point at which further pressure, however, becomes counter-productive. For example, some participants were concerned that strict financing timelines in the current wave of PPAs are increasing the risk of financing failing completely.

Although not currently at the top of the list, another prevailing concern for the next five years is security of supply (70%). This concern is consistent with the challenges facing the timely implementation of the GoI's 35 GW plan. The other bottleneck the industry is worried about is skills. APLSI supports the GoI's target on local content and manufacturing, but the industry is worried that requirements for local engineers in particular could bottleneck the 35 GW program in the future.

Regulation and reform

89% of survey respondents were optimistic that the direction of regulatory reform is positive, and that significant potential remains to boost the power sector's performance. In particular, respondents thought that if policy levers such as Cost Reflective Tariffs and improved risk allocation in PPAs² were deployed, then this would support electrification and reliability of power supply.

Even so investors surveyed believe the GoI has created a more conducive investment environment for private investors. A smaller majority (58%) of respondents deem the current regulatory and legal framework in Indonesia as having created a conducive investment environment to underpin the expansion of generation capacity. One respondent stated that “this is only achievable if there is consistency and coherence among regulators, other government bodies, the state-owned electricity company, PLN and investors”. For example, the proposed changes to PLN’s subsidy regime have been repeatedly delayed and the timeline for implementation remains unclear.

With luck, the introduction of the One-Stop Shop (“Pelayanan Terpadu Satu Pintu”) program by the Indonesian Investment Coordinating Board (“BKPM”) in 2015 and Presidential Regulation (“PR”) No. 4/2016 for Power Project Acceleration (as amended by PR No. 14/2017) will also support progress.

In addition, the overarching planning framework is not clear to companies; most respondents (40%) said the latest RUPTL lacked clarity on how the long-term vision would be achieved.

Some interviewees mentioned that the regulator must stay on top of changes precipitated by technologies, especially mini-grids. It is notable, therefore, that the GoI released at the end of 2016 a new regulation to clarify and expand procurement options for rural mini-grids below 50 megawatts (“MW”).

With respect to potential larger reforms, such as unbundling generation, transmission and distribution assets, survey respondents considered wholesale reform desirable but unlikely; over half thought T&D assets would remain wholly in public ownership in ten years. This perhaps reflects memories of the Constitutional challenge to the failed Law No. 20/2002 on Electricity (the “2002 Electricity Law”),³ as well as the 2016 decision reaffirming the importance of state control of the sector. However, respondents did believe that the private sector would continue to increase its share of generation through IPP arrangements.

2 Note: this survey was finalized before the release of MoEMR Regulation 10/2017 (see page 12).

3 <https://www.iea.org/policiesandmeasures/pams/indonesia/name-140166-en.php>

Recent changes: New Regulations on IPPs and Renewables

As this report was being finalized in early 2017, the Ministry of Energy and Mineral Resources (“MoEMR”) issued two new regulations (for full details see PwC NewsFlash No. 61, March 2017).

1. No.10/2017 on Principles of Power Purchase Agreements; and,
2. No.12/2017 on Utilisation of Renewable Resources for Electricity.

Since the survey was already complete, views on these regulations do not feature in this report. However, in February 2017, APLSI held a workshop with several IPPs to gauge the industry's initial reaction. A short summary of the new regulations and some industry commentary follows.

Regulation No.10/2017 relates largely to risk allocation and legal form, and sets out specific provisions that must be included in PPAs for all technologies except intermittent renewables, mini hydro, biogas and waste-to-energy. Some of the provisions are already market practice, but others are new. The key new provisions include:

- requiring all PPAs to be structured as Build-Own-Operate-Transfer (“BOOT”), and capping PPA tenors at 30 years
- introducing a penalty for IPPs who fail to deliver forecast power under a Take-or-Pay arrangement (equal to the power shortfall multiplied by the alternative cost of power generation for PLN)
- exempting PLN from the obligation to pay Deemed Dispatch and Termination Payments in the event of certain force majeure events for PLN
- IPPs can now earn an incentive for completing COD early, with PLN's approval

Regulation No.12/2017 stipulates new mechanisms for the purchase of renewable electricity. In general, renewable energy tariffs can now be determined based on negotiations between PLN and IPPs, with reference to the regional electricity generation cost (*Biaya Pokok Pembangkitan*—“BPP”). Solar Photovoltaic (“PV”) will be tendered based on capacity quotas in the RUPTL. In general, where the regional BPP is above the national average, the reference price will be 85% of BPP.

However, procurement routes and reference prices vary by technology.

Participants in the workshop had mixed views on the regulations, but some common themes were as follows:

1. Matching 85% of BPP costs in many Provinces, especially in Java and Sumatera, may be hard for renewable energy technologies at first. It was perceived that this was a cost-cutting measure and there is now “nothing to encourage renewable energy investment in these areas”.
2. The new penalty regime for Take-or-Pay, while “not necessarily unfair” will lead to a “new perspective on risk allocation”. These risks may be priced into bid tariffs.
3. There are various problems with the BPP formula that discourage good economic decision-making – for example, it is an average cost, not a marginal cost. Also, in some Provinces there may be a ‘knife edge’ effect, where Provinces close to the National BPP are 15% apart in terms of procurement benchmark prices if one Province is slightly over and one slightly under (or where the same Province has different BPPs in different years).
4. Some of the provisions around risk allocation may have PPA bankability implications (e.g., extending the PPA tenor to compensate for short-term PLN inability to take power does not address lenders' potential concerns about who is paying debt service in the meantime).
5. APLSI welcomes the use of local content (“TKDN”) in projects but notes that skilled Indonesian engineers are not easy to find for every technology. It is important for the industry to re-double their efforts on training engineers, but also for the GoI to be realistic on current availability.
6. Will this be final? With many changes for Coal Mine Mouth and Solar PV in the past two years, many investors are asking for certainty in regulation.

APLSI suggested a more consultative approach to issuance of major regulations would be helpful in future, as they consider themselves PLN's, and the Government's, long-term partners.

Big challenges

The power sector faces challenges from many angles. Megatrends such as population growth and urbanization are driving rapid demand growth. At the same time, technology promises to upset conventional wisdom on power supply.

The trade-off between affordability, security and sustainability looks set to evolve, with cost recovery and renewable energy becoming more important over the next ten years.

Megatrends, growth and infrastructure

In 2013, the Indonesian economy entered a slowdown period as global commodity prices fell, exacerbated particularly by the slowdown in the Chinese economy. Gross domestic product (“GDP”) growth in 2013 – 2015 averaged 5%, compared to above 6% growth since 2009. In 2016, uncertainty around the presidential elections subsided and President Widodo’s initiatives on the Government’s infrastructure spending and regulatory and subsidy reforms began to be felt. A boost from the Tax Amnesty and stronger fiscal management is also expected, and 2016 growth was around 5.1%.⁴ The World Bank forecasts growth of 5.3% this year (2017).

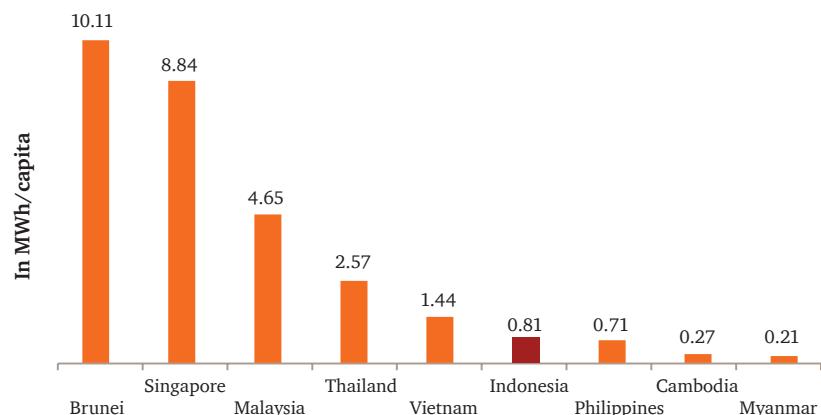
Indonesia continues to be a bright spot for economic growth in a global context. Current growth remains ahead of many other countries. PwC projects Indonesia will have a larger GDP than that of Germany, Russia, Brazil and Japan by 2030 (in purchasing power parity terms) and have the world’s fifth largest GDP by 2030 and fourth largest by 2050, respectively.⁵

Currently, access to electricity and electricity consumption vary across the Indonesian archipelago. Electricity consumption in 2014 was 0.81 megawatt hours (“MWh”) per capita on a national basis, lower than regional competitors (see Figure 3), although consumption is higher in more industrialized areas, such as the western part of Java.

⁴ World Bank (2017) *Indonesia Economic Quarterly*, January 2017.

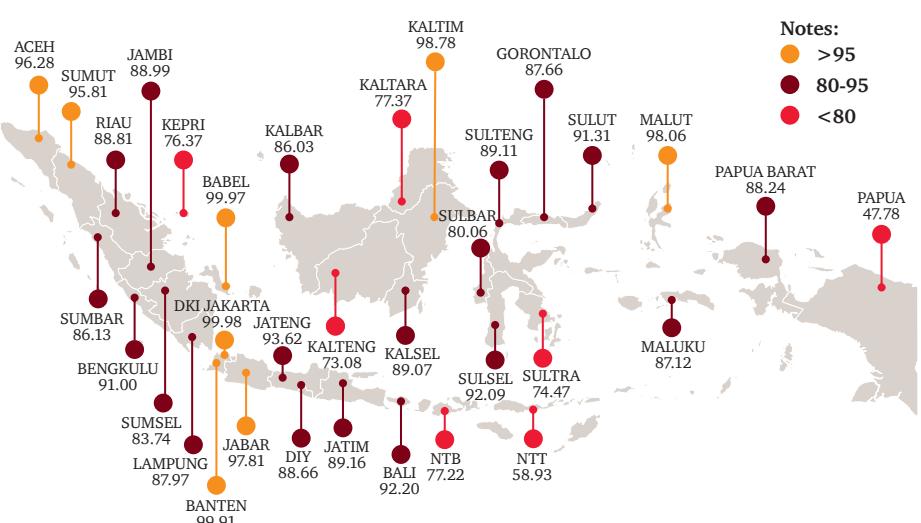
⁵ PwC, “The World in 2050: How will the global economic order change by 2050?”, February 2017.

Figure 3 - 2014 Electricity consumption per capita in major Association of Southeast Asian Nations (“ASEAN”) countries



Source: IEA Energy Atlas

Even based on the 2016 consumption of 0.96 MWh per capita, Indonesia is still well behind its neighbouring economies. Similarly, in terms of access to the grid, the picture is mixed, with electrification in the western part of the country as high as 99.98% (DKI Jakarta), and in the eastern part of the country as low as 47.8% (Papua) (see Figure 4). The national average in 2016 was 91.2%.⁶ Based on the RUPTL 2016 – 2025, the electrification ratio is planned to increase to 97.4% by 2019 and to 99.7% by 2025.⁷



Source: LAKIN DJK 2016, p. 28.

⁶ Laporan Kinerja Direktorat Jenderal Ketenagalistrikan 2016 (“LAKIN DJK 2016”) [2016 Directorate General of Electricity Performance Report], p. 28.
⁷ PwC Indonesia Energy, Utilities & Mining NewsFlash, No. 59, July 2016, p. 1.

Alongside economic growth, population pressures are adding to energy demand. Indonesia had a population of over 258 million people in 2016. This makes it the world's fourth most populous country, and the largest economy in Southeast Asia. Demographics are also in Indonesia's favour. The country has an expected emerging middle class of some 74 million, and has already undergone an unprecedented degree of urbanization and industrialization, which is likely to continue.

The GoI expects population growth to continue at 1.0% per annum ("p.a.") until 2030.⁸ It is expected that the population of Indonesia will be approximately 296 million by 2030. This is set to add to the pressure on urban areas. Indonesia has at least 11 cities of over a million residents (medium-sized cities) with Jakarta considered as a megacity (with population of over ten million). The number of large cities with populations of more than one million is expected to increase.

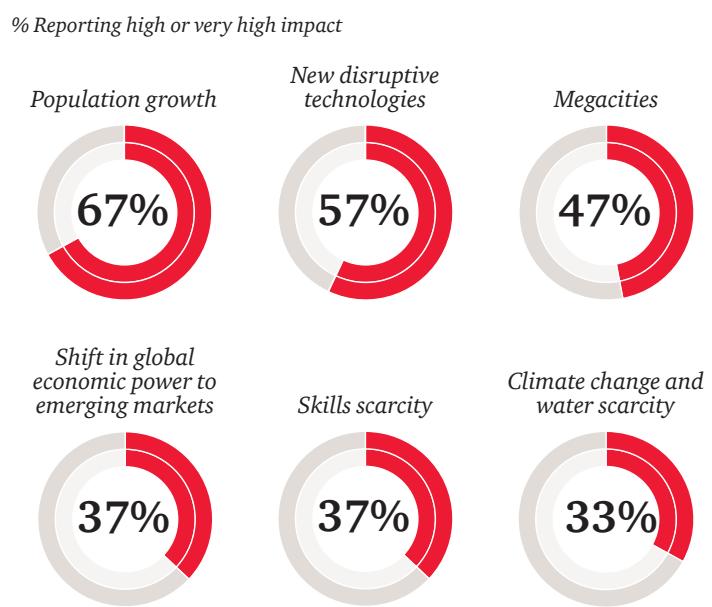
An era of rapid technological change is coming at a pivotal time in the expansion of Indonesian power infrastructure. In particular, the prospect of more affordable off-grid energy is tantalisingly close. Global commentators have penned 2017 as the year that battery storage technologies will begin to commercially scale up and undergo continued cost reductions. In Indonesia, this presents the possibility that small, remote mini-grids could be technically self-sufficient and rely on intermittent sources of power. Also, although an established technology, rapid cost reductions for PV modules threaten to disrupt rural power markets.

On-grid, PLN continues to run a Smart Grid pilot in Bali.⁹ Again, real-time power pricing and metering gives rise to the prospect of real-time demand responses and amelioration of pressure on PLN's generation capacity. In addition, 2016 saw significant promotion of in-plant sensor technologies based on the Industrial Internet of Things, which can boost power plant efficiency and responsiveness.

All of these trends pose major infrastructure challenges and opportunities to the power sector. However, no single megatrend dominates power sector challenges in Indonesia, according to the power sector executives and stakeholders interviewed. As evident from Figure 5, population growth (67%) and new disruptive technologies (57%) represent the greatest perceived challenges to the power sector.

Figure 5. Megatrends – 2015

As of now, which global and Indonesian megatrends will possess an impact on your power sector that concerns you the most?



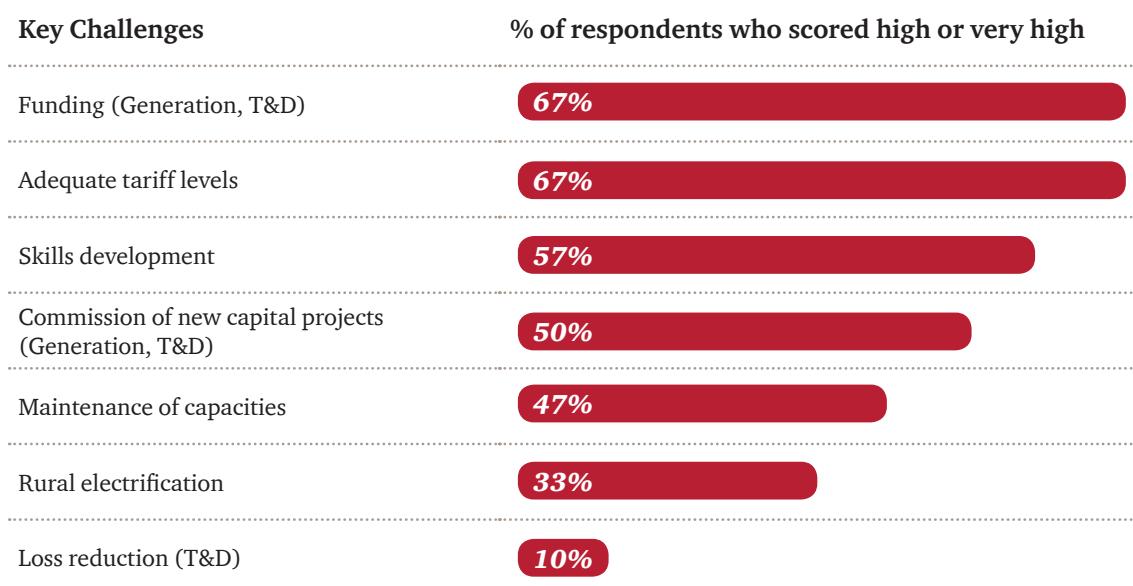
8 <https://www.bps.go.id/linkTabelStatistik/view/id/1274>

9 <http://pit.esdm.go.id/index.php/en/2016/06/02/pln-luncurkan-bali-eco-smart-grid/>

Perhaps surprisingly, skills scarcity is ranked only slightly higher than Climate Change and Water Scarcity (the least worry for those interviewed) despite skills scarcity being a major area of commentary recently in Indonesia.¹⁰ However, clean energy is the fastest growing area of concern by 2025 (see page 17).

Climate Change and Water Scarcity is bottom of the agenda for survey respondents. This comes despite Indonesia signing up to the targets under the Conference of Parties 21 (“COP21”) agreement, at the High-Level Signature Ceremony in New York, 22 April 2016.¹¹ Under the GoI’s Intended Nationally Determined Contribution (“INDC”) made based on this agreement, Indonesia has committed itself to reduce 29% of its emissions versus a ‘Business As Usual’ scenario with its own effort (and up to a 41% reduction with international assistance) by 2030.¹² This would likely require a significant reduction in the fossil fuel intensity of the fuel mix. It was not clear whether respondents are sceptical of the global or Indonesian commitment, or whether they are simply underestimating the impact.

Figure 6. Which of the following key challenges have a high priority in your business operations today?



When asked to rank key challenges for prioritization in business operations today, 67% of respondents believe that funding and adequate tariff levels are the most concerning challenges. 57% follow with concern about skills development. This result is obtained despite skills scarcity being ranked the second-to-last megatrend affecting the power sector. This suggests that while it may be less important as a ‘strategic issue’ than, for example, meeting demand from population growth, it is still in practical terms an ongoing priority for business operations. In colloquial terms, it is something that may keep the COO awake at night, if not the CEO.

Following closely behind, 50% of the respondents also think that commissioning new capital projects (i.e., getting them online and generating power) is a major challenge.

10 https://www.nytimes.com/2016/12/18/world/asia/indonesias-dire-need-for-engineers-is-going-unmet.html?_r=0

11 http://unfccc.int/paris_agreement/items/9444.php

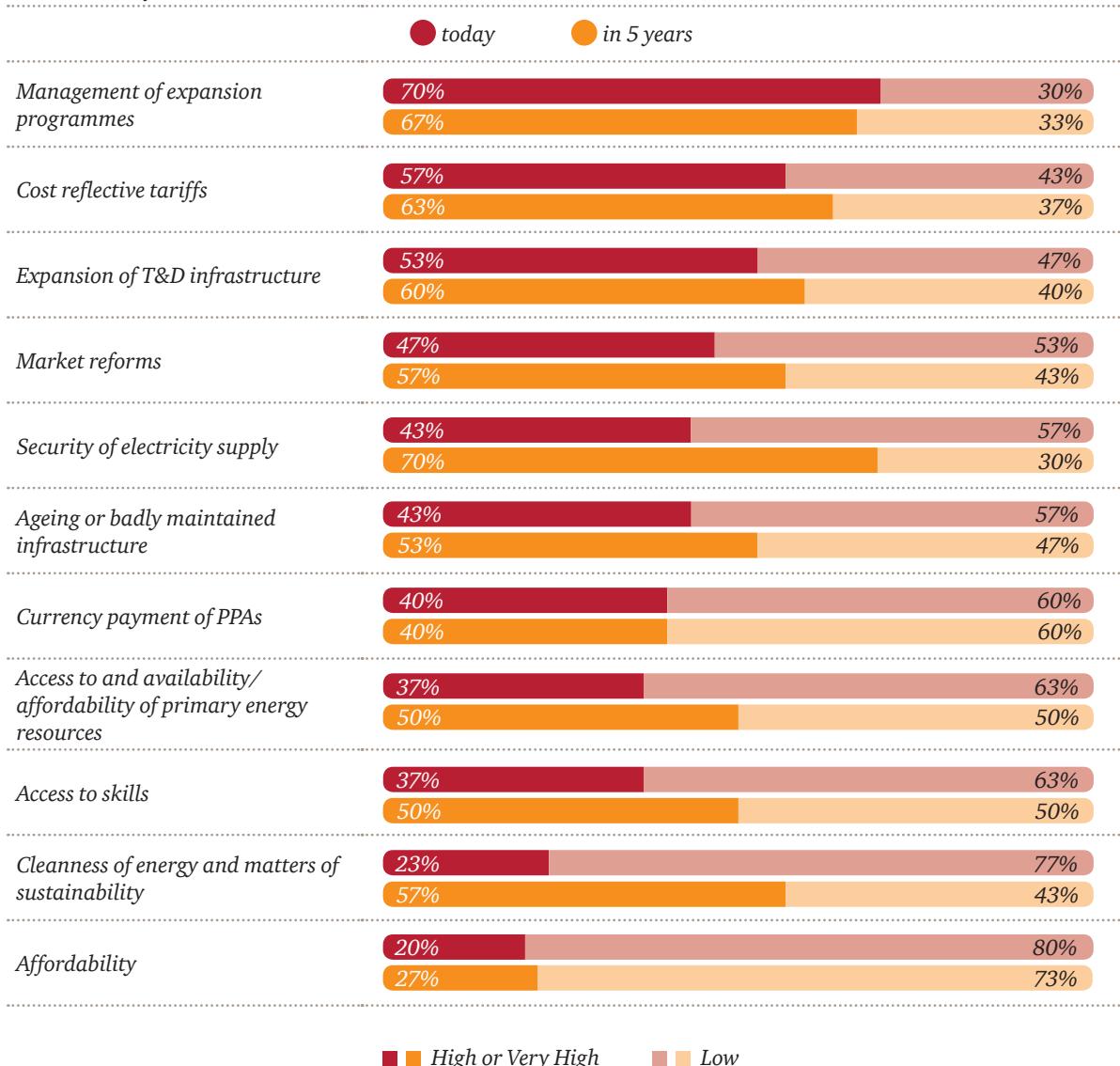
12 <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Indonesia/1/INDC REPUBLIC%20OF%20INDONESIA.pdfat>

Power Industry

In order to better understand the challenges that power industry participants are facing, we also asked them about the big challenges that they are concerned about now and what they expect to be dealing with in 5 years' time.

Figure 7. Big challenges in the Indonesian power industry

Which of the following big challenges in the Indonesian power industry are you most concerned about today and in the next 5 years?



The greatest source of concern shared by over two-thirds (70%) is the management of the 35 GW expansion program. Several key risks may hold back progress, including land acquisition, restrictions on foreign ownership for <10 MW projects, tender delays, uncertainty around guarantees, pricing of power, as well as regulatory trends. Currently, industry players are most concerned about the 35 GW program's progress (see also Figure 1). Indonesia's National Energy Board (*Dewan Energi Nasional*) has reportedly stated that only 19 GW of electricity is likely to be achieved by 2019.¹³ There is a degree of optimism that the management of the expansion program will improve slightly within five years' time.

More than half of survey respondents (57%) view cost-reflective tariffs as a big challenge. Tariffs to end-users of electricity typically do not reflect the actual cost of its generation and supply, thus directly inhibiting investment by PLN, and indirectly providing cause for concern to IPPs. 63% of respondents still view this as being a big challenge in the next five years.

A slightly lower portion (53%) agree that the expansion of T&D infrastructure is a major challenge. It is perceived by 60% of survey respondents to remain a main challenge in five years' time. One respondent viewed that "to improve the Indonesian power sector, PLN should place more attention on T&D, because the 35 GW program would be useless if there is not enough transmission capacity".

Lesser concerns (40% or less) include:

- *Access to skills.* The 2009 Electricity Law requires holders of an *Izin Usaha Penyediaan Tenaga Listrik* ("IUPTL") or an *Izin Usaha Jasa Penyediaan Tenaga Listrik* ("IUJPTL") to prioritise the use of domestic products and services. Minister of Industry Regulation ("MoI Regulation") No. 54/2012 stipulates the minimum required percentage of local goods and services (by value) used for the development of electricity infrastructure. At the moment, not all respondents are confident that there are sufficient local human resources to complete the 35 GW program within the specified timeframe.
- *Currency payment of PPAs.* This unchanging stance follows the introduction of Law No. 7/2011 and Bank Indonesia ("BI") Regulation No. 17/3/PBI/2015, which requires all domestic transactions to use Indonesian Rupiah ("IDR"). However, there are examples of tripartite agreements between, PLN, and State-Owned Banks, whereby PLN will index the tariff to USD, but pay the invoice in IDR, which will then be converted by State-Owned Enterprise ("SOE") banks to USD when payment is transferred to the IPPs' bank accounts.

Furthermore, the survey shows that other challenges could increase in the next five years. Aside from currency payments in PPAs (which is now a known and understood challenge), all challenges show greater concern in future than today. In particular, security of supply and clean energy (matters of sustainability) are expected to jump in terms of level of concern.

¹³ <http://www.thejakartapost.com/news/2016/11/17/indonesia-braces-for-defeat-in-35-gw-program.html>,
<https://www.rambuenergy.com/2016/11/indonesia-energy-ministry-admits-only-56-5-of-the-35-gw-power-programs-completed-by-end-2019/>

The “Energy Trilemma”

The trade-off between the three classic energy objectives of security of supply, affordability and sustainability has long been recognised as a central dilemma, or ‘trilemma’, for energy policy. The energy supply that might be the most secure may not be the most affordable and/or the most sustainable and vice versa. As the World Energy Council points out, “delivering policies which simultaneously address energy security, universal access to affordable energy services, and environmentally sensitive production and use of energy is one of the most formidable challenges facing government and industry.”¹⁴ In Indonesia’s case, energy security should not in theory be an issue since, based on Government data, Indonesia has abundant natural resources such as oil and gas, coal (see Table 1 and Figure 8) as well as renewable energy (see Table 2). As at 1 January 2016, Indonesia had total oil and gas reserves of 7.3 billion barrels and 144.1 trillion standard cubic feet (“TSCF”), respectively, as well as coal reserves of 28.5 billion tonnes. However, with the ongoing depletion of those reserves as well as concerns about investment in exploration and bottlenecks in physical infrastructure, security of energy may become an issue in the near future.

Table 1. Indonesia’s Coal Reserves in 2016

Quality	Reserves (Million Tonnes)		
	Probable	Proven	Total
Low Calorie (<5,100 kcal/gr)	7,108.27	7,121.47	14,229.74
Medium Calorie (5,100 - 6,100 kcal/gr)	3,570.70	6,841.66	10,412.36
High Calorie (>6,100 - 7,100 kcal/gr)	541.60	2,769.20	3,310.80
Very High Calorie (>7,100 kcal/gr)	264.19	240.20	504.39
Total	11,484.76	16,972.53	28,457.29

Source: Laporan Kinerja Direktorat Jenderal Mineral dan Batubara 2016 [2016 Directorate General of Mineral and Coal Performance Report], p. 4.

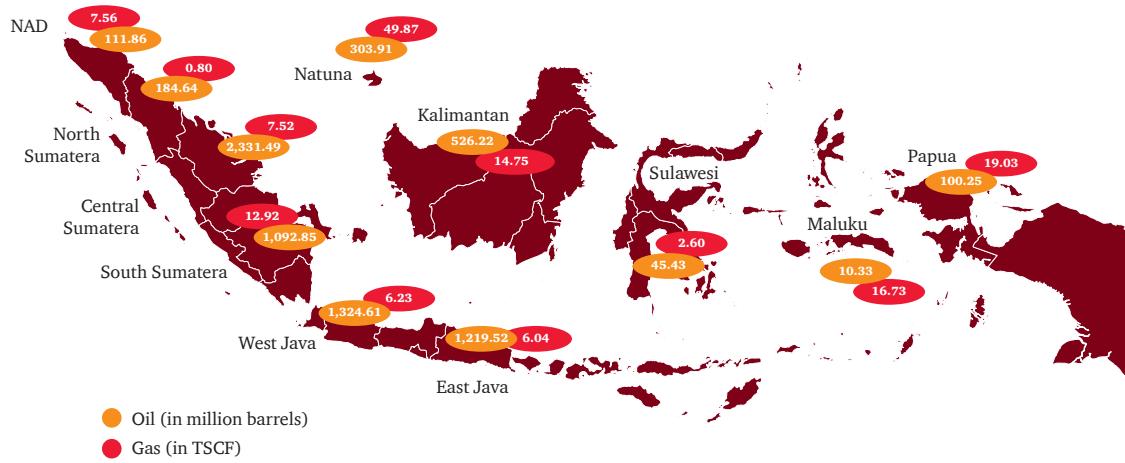
Table 2. Renewable Energy Resources in Indonesia

Source	Potential Power Generation
Hydropower	75 GW
Geothermal	29 GW
Biomass	50 GW
Solar Photovoltaic (“PV”)	4.80 kWh/m ² /day
Wind Power	3 - 6m/s
Ocean	49 GW

Source: Rencana Strategis 2015 – 2019 Kementerian Energi dan Sumberdaya Mineral (“RENTRA KESDM 2015 – 2019”) [2015 – 2019 Strategic Plan of Ministry of Energy and Mineral Resources] and RUPTL 2016-2025

Despite the fact that crude oil has traditionally played a greater role in Indonesia’s energy supply and export, Indonesia is now a net oil importer. Further, Indonesia has experienced a gradually narrowing surplus of gas production over domestic consumption for the past five years; partly due to transport infrastructure constraints in bringing gas to market. The GoI forecasts that there will be a significant increase in domestic use, which may result in Indonesia starting to import gas significantly from 2019. Indeed, now gas is already being imported for the use of PLN and IPPs.

Figure 8 - Map of Indonesian Oil and Gas Reserves as of 1 January 2016



Source: Laporan Kinerja Direktorat Jenderal Minyak dan Gas Bumi 2016 [2016 Directorate General Oil and Gas Performance Report], p. 25-26.

Similarly, for energy security reasons, it has been reported that the GoI plans to restrict coal production to only 400 million metric tonnes by 2019, of which 60% will be consumed domestically.¹⁵

We put the question of this ‘energy trilemma’ to our survey participants. We asked them to assess how much they prioritize each dimension of the trilemma but also forced them to make trade-offs between the different elements, in reflection of the real-life trade-offs that exist. Not surprisingly, security of supply is confirmed as the number one priority but survey participants expect significant change in the next five years (Figures 9 and 10).

Looking at Figures 9 and 10, the responses confirm security of supply (100%) as the foremost priority, with affordability following closely behind (96%). Currently, respondents give sustainability/clean power only 75% emphasis.

However, survey respondents expect significant change in policy emphasis in the next five years. By 2020, respondents expect sustainability/clean energy to move up to 100% as the main focus. We found that this is a trend expected by survey participants in every major region of the world. Currently, respondents gave sustainability/clean energy the least focus amongst the three priorities. In the next five years, affordability and security of supply is given the least emphasis (77% and 76% emphasis respectively). This shift in emphasis suggests that our survey respondents will take the COP21 deal more seriously in the future. However, respondents are still sceptical about implementation (see page 23), despite the shift in emphasis.

15 RENSTRA ESDM 2015 – 2019, p. 85 and 87.

Figure 9. Energy trilemma – Today

Right now, where do you see Indonesia's position in the 'trilemma' between security, affordability and sustainability?

Today	Average score	Indonesia index	Global index *
Security of supply	5.44	100	100
Affordability	5.21	96	92
Sustainability/clean power	4.06	75	61

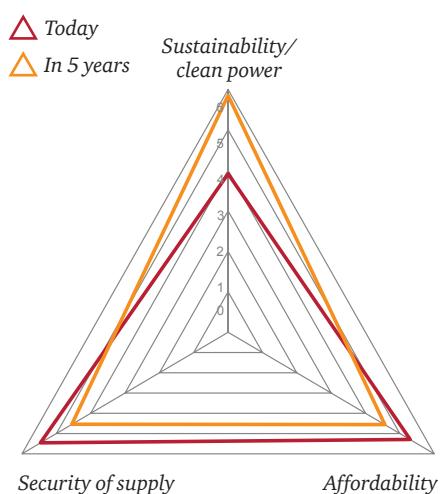
*Global index is from PwC's 14th Global Power & Utilities Survey, 2015.

Figure 10. Energy trilemma – In 5 years

In 5 years' time, where do you foresee Indonesia positioned in the 'trilemma' between security of supply, affordability and sustainability?

In 5 years	Average score	Indonesia index	Global index *
Security of supply	4.52	76	100
Affordability	4.54	77	83
Sustainability/clean power	5.92	100	81

*Global index is from PwC's 14th Global Power & Utilities Survey, 2015.

Figure 11. Within the Energy Trilemma where would you place Indonesia today and in 5 years' time?

Renewables

Global Trends

As the International Energy Agency ("IEA") recently headlined, "renewable power generation grew by an estimated 5% in 2015 and now accounts for around 23% of total electricity generation globally. New renewable electricity capacity grew at its fastest pace ever in 2015, supported by policies driven by energy security, local pollution concerns and climate benefits".¹⁶ Around 40% of new renewable additions globally came from onshore wind, with the commissioning of an estimated 60 GW of new grid-integrated capacity. Solar PV capacity grew by 45 – 50 GW in 2015. The remainder came from hydropower and offshore wind deployment.¹⁷

Renewable costs, especially solar PV and onshore wind, have tumbled as installed capacity rocketed. Onshore wind fell around 20% and Utility-scale Solar PV around 66% between 2010 and 2015. Up to 2020, these are expected to fall an additional 12% and an additional 25%, respectively.¹⁸

However, according to the IEA, cost reductions for renewables, on their own, will not be enough to secure an efficient decarbonisation of electricity supply. It is necessary to have structural changes to the design and operation of the power system to ensure adequate incentives for investment and to integrate high shares of variable wind and solar power.¹⁹

Given this global background of growing capacity and falling costs, it is no surprise that Indonesia is increasingly encouraging renewables deployment. The GoI has now specifically stated a target of achieving 23% energy mix from renewables by 2025 (as set out in the NEP). PLN's current target based on the RUPTL 2016 - 2025 is 19% - still a significant increase on the current slightly over 10%.

¹⁶ International Energy Agency, Tracking Clean Energy Progress 2016, p. 5.

¹⁷ Ibid., p. 18.

¹⁸ Ibid., p. 18.

¹⁹ International Energy Agency, 2016 World Energy Outlook: Executive Summary, 2016, p. 4.

Technology Development

Figure 12 - Technology development in your market. Which of the following technology developments do you expect to have the biggest impact on the market?

Major Technology Developments	% of respondents who scored high or very high
<i>Reductions in the cost of renewable energy generation</i>	60%
<i>Energy efficiency technologies</i>	57%
<i>Expansion of renewable energy power generation</i>	57%
<i>Availability of cost efficient storage technologies for renewable energy</i>	50%
<i>New gas field exploration and/or domestic use of LNG for power</i>	47%
<i>The deployment of demand-side management technology</i>	37%

Industry players also appear to believe that renewables are an important technology trend (Figure 12). 60% believe reductions in the cost of renewable energy generation is the technology development that will have the biggest impact on Indonesia's power market. Currently, even though there are guarantees, tax and feed-in tariff incentives²⁰ as well as Value Added Tax/import duty exemptions, renewable power generation is still significantly more expensive than conventionally-generated power in Indonesia. Thus, reductions in the price of renewable energy generation would greatly change the power market.

57% view energy efficiency technologies as having the next-biggest impact on the market. Energy efficiency is reducing the consumption requirements of many devices, buildings and processes. More efficient energy usage (including Demand Side Management) would reduce the cost of energy services provision since this may result in a more stable demand for electricity throughout the seasons/days (i.e., flatten the load curve), which could help reduce the average cost of supply.

57% of respondents also believe that the expansion of renewable energy power generation will have a big impact. Following years of under-investment within the renewables sector, Indonesia's production of renewable energy remains modest. Aside from the historically inadequate tariffs, it is often mentioned that the challenges of investing in renewable energy includes significant upfront expenditure. However, with the falling global and Indonesia costs, and the new Government's policies and PLN plans, this is likely set to change.

Following closely behind, 50% see having cost-efficient storage technologies for renewable energy as having a large impact. This would be very helpful in the provision of (intermittent) solar, wind and hydro. Major technology developments in energy storage technologies could enable renewables to provide reliable power capacity to meet daily electricity demand fluctuations.

²⁰ Note that under currently issued MoEMR Regulation No. 12/2017, the feed-in tariff incentives are no longer available, but have been replaced by tariffs linked to average national costs of generation and regional costs of generation. See PwC Indonesia's EU&M NewsFlash No. 61/2017.

Indonesia's Target

However, despite current optimism and understanding of global trends, the industry is very cautious about renewables growth targets. Given the GoI's aim that by 2025 renewable power should represent at least 23% of the energy mix, we asked the respondents to explore the probability of such a scenario being realised in future.²¹

This scepticism (see box below) may reflect the view that PLN is still focused on profit first-and-foremost. The interests of the Ministry of SOEs as the shareholder are not always aligned with MoEMR's interests as the energy regulator.

Reconciling this conflict would likely be helped by greater state budget allocation to incentivise investment in renewables. This may not be realistic within the near future with the current political environment and prevailing budget deficit.



Future Scenario

Power generated by renewables in 2025

"At least 25% of power generation in Indonesia will come from renewables in 2025."

Despite a positive outlook on sustainability in general, survey respondents did not generally agree with this statement. The majority (47%) believed that there is only a moderate chance of this being achieved while 43% project there is a low probability. Only 10% believe there is a high chance of achieving the target.

²¹ It is worth noting that we asked this question before MoEMR No. 12/2017 was released (see Page 12).

Energy access

Given that close to 10% of the population of Indonesia are without access to electricity and many of those who are connected suffer frequent supply interruptions, it is unsurprising that expansion of power generation and T&D networks is both a priority and a major challenge. PLN projects electricity demand growth of around 8.5% p.a. between 2015 and 2025, reaching a total of 457 terawatt hours (“TWh”) of electricity consumed in 2025, compared to 203 TWh in 2015.²² By 2025, the GoI expects that the entire population of Indonesia will have access to electricity.²³

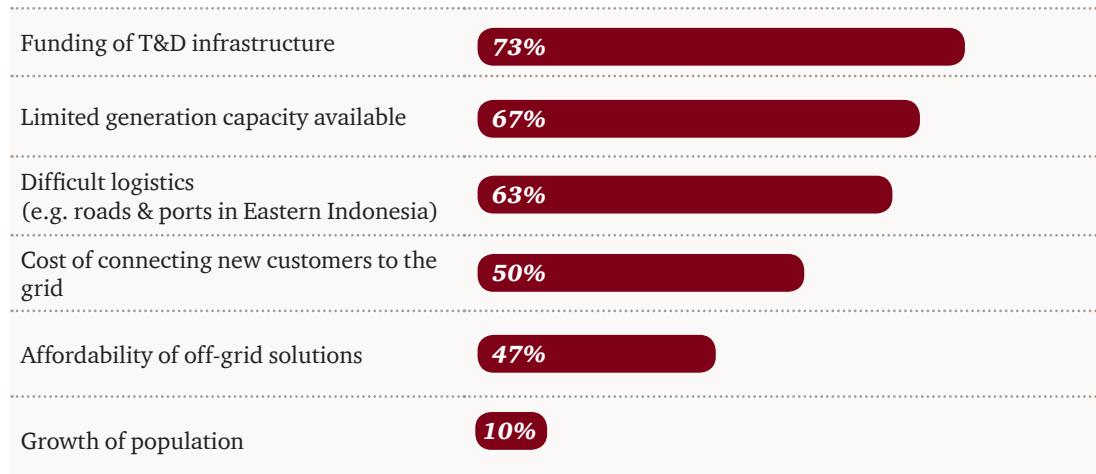
We asked survey participants to explore the barriers to electrification. Funding of T&D infrastructure topped the list with close to three-quarters (73%) reporting that it was a big or very big barrier.

Limited generation capacity was also seen as a major barrier by over two-thirds (67%) of those who responded. Difficult logistics followed close behind (63%), in particular in Eastern Indonesia where it may be relatively expensive to extend the current T&D grid.

In turn, lack of T&D infrastructure is a major factor in racking up a significant cost for connecting new customers to the grid, which was seen as a major barrier by 50% of those surveyed. A lower proportion (47%) also said the affordability of off-grid solutions remained a major barrier.

In this context, it is notable that the Government launched, at the end of 2016, MoEMR Regulation No. 38/2016 on Electrification for Remote Areas. The regulation permits power supply to under-developed villages, remote villages, and inhabited small islands via the use of mini-grids with up to 50 MW generation capacity. There are also explicit provisions for subsidy, subject to Governor and MoEMR approval. The approved areas (*Wilayah Usaha*) can be tendered to businesses. While this regulation will not help logistics constraints highlighted by survey participants, it may help the security of supply and affordability issues (with knock-on implications for the ease of collection (billing) in rural areas).

Figure 13. What are the main barriers to improving the electrification rates in Indonesia?



22 RUPTL 2016 - 2025, p. 126 and 2015 PLN Annual Report, p. 18.

23 Government Regulation No. 79/2014 on National Energy Policy.



**Future Scenario:
Availability of rural electrification
level by 2020**

“Advances and cost reductions in green off-grid technology will deliver an exponential increase in rural electrification levels by 2020.”

Survey respondents hold positive views towards this future scenario (79% view this scenario as having a medium or high chance of happening). There are already many available technologies to explore in this field, and recent regulations support less than 50 MW application in rural parts of Indonesia (see previous page). However, even though there are cost reductions in this technology, electricity provision through this method will need to be supported by improvement in infrastructure and proven, scalable business models.

Affordability and cost recovery

As Indonesia seeks to expand investment in the power sector, affordability is coming under strain. One of the most important perceived pressures on affordability stems from electricity sector regulations and obligations (see Figure 14 overleaf; 82% of respondents rated this as a major driver of increasing power prices). For a long time, many policymakers have been striving to implement tariff levels that reflect the true costs of producing electricity (this is further explored under the end-user tariff and subsidy section on page 34). However, there remains a gap between cost of production and the average retail tariff. Electricity tariffs typically derive from a political bargain between the legislative and the executive branches of the Government (rather than the decision of an objective, independent regulator).

In practice, Indonesia's electricity tariffs are fixed by considering each customer group's installed power capacity. The higher the installed power, the higher the tariff imposed. Also, the higher the electricity consumption, the higher the multiplier used for determining the tariff, in order to encourage customers to use electricity wisely. Different tariffs are subject to different subsidy arrangements; for example, small household tariffs are heavily subsidised; IDR319/kWh represents a price more than four times lower than the average generation cost of IDR1,350/kWh in 2015. Throughout the years, PLN has been compensated from the state budget via a subsidy, should the regulated price for electricity fall below its cost of production.

Since 2013, this subsidy has stabilized due to the stabilization of the average cost of generation, and the ability of PLN to pass on increases in inflation, the price of oil and the USD/IDR exchange rate to consumers (the "automatic adjustment mechanism") through MoEMR Regulation No. 31/2014 as amended by MoEMR Regulation No. 9/2015. This subsidy includes a public service obligation ("PSO") margin, which has been 7% since 2012. Recent and potential future policy moves are discussed further on page 34 on "Liberalisation and Competition".

Alongside Electricity Sector Regulations, 82% of our survey respondents also believe that IPP pricing in the electricity sector is an equally important driver behind increasing electricity prices (Figure 14).

The third, fourth, and fifth most important perceived pressures on affordability result from fossil fuel prices (gas, coal, oil). Despite the fall in oil prices in 2016, the majority of participants (72%) still identified fossil fuel prices such as natural gas, coal, and oil as important key factors in increasing electricity prices. They are perhaps mindful of the longer-term build-up of oil price pressure and the reliance on oil in remote regions and for emergency supply. It is also worth noting that as this survey was conducted in late 2016, coal prices had temporarily shot up, largely due to Chinese Government policy.

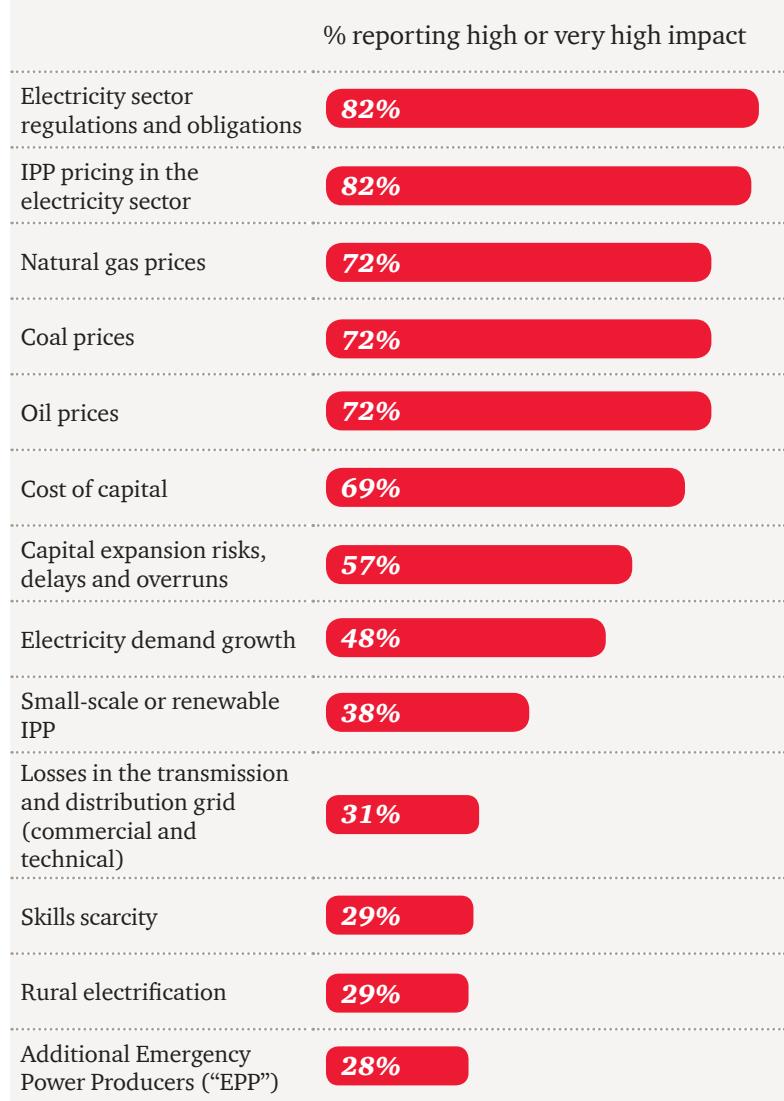
Continuing need for the development of regulatory frameworks, as well as Indonesian country risk, has the effect of increasing the cost of capital for power sector investment, which was highlighted by 69% of respondents as a key driver of electricity prices. This likely reflects the (sometimes) higher cost of borrowing in Indonesia than other neighbouring countries such as Malaysia or Singapore. It may also indirectly drive IPP pricing discussed above.

With so much of the power sector focused on infrastructure expansion and renewal, capital project risks, delays and overruns are also deemed risks for PLN and IPPs by 57% of respondents. This may impact project returns, and in the long-run, IPP and end user tariffs, given a fixed expectation of the required equity return.

Other, less prominent, reasons for price increases, include small-scale or renewable IPPs (with generally higher generation costs), emergency power suppliers (e.g. Diesel Powered Power Plants in Sulawesi and East Nusa Tenggara (“NTT”)), losses in the T&D grid, skills scarcity, and (the cost of funding) rural electrification.

Figure 14. Drivers of increasing electricity prices.

In your view, which of these are the drivers of increasing electricity prices?



Big responses

The Government has taken steps to meet industry challenges, with new regulations and funding. However, greater regulatory planning and procurement clarity and consistency would help drive change.

Energy policy and market design

In Indonesia, as elsewhere in the world, clear power sector policies in combination with reliable, predictable regulation are the key to unlocking investment, improving efficiency and significantly increasing electricity access. The GoI, by way of PR No. 4/2016 on the Acceleration of Power Infrastructure Development (as amended by PR No. 14/2017) and a number of other regulations in 2016 – 2017, has tried hard to address the various issues affecting power project development in Indonesia. Having appropriate regulation and a well-designed regulatory strategy is important for governments, companies and investors in Indonesia. One of the GoI's other new initiatives is the introduction of a one-stop shop (integrated services centre) by BKPM, an online permit application system. These initiatives are essential for stimulating the growth and performance of the sector so that it is, in turn, able to play its part in Indonesia's economic growth.

We asked the respondents to explore the barriers to investing in new large-scale generation. All around the world, power companies are concerned about regulatory uncertainty. This is a barrier to investment and a risk that consistently comes top of the list when we survey or speak with power companies or developers/investors worldwide. This is consistent with Indonesia, where regulatory uncertainty tops the list as the single most important barrier to making large-scale investments (Figure 15), as deemed by 83% of survey respondents. Regarding this matter, one respondent said, “the execution of policy so far seems to be inconsistent”.

Examples from the past two years include:

- More than four regulations relating to Coal Mine Mouth procurement or pricing
- Disagreements between MoEMR and PLN on the appropriate mini-hydro FiT
- Two major revisions to benchmark costs for Solar PV regulation²⁴

Respondents also noted the risk of adverse Supreme Court decisions. For example, at the end of 2016 Waste Incineration technology was prohibited.²⁵

The second most concerning barrier to investment is lack of coordination between Ministries/other government institutions (73%). Other than that, 67% of survey participants share the view that obtaining finance, and following closely behind, timely conclusion of PPAs and permits (63%) are major barriers. Direct Selection and Direct Appointment PPAs are supposed, by law, to be concluded within 30-45 days of PLN Due Diligence ending. Yet, the industry is clearly not convinced that these timelines are being followed every time.

Figure 15. Major barriers to invest in new large-scale generation

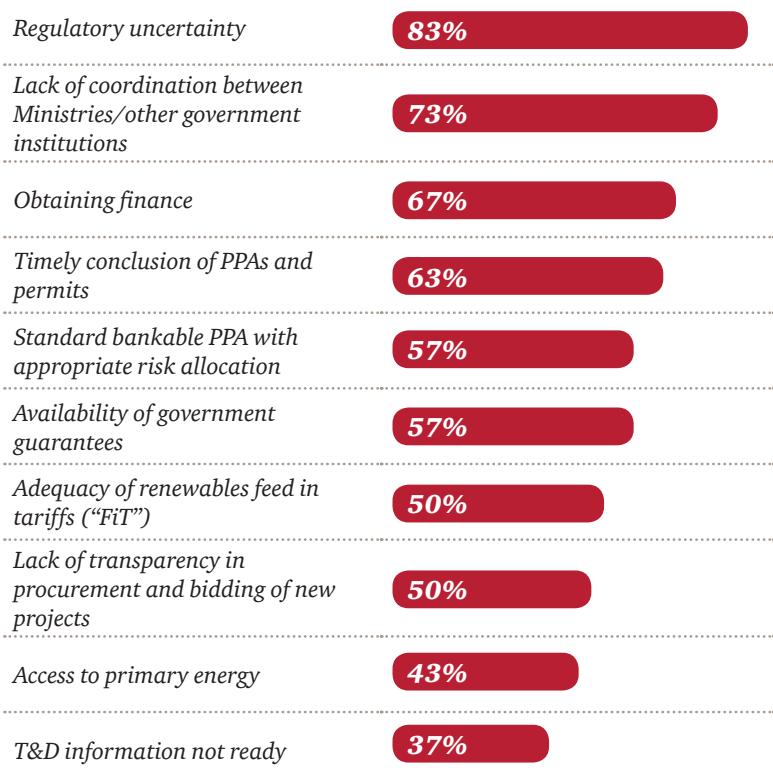
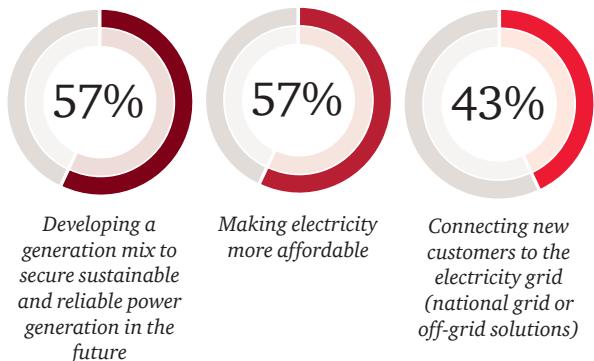


Figure 15 paints a relatively positive view of the respondents towards transparency in the procurement and bidding of new projects. This is also apparent where 50% of respondents believe that there is sufficient transparency in the procurement of new power capacity in Indonesia. However, the process may have been transparent but inconsistent, which creates uncertainty in the investment environment. Some common uncertainties relate to the consistency of PPA terms, cancelled or postponed projects, and shifting procurement timeframes.

24 MoEMR Regulation No. 19/2016 and MoEMR Regulation No. 12/2017

25 Source: Constitutional Court of the Republic of Indonesia, Decision No. 111/PUU-XIII/2015

Figure 16. How much focus on the following objectives does energy policy have in Indonesia?

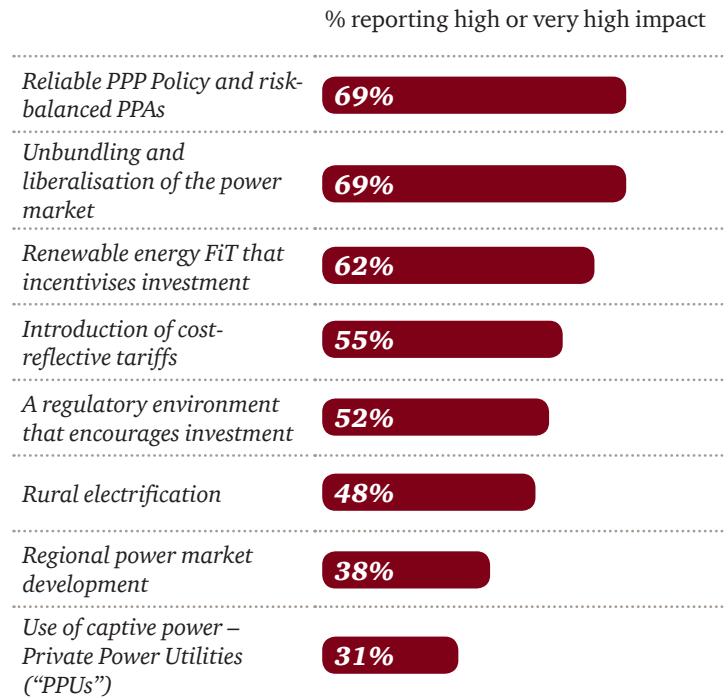


Furthermore, we asked the respondents to explore the current focus of Indonesia's energy policy. Figure 16 shows that respondents currently think that the focus is both on developing a generation mix to secure sustainable and reliable power generation in the future (57%) and making electricity more affordable (57%). A slightly lower portion of the industry (43%) also thinks that connecting new customers to the electricity grid is a key objective in Indonesia's energy policy.

In terms of affordability, there has been a long-standing trade-off between balancing low electricity prices and sustainability. In the RUPTL 2016 - 2025,²⁶ it is noted that there is a shift in focus towards renewable sources of energy, thus improving sustainability. However, there is push-back from both the GoI (or at least the DPR) and PLN as they have to ensure both profitability for the company as well as affordable electricity prices for the masses; both of which are hard to achieve given the shifting focus towards sustainability.

What then do survey respondents tell us about the policy improvements they would like to see to address the key problems of expanding power provision and making existing assets more reliable? Figure 17 shows that 69% emphasize the importance of a "more reliable PPP policy and risk-balanced PPAs". Respondents also view the opening up of markets as an equally important energy policy lever. The opening up of markets, in the form of unbundling and liberalisation would have a high or very high impact on electrification and supply reliability. One respondent further suggested that it may be specifically helpful for PLN to allow foreign capital in transmission, construction, and operation within the power market since PLN has insufficient cashflow or money to develop power plants on its own. Two other factors rated less highly are better frameworks to incentivise renewable energy and moves to make tariffs most cost-reflective.

Figure 17. How important will the following energy policy levers be in helping to increase electrification and improve reliability of power supply?



26 On 29 March 2017, the 2017-2026 RUPTL is issued by the MoEMR

Electricity planning

The RUPTL constitutes a ten-year electricity development plan for the operating areas, or *Wilayah Usaha* of PLN. The RUPTL is based on the Electricity General Plan (*Rencana Umum Ketenagalistrikan*) which consists of the National Electricity Plan ("RUKN") and Regional Electricity Plan ("RUKD"). The RUPTL contains demand forecasts, future expansion plans, electricity production forecasts, fuel requirements, etc, and also indicates which projects are planned to be developed by PLN and IPP investors, respectively. Direct selection or direct appointments for IPPs to build power plants are based on the RUPTL. As such, the RUPTL is a very important document for all investors in the Indonesian power sector to understand. The RUPTL is reviewed annually by the MoEMR and PLN.

In June 2016, the MoEMR issued the RUPTL 2016 – 2025, which in previous years was usually issued in January – February. The RUPTL aims to achieve an electrification ratio for Indonesia of 99.7% by 2025. To achieve this level of electrification, the RUPTL indicates at least 80.5 GW of power generation capacity will need to be constructed by 2025, with 18.2 GW of plants planned to be constructed by PLN and 45.7 GW by IPPs. The remaining 16.6 GW has not yet been allocated between PLN and IPPs. The RUPTL also focuses on achieving the renewables targets set out in the 2014 National Energy Policy ("NEP").

With the issuance of the RUPTL 2016 – 2025, commencement of tendering for IPP projects which have been stalled for months or years can be continued, and therefore the process of satisfying the much-needed expansion of power generation capacity in Indonesia, particularly in the eastern parts of the country, can be expedited.

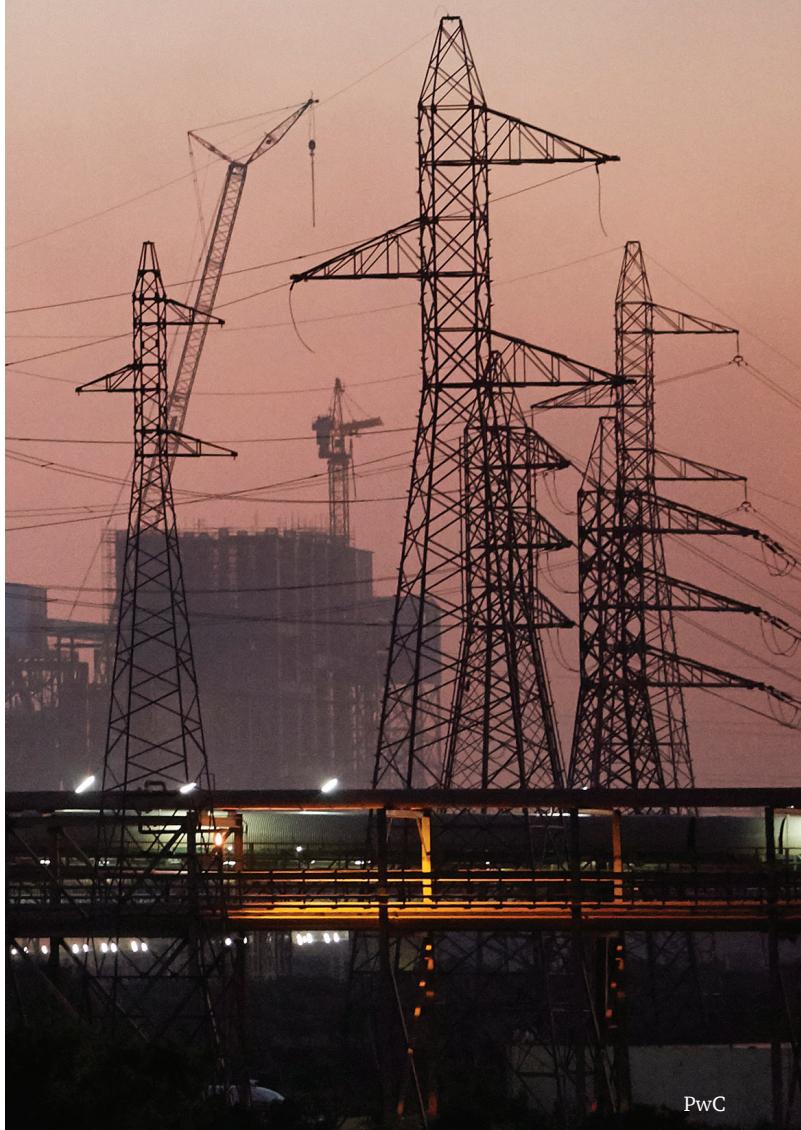


Figure 18. Industry sentiments towards the RUPTL 2016 – 2025.

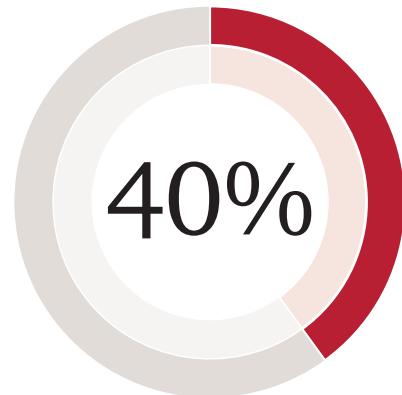
In your view, is the RUPTL 2016 – 2025 designed to adequately anticipate and respond to the current and future challenges in the sector?

	% reporting high or very high impact
<i>Current plan does not offer sufficient clarity on how the long-term vision for the sector will be achieved.</i>	40%
<i>Current plan is adequate in design and content.</i>	27%
<i>The current plan is antiquated; a comprehensive review and update is needed.</i>	17%
<i>Current plan would benefit from details on how to achieve resilience to alternative futures.</i>	10%
<i>I was not aware that the RUPTL existed at this moment.</i>	7%

Figure 18 shows that the general sentiment towards the RUPTL is negative. A large portion of respondents (40%) believe that the current plan does not offer sufficient clarity on how the long-term vision for the sector will be achieved. Looking back at Figure 15, the number one concern about regulatory uncertainty could be substantially addressed by a clearer and more consistent master plan that addresses and anticipates current and future sector challenges.

Only 27% of survey participants think that the current master plan (PLN's RUPTL) is adequate. It is worth noting that the RUPTL 2016 – 2025 was not released until June 2016, not January as planned.

In 2016, there appeared to be some tension and differences of opinion between the regulator and PLN on some issues that affect the implementation of the 35 GW and other electricity infrastructure plans. These issues include the pricing of hydro and solar power, as well as the fuel cost of coal-fired power plants. The implementation of the



view PLN's RUPTL 2016 – 2025 as being insufficiently clear on how the sector's long-term vision will be achieved

35 GW program (and the RUPTL 2016 – 2025) may be improved by involving more inputs from industry players to devise a framework, tariff, and tender regulation that is fair for the government/PLN and commercially viable for investors. More recently, the Government appears to be more coordinated internally on both policy and targets.

In December 2016, the Indonesian Constitutional Court released a decision on the 2009 Electricity Law, concerning private sector participation in the power industry. The 2016 decision declared, among other things, that private sector participation in the power supply business is unconstitutional unless there is some element of State control. However, the decision has no significant impact on IPPs, because the State in any case retains effective control of procurement/licensing in such cases.²⁷ Although considered insignificant in practice, the bringing of the lawsuit in the first place illustrates the reticence of some stakeholders towards the liberalisation of the power market and also makes further liberalisation difficult.

27 [http://f.datasrvr.com/fr1/716/11648/Finance__Projects_-_Indonesian_Constitutional_Court_rules_\(again!\)_on_Electricity_Law.pdf](http://f.datasrvr.com/fr1/716/11648/Finance__Projects_-_Indonesian_Constitutional_Court_rules_(again!)_on_Electricity_Law.pdf)

Future scenario

Public Private Partnerships

“How can the GoI, industry investors and other stakeholders work together to develop Indonesia’s power & utility sector and satisfy Indonesia’s short to medium term electricity needs, with adequate allowance for the anticipated growth in demand of electricity?”

Survey participants are positive about the direction of partnerships within the power sector. 89% say there is a medium or high probability that the power and utility sector will collaborate in meeting short to medium term electricity needs.

Respondents’ however expressed that the GoI should work together more with IPPs to develop the power sector, as is already happening in the current IPP programme. Other than that, one respondent also stated that “currently, available regulations are difficult to implement due to poor coordination among Ministries. This gets worse at the working level within government organizations.”

Liberalisation and competition

End user tariff and subsidy

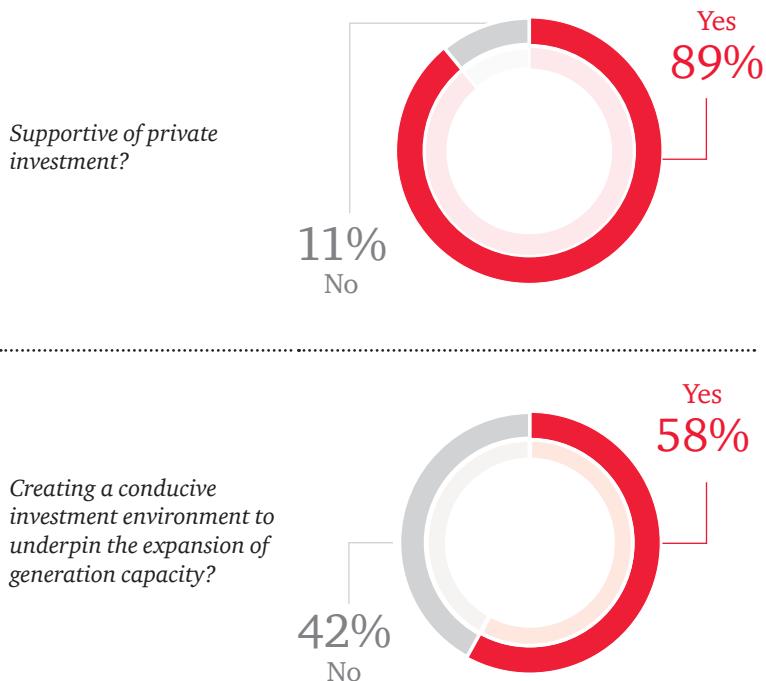
As explained on page 26 on “Affordability and Cost Recovery”, power is still subsidised overall in Indonesia and a PSO remains in place today.

However, in future, it is expected that PLN will not automatically be granted its PSO subsidy of costs plus 7% margin. PLN will be required to achieve certain performance targets each year in order to receive the subsidy, as required under MoF Regulation No. 195/2015 (now replaced by MoF Regulation No. 44/2017), and the overall magnitude of the subsidy should gradually be reduced. The Government plans to have all households (except the very poorest) pay ‘market prices’ for electricity.

One recent facet of the implementation of subsidy reform is the issuance of MoEMR Regulation No. 28/2016, as amended by MoEMR Regulation No. 18/2017 under which PLN will gradually (but significantly) reduce its spending on subsidy for low-income households, (defined as subscribers of 900 VA electricity), which started from 1 January 2017. The aim is to reduce the current 23 million beneficiaries to 4.1 million, the original number of poor households recorded in PLN’s database.²⁸ Industrial tariffs and certain residential customers are already unsubsidized.

The GoI still faces the dilemma of how best to balance strategies that promote investment and energy access while also ensuring that electricity is affordable.

Figure 19. Is the regulatory and legal framework in Indonesia supportive of private investment and creating a conducive investment environment to underpin the expansion of generation capacity?



Respondents seem generally positive on whether the Indonesian regulatory and legal framework is supportive of private investment (89% said it was). However, when asked if the investment environment underpins the expansion of new generation capacity, a smaller majority (58%) said yes.

This points to the overarching investment framework being acceptable to IPP investors, but the details being less investor-friendly to drive significant new capacity investment.²⁹ This likely relates to the issues mentioned elsewhere in the report about regulatory and procurement consistency and uncertainty. This was confirmed in follow-up stakeholder discussions.

28 <http://www.cnnindonesia.com/ekonomi/20161118135538-85-173557/subsidi-listrik-900-va-dicabut-2017-tarif-naik-tiap-3-bulan/>

29 We note this question was asked before release of MoEMR Regulation No. 10/2017, MoEMR Regulation No. 12/2017, and MoEMR Regulation No. 19/2017

Future scenario

IPPs

“The private sector will own and operate more than half of generation capacity by 2025.”

It is implicit from the RUPTL 2016 – 2025 that between 41% and 60% of generation capacity could end up being delivered by IPPs (the range depending on how 16.6 GW of unallocated capacity is procured).

Survey participants are positive about the direction of partnerships within the sector, and their responses suggest they believe most of the unallocated capacity will be delivered by IPPs. 73% say there is a medium or high probability that IPPs will own and operate more than half of the generation capacity by 2025.

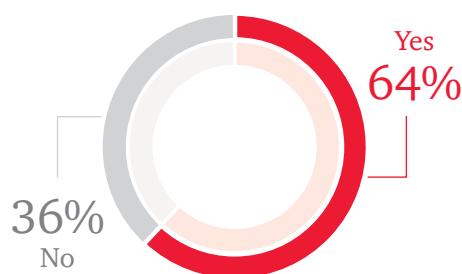
Power wheeling

The 2009 Electricity Law provides PLN with priority rights to conduct its business throughout Indonesia. Whilst the 2009 Electricity Law and Government Regulation (“GR”) No. 14/2012 (as amended by GR No. 23/2014) allow for private participation in the supply of power for public use and open access for T&D, currently private sector participation is in effect still limited to the power generation sector. As the sole owner of T&D assets, PLN remains the only business entity involved in transmitting and distributing electrical power.

This is set to change following the enactment of MoEMR Regulation No. 1/2015 on “power wheeling” which aims to allow IPPs and PPUs to use PLN’s existing T&D networks to transmit power to power buyers. However, implementing regulations setting out detailed technical procedures and financial charges for T&D network access have yet to be released. This survey gauges the general sentiment from the industry and whether or not power wheeling is seen as an opportunity to catalyse the sector liberalisation efforts as well as improve the electrification rates in Indonesia.

Figure 20. Improvement in Electrification Ratio

In your view, will being allowed to generate power and transmit/distribute over PLN’s network to end users (power wheeling) improve the electrification ratio?



Looking at Figure 20, the majority (64%) of respondents feel that power wheeling plays an important role in improving the electrification ratio in Indonesia. This may be due to the fact that a significant part of the respondents feel that difficult logistics (e.g. roads and ports in Eastern Indonesia) is the third most important barrier to improving the electrification ratio in Indonesia (Figure 13). However, the fact that 36% feel that power wheeling will not improve the electrification ratio shows that there is also some part of the industry that has yet to see the benefits of this policy or may see challenges in its implementation. Nevertheless, the enactment of an effective and seamless power wheeling process would be a significant step in liberalisation of the electricity sector.

Unbundling of the electricity market

Similar to the case in other emerging markets, electricity generation, production and transmission to end users are mostly handled by the Government-owned monopoly, PLN. In 2002, the Government introduced reforms largely through the enactment of the 2002 Electricity Law. Under this law, power business areas were divided into competitive and non-competitive areas, the former allowing for private participation in the generation and retail areas of the electricity value chain.

However, in December 2004, Indonesia's Constitutional Court ruled the 2002 Electricity Law to be unconstitutional on the basis that it contravened Article 33 of the Indonesian Constitution. According to the Constitutional Court, electricity is a strategic commodity and its generation and distribution should remain under the exclusive control of the Government. As a result, the Court effectively re-enacted the previous 1985 Law and from 1999 – 2004 there was very little private investment of any sort in new power projects.

Private-sector participation, however, is allowed through IPP or PPP arrangements. IPP appointments are most often granted through competitive tender, although IPPs can be directly selected or directly appointed in certain circumstances under PR No. 14/2012 (as amended by PR No. 23/2014) and the relevant implementing regulation, MoEMR Regulation No. 3/2015. However, IPP participation in the grand scheme of electricity provision in Indonesia is limited to upstream production as power generation has to be transmitted through the PLN transmission network, with the revenue stream for the IPP determined by a PPA agreed between IPP investors and PLN.

An unbundling of the electricity market would mean the disaggregation of the total electric service provided by a power utility into its basic components and offering to sell each service separately with separate rates for each component. Thus, generation, transmission, and distribution services could be functionally unbundled into separate entities and operated as discrete services. The end goal of this process would be improved competition with multiple generators generating and selling power through multiple distributors on a spot market basis. Though that is the final step of the unbundling process, more realistically, unbundling in Indonesia's case would mean incremental steps towards such an environment.

Indeed, such an environment is not generally considered feasible in the short-run given the sector's history including the 2004 Constitutional Court decision (see above) and the 2016 Constitutional Court decision (see page 32).

Future scenario

Market Liberalisation

If the Indonesian electricity market was to be liberalised for competition, with unbundling of the power sector into separate generation, transmission, distribution and retailing sectors, what circumstances and conditions would private sector investors require to commit the capital expenditures needed?

Survey participants asked for regulatory certainty by the Government and simplification of bureaucracy. Several respondents suggested the Government let market mechanisms determine electricity tariffs. According to them, this condition will recognize the quality of supply that private investors deliver (by letting them charge premium pricing). Moreover, one respondent referred to Electricity Law No. 30/2009, which is the current basis of the business mechanism in Indonesia's power sector, and added that the Government should further strengthen and increase private participation in a fairer manner (e.g. transparent bidding process).

Future scenario

Captive power and PPUs

“More than half of industrial companies will have their own generation solutions within 10 years and will only connect to the grid for backup.”

Respondents answered in a balanced way to this question; 53% believe that there is a low chance and 47% believe that there is a medium chance of more than half of industrial companies having their own generation solutions within 10 years. One respondent suggested that this would only happen if the implementation of power wheeling and the legal framework outlining power purchase schemes between the relevant parties (power plant owners, industrial estate owners, and industrial zone tenants) is fully coherent and integrated.

A significant portion of respondents feel that there is a high chance that industrial companies would still have to rely on the PLN transmission grid, even in 10 years. One said “Big corporations can generate electricity for their own consumption but it is not the right solution for the whole country”. This is reinforced by subsidized power prices, which makes relying on the PLN transmission grid less costly than having their own captive power/PPU, despite potential reliability issues.

Captive power and PPU

Investors who generate electricity for their own use rather than for sale to PLN are known as PPUs. PPUs with capacity greater than 200 kVA must hold an operating license (*Izin Operasi – IO*) to generate, transmit and distribute electricity for their own use or to their own customer base (such as tenants in an industrial estate).

Captive power offers potential benefits to all stakeholders of the Indonesian electricity sector. This includes not only the private sector, but also the Government and PLN. Captive power reduces the need for PLN to make extensive T&D investments to extend the grid to remote locations, while at the same time meeting its PSO.

Apart from that, looking from the consumer's point of view, captive power is often associated with a reduction in blackout/brownout time. A report by PwC and General Electric³⁰ suggests that this could save firms in seven manufacturing sectors around USD 415 million a year if they avoid an average of around 60 hours of blackouts per year. For developers, a full industrial ecosystem, including power supply, is essential to attract high quality tenants, and financial returns on captive power can make it an attractive investment. It could also provide significant new sources of long-term, recurring income in the real estate portfolio. Lastly, an increase in the use of PPUs would allow users to hedge long-term electricity costs as it insulates industry from the volatile unsubsidized electricity price.

Reliable statistics are hard to find, but a 2009 estimate states that captive power capacity in Indonesia is at 16.8 GW, of which 8.5 GW was for primary use, and 7.8 GW for backup power. Geographically, 49% of captive power capacity is in Java. We asked respondents to the survey to gauge sentiment towards prospects for captive power and PPU usage across various industrial sectors in Indonesia.

At the beginning of 2017, MoEMR released a new regulation (MoEMR Regulation No. 1/2017) which is helpful to PPU owners as it allows them to operate in parallel with PLN. Specifically, they could purchase power from PLN occasionally supported by a backup agreement or otherwise purchase supplementary power. Several charges that need to be paid are: connection fee, capacity charge, and energy charge.

³⁰ PwC and General Electric (2015) “Private Power Utilities: The Economic Benefits of Captive Power in Industrial Estates in Indonesia”

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