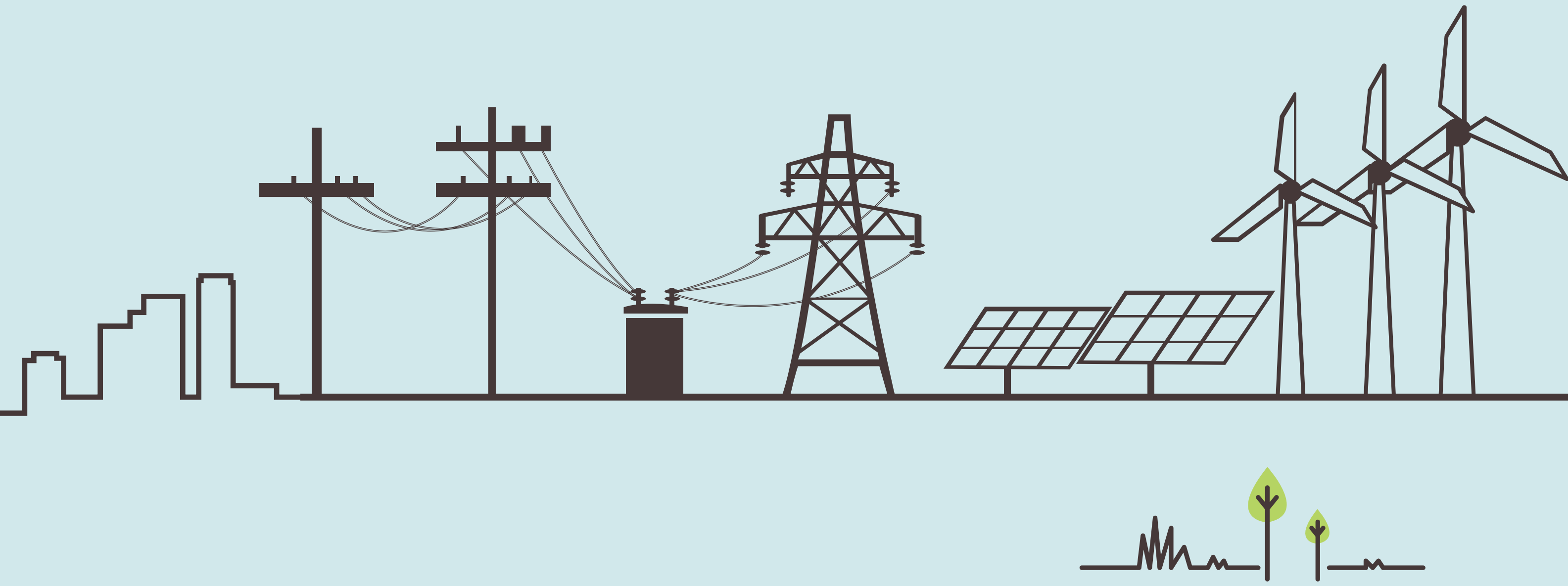
THE COUNCIL

# Risks in Renewable Energy Markets in Emerging Economies

## SPOTLIGHT ON SOUTH AFRICA AND INDONESIA

Interim Report | June 2018

KANIKA CHAWLA, MANU AGGARWAL
ANJALI VISWAMOHANAN, ARJUN DUTT, AND NEERAJ KULDEEP



CEEW
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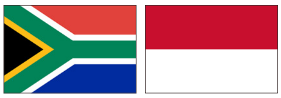

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The **Council on Energy, Environment and Water** (http://ceew.in/) is one of South Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain-and change- the use, reuse, and misuse of resources. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions, and engages with the wider public. In 2018, CEEW has once again been featured across nine categories in the '2017 Global Go To Think Tank Index Report'. It has also been consistently ranked among the world's top climate change think tanks.

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The Council on Energy, Environment and Water (http://ceew.in/) is one of South Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain-and change-the use, reuse, and misuse of resources. The Council addresses pressing global challenges through an integrated and internationally focused approach. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions, and engages with the wider public.

In 2018, CEEW has once again featured across nine categories in the '2017 Global Go To Think Tank Index Report', including being ranked as South Asia's top think tank (14th globally) with an annual operating budget of less than USD 5 million for the fifth year in a row. In 2016, CEEW was also ranked 2nd in India, 4th outside Europe and North America, and 20th globally out of 240 think tanks as per the ICCG Climate Think Tank's standardised rankings. In 2013 and 2014, CEEW was rated as India's top climate change think-tank as per the ICCG standardised rankings.

In over seven years of operations, The Council has engaged in more than 180 research projects, published well over 110 peer-reviewed books, policy reports and papers, advised governments around the world over 400 times, engaged with industry to encourage investments in clean technologies and improve efficiency in resource use, promoted bilateral and multilateral initiatives between governments on more than 50 occasions, helped state governments with water and irrigation reforms, and organised more than 210 seminars and conferences.

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Kanika Chawla is a policy specialist, working at the intersection of two revolutions in India: in renewable energy and in financial markets. As Senior Programme Lead at the Council on Energy, Environment and Water (CEEW), Kanika manages The Council's research and outreach in renewable energy policy, finance, and jobs and skills. Her current responsibilities include: analysing financial risks affecting renewable energy investments in India; analysing changing market conditions and tax regimes and their impact on renewable energy; managing The Council's periodic surveys on renewable energy jobs; and convening a high-level working group on renewable energy finance. She is actively engaged with private and public enterprises within and outside India to design and develop new financial de-risking instruments and new financial institutions such as green banks.

Kanika has an M.Sc. in Economics and Development Economics from the University of Nottingham and an undergraduate Honours degree in Economics from Miranda House, University of Delhi.

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Manu is a climate and energy expert and works on the efficient allocation of risks and well-functioning markets to minimise the resource wastage. He has a keen interest in leveraging actuarial and risk science, and big data to improve governance and deepen markets. His current research interests lie at the intersection of development policy, finance, technology, and institutions.

At The Council, Manu's work involves designing market-transformative insurance products, and restructuring regulatory and commercial contracts to de-risk renewables. Besides India, he is also assessing risks in emerging economies in Asia and Africa. Manu leads The Council's work on the non-UNFCCC negotiations on emissions due to international transport. He also closely monitors Indo-US energy and climate diplomacy.

In his previous avatars, he worked in business analytics, energy commodities trading, and international development. Manu is a graduate in Mechanical Engineering from Thapar University, Patiala. He is waiting for his CFA charter from the CFA Institute, USA.

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Her broader interest lies in assessing the feasibility of energy transition scenarios as a response to the perpetually evolving technology mix. She is keen on structuring frameworks around governance issues such as transparency, specifically to advance the development of technology that deals with the growing climate change-related concerns of the developing world.

Prior to CEEW, Anjali worked with two of the top law firms in India, where she advised clients on investing in infrastructure projects. She holds a B.A., LL.B (Hons.) degree from the Gujarat National Law University (2013) and is enrolled as an advocate with the Bar Council of Maharashtra and Goa.

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Arjun is a Programme Associate at CEEW. He holds a keen interest in finance, renewable energy, public policy, and technology. At The Council, his research is geared towards enhancing the flow of affordable finance to the renewable energy sector. This includes the analysis of risks constraining renewable energy investments, particularly in underserved market segments, and the development of suitable interventions aimed at de-risking the renewable energy sector. He is actively engaged with an array of public and private sector stakeholders to design and develop specialised institutional mechanisms such as green banks as well as financial instruments aimed at risk mitigation.

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Neeraj Kuldeep is a Programme Associate at CEEW. As part of the Renewable Energy (RE) team, he has researched and published multiple policy briefs on the impact of Goods and Services Tax (GST) on RE, skill gaps in the solar and wind energy segment, assessing employment potential in the renewable energy market, applications and economics of energy storage technologies, long-term view on grid electricity tariffs, etc.

He is currently leading The Council's work on design and development of new business models for Delhi to proliferate deployment of rooftop solar.

He holds an M.Tech. in Energy Systems and a B.Tech. in Energy Science and Engineering from the Indian Institute of Technology (IIT), Bombay.

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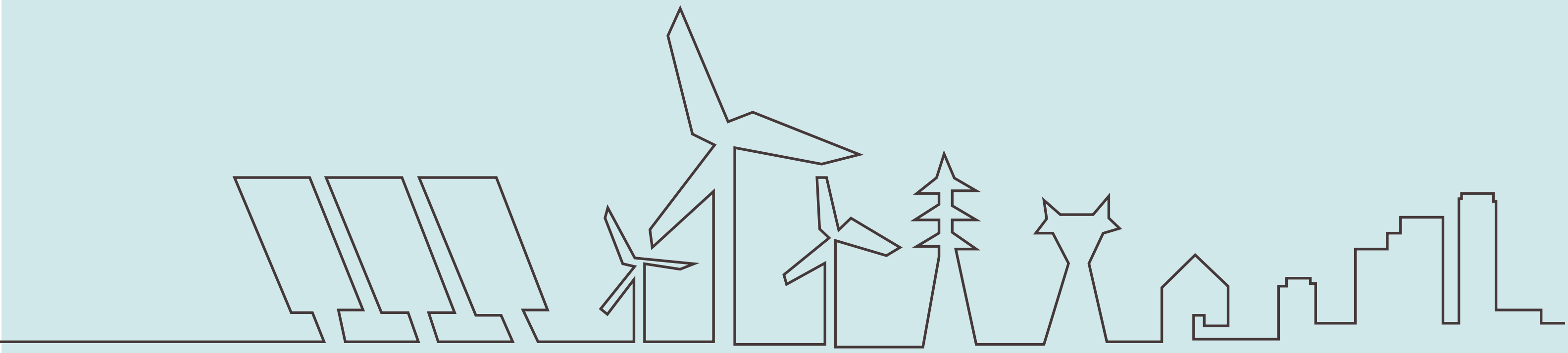

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# Abbreviations

| | |
|---|---|
| **CRGE** | climate resilient green economy |
| **DFI** | development finance institutions |
| **DISCOM** | distribution company |
| **FiT** | feed-in-tariff |
| **FOREX** | foreign exchange |
| **GDP** | gross domestic product |
| **IA** | implementation agreement |
| **IPP** | independent power producers |
| **IRP** | integrated resource plan |
| **kW** | kilo watt |
| **kWh** | kilo watt hour |
| **LCOE** | levelised cost of electricity |
| **MEMR** | Ministry of Energy and Mineral Resources |
| **MUs** | million units |
| **MW** | mega watt |
| **NERSA** | National Energy Regulator of South Africa |
| **PPA** | power purchase agreement |
| **PV** | photovoltaic |
| **RE** | renewable energy |
| **REIPPP** | Renewable Energy Independent Power Producer Procurement Programme |
| **USD** | United States dollar |
| **VAT** | Value Added Tax |

# Introduction

## 1.1 Motivations for the project

Global investment flows into renewable energy (RE) have increased rapidly, with RE investments outstripping investments in thermal energy globally in 2017.[1] However, these investments are concentrated in select markets, particularly in the case of developing countries, with China, India, and Brazil accounting for about 80 per cent of RE investment flows into developing countries in the past three years.[2] While the business case for RE investments has become considerably more robust in a few geographies resulting in investment concentration in these regions, the deployment of RE still faces varying degrees and types of risk in most developing countries, which constrains the flow of RE investments.

In order to accelerate the global transition to clean energy, it is important to systematically identify the risks associated with RE deployment and address these risks through a combination of policy and market-based interventions. Bolstering the business case for RE technologies in developing nations will help attract a steady flow of investments into this sector. This study aims to present the risks of RE investment in two sample emerging economies, one in Asia (Indonesia) and the other in Africa (South Africa), from the perspective of financiers as well as other important stakeholders such as policymakers and developers.

This risk analysis presents an opportunity to test and further extend CEEW's framework for analysing RE investors' risk perceptions. Moreover, the method adopted here would help identify any misalignment in the risk perceptions of financiers and other stakeholders. Such insights could inform policy and market-based interventions geared towards accelerating RE investments.

## 1.2 Why study risks?

Developing an understanding of the risks constraining RE investment is essential to design appropriate interventions aimed at increasing the flow of private capital into the RE sector. Strategic de-risking could help drive investment flows by mitigating non-project-specific risks. Building investor confidence by addressing inflated risk perceptions that are higher than actual risks is critical for increasing private sector investments in RE deployments at the global scale.[3,4]

Strategies geared towards risk mitigation present a more efficient means of utilising scarce public capital, as they can increase RE investment flows vis-à-vis direct lending.

Strategic de-risking could help drive investment flows by mitigating non-project-specific risks

[1] Frankfurt School-UNEP Centre (2018) "Global Trends in Renewable Energy Investment 2018," *Bloomberg New Energy Finance*. Available at http://fs-unep-centre.org/sites/default/files/publications/gtr2018v2.pdf; accessed 20 June 2018.

[2] FS-UNEP Centre, "Global Trends"

[3] Hussain, Mustafa Zakir (2013) "Financing Renewable Energy—Options for Developing Instruments Using Public Funds," *The World Bank Group, Climate Investment Funds*. Available at http://documents.worldbank.org/curated/en/196071468331818432/Financing-renewable-energy-options-for-developing-financing-instruments-using-public-funds; accessed on 5 June 18.

[4] Griffith-Jones, Stephany, Jose Antonio Ocampo, and Stephen Spratt (2011) "Financing Renewable Energy in Developing Countries: Mechanisms and Responsibilities," *European Report on Development*. Available at http://policydialogue.org/files/publications/Financing_Renewable_Energy_in_Developing_Countries.pdf; accessed on 20 June 18.

While direct investments certainly contribute to furthering RE deployments, strategic risk mitigation could greatly enhance investment flows by attracting more risk-averse investors. For example, specialised financial institutions geared towards risk mitigation, such as green investment banks (usually set up with public capital), can leverage limited capital to attract much greater investment flows.[5]

## 1.3 Why emerging economies?

Most of the world's increase in energy demand is expected to come from developing and emerging economies,[7] driven by rising incomes and electrification rates. In contrast, developed economies are expected to show lower growth in electricity demand and account for a growing share in efficiency improvements over time. In developed countries, the deployment of new RE capacities is geared towards replacing older, conventional sources of energy generation.

Therefore, it is critical to understand and underwrite the risk in countries where the transition pathway includes adding RE capacity, even as there are competing investment opportunities being offered in conventional energy markets. Further, RE deployments in developing countries face higher risks compared to developed countries for a variety of reasons including lower institutional capacities or support for RE deployment, fewer bankable projects, and insufficient domestic financing capacity.[6]

[5] For example, the Malaysia Green Technology Corporation, a green investment bank financed by the Malaysian government, guarantees 60 per cent of the loan amount for projects in the RE sector through its Green Technology Finance Scheme. The scheme has been successful in facilitating the participation of private capital, with a total of 28 private banks and financial institutions offering loans under this scheme, financing projects worth USD 1.7 billion between the bank's inception in 2010 and October 2017.

[6] Hussain, "Financing Renewable Energy".

# Methodology

## 2.1 Methodology for country selection

**Countries considered:** Ethiopia, Kenya, South Africa, Tanzania, The Gambia

### ETHIOPIA

Ethiopia has a relatively high potential for generating electricity from large hydropower projects. The government is cognisant of this, and its current energy mix and future targets clearly prioritise large hydro. Ethiopia initiated its Climate Resilient Green Economy (CRGE) strategy in 2011, which seeks to develop 25,000 MW of RE capacity by 2030 (dominated by large hydro-22000 MW). Ethiopia has a single ministry to oversee water, irrigation, and energy, which emphasises its focus on the synergies between large hydro and other allied sectors such as agriculture. Ethiopia fairs very poorly on the ease of doing business index. It lies in the bottom 20$^{th}$ percentile of the 190 countries considered in the study. Corruption levels have certainly decreased, but political stability levels-which are crucial for attracting private investments-are still low.

### KENYA

The share of RE in Kenya's energy mix is substantial, with most of it coming from geothermal and hydro sources; in addition, the Kenyan Government has been actively promoting investments in wind and solar projects. They have zero import duty and have removed the value added tax (VAT) on renewable energy equipment. The deployment of wind energy technologies is impeded by high capital costs and the lack of sufficient data. With adequate government support, it will not be difficult for Kenya to attain its renewable energy target of 3 GW of wind power and 500 MW of solar power by 2030. The current political situation in Kenya, however, is far from stable, with elections just concluded in August 2017. Kenya ranked poorly in both political stability and corruption amongst the countries we studied in the African continent, considered for this analysis.

### SOUTH AFRICA

Being an upper-middle-income country, South Africa ranks relatively higher in terms of installed electricity capacities. Its energy mix is dominated by thermal energy sources due to legacy issues. However, the country also aims to ramp up electricity production using modern RE sources such as wind and solar. It has initiated a very modern and progressive programme called Renewable Energy Independent Power Producer Procurement Programme (REIPPP) to ramp up RE capacities in a cost-effective manner. It scores well (74$^{th}$) on the ease of doing business index. It has a very conducive insolvency framework and a stable tax regime, which are expected to help attract private capital for its RE goals. Its corruption levels are high, however, and are a cause of major political instability.

## TANZANIA

Tanzania's current electricity mix is dominated by large hydro, followed by natural gas and biomass. It has set itself the target of sourcing all its energy from renewable sources by 2050, but it expects to generate most of its RE from large hydro and biomass. Despite the country being endowed with good solar irradiation and normal-to-high wind speeds in certain regions, the RE programme has not paid attention to harnessing these sources. It has a good track record in contract enforceability, but a very hostile and unpredictable tax regime. The effective corporate tax rate is more than 45 per cent. The country has also been steadily reducing its corruption levels over the last five years.

## THE GAMBIA

Although the Gambian government has acknowledged the need to promote RE in the country, and in 1987 set up a specific department in the Ministry of Energy for this purpose, no concrete policy targets have yet been set. Studies assessing the potential of wind and solar energy are inadequate but signal large potential. The reliance on biomass can be explained by the other issues plaguing the country's energy sector, particularly the poor connectivity infrastructure which hinders access to energy.

*Considering the uncertain costs and benefits of large hydropower stations, and given that several experts no longer consider it a source of renewable energy, countries where large hydro dominates RE potential and future clean energy targets have not been selected for further analysis. Of the countries analysed, all except South Africa and Kenya emphasise large hydro and have a high dependency on it. Between Kenya and South Africa, the latter has a larger energy import bill (and thus political and economic incentives to reduce it) and a more modern and ambitious plan to ramp up RE deployment. Although both countries have high levels of corruption and political uncertainty, the RE sector in South Africa has the greatest potential for RE development due to the country's higher ranking on the ease of doing business index, its clear focus on modern RE technologies, its budding manufacturing base, and the strong momentum of its institutional mechanism for developing the RE sector.*

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## 2.1.2 Country selection for Asia

**Countries considered:** Cambodia, Indonesia, Thailand, The Philippines, Vietnam

### CAMBODIA

Cambodia is a relatively small economy, with an installed capacity of close to 2 GW. Due to civil war in the 1970s, the country's power sector is underdeveloped and its infrastructure limited. Only two-thirds of households have access to grid electricity. Currently, hydropower dominates renewable energy generation in the country, accounting for nearly half of the total installed capacity, with solar-and biomass-based generation amounting to only a few megawatts each. To bolster its energy security, Cambodia aims to harness its abundant hydropower potential as well as ramp up coal-based energy generation. Though the country has acknowledged the role of distributed sources of generation-particularly biomass and solar-in expanding electricity access in off-grid areas, it does not have a formal RE programme or an adequate policy framework to promote RE generation. Moreover, it has an unfavourable political and regulatory regime which scores very poorly on indicators of corruption, contract enforceability, and the overall ease of doing business.

### INDONESIA

Indonesia, the largest economy in the Southeast Asia region, has traditionally relied on fossil fuels (approximately 87 per cent of its electricity generation), particularly coal. Renewable energy installations account for only five per cent of electricity generation, with geothermal energy accounting for the largest share, and other sources such as solar and wind contributing tiny amounts. Despite its traditional reliance on thermal energy, Indonesia hosts plentiful resources for RE generation across technologies. Given the need to meet the growing demand for electricity (electricity demand is expected to grow at 8.4 per cent per annum from 2017 to 2026) in a sustainable manner, the government is systematically trying to increase the share of renewable energy in the country's energy mix. By 2025, it aims to have installed capacities of 7.1 GW of geothermal energy, 6.4 GW of solar, 5.5 GW of biomass/biogas, 3.1 GW of ocean energy, 3 GW of small hydro, and 1.8 GW of wind energy. The Directorate General of New and Renewable Energy and Energy Conservation, under the Ministry of Energy and Mineral Resources (MEMR), is a dedicated department which oversees the development of renewable energy. The country has a favourable rating on overall ease of doing business (though contract enforceability is a concern), and fares well on indicators of corruption.

### THAILAND

Thailand has an installed generation capacity of about 41 GW, dominated by gas-based power plants (21 GW), followed by coal plants (7.5 GW). Current solar and wind installations contribute only about 2 GW, which is just one per cent of the overall energy mix. The Thai Government has established a dedicated Department of Alternative Energy Development and Efficiency, under the Ministry of Energy, which aims to increase renewable energy penetration. Thailand aims to increase the share of RE (including large hydro) in its energy mix to 25 per cent by 2030, by adding

2 GW of wind and 3.8 GW of solar capacity. This focus on renewables is a political strategy as well, aimed at reducing the country's dependence on imported fuels. The Thai Government plans to deploy cheaper renewable sources such as hydropower in the short run, and then work towards deploying solar and wind technologies in the long term. The higher tariffs associated with solar and wind generation are both a function, as well as a cause, of this policy. Thailand fares well on the ease of doing business and regulatory regime rankings, especially when compared to other Southeast Asian countries, though after the death of the Thai king, Bhumibol Adulyadej, political stability remains a concern in the country.

## THE PHILIPPINES

The Philippines is the third-largest economy in Southeast Asia after Indonesia and Thailand. The peak power demand in the country is only about 13 GW, whereas the total installed capacity is about 22 GW. The power sector in Philippines is largely dominated by fossil fuels (about 70 per cent), with coal accounting for 7.5 GW, oil for 3.6 GW, and gas for 3.5 GW. Hydro accounts for a large share of the energy mix, at about 4 GW of installed capacity. Despite the lack of energy demand, the Philippines has been promoting niche renewable energy technologies such as geothermal and ocean energy. As part of their National Renewable Energy Programme, the Philippines aims to become the largest geothermal energy producer in the world by 2030. Even though the Philippines has promising renewable energy goals, its low power demand and a significantly low ranking on the ease of doing business and regulatory enforceability indexes, makes RE targets far-fetched. The Philippines is in the bottom 20 per cent of countries for contract enforceability and ranks 99$^{th}$ (of 190 countries) on ease of doing business.

## VIETNAM

Energy demand in Vietnam is growing at 10 to 13 per cent per year. In the next decade, Vietnam is expected to add close to 100 GW of energy generation capacity to meet the growing demand. Currently, there is only about 38 GW of total installed capacity in Vietnam. Hydro generation is the leading means of energy production in the country, supplying about 38 per cent of total electricity. Conventional power generators (coal, gas, and oil) contribute another 54 per cent. The country's non-hydro RE installed capacity is limited to 100 MW. Given the need for significant capacity addition in the near future, Vietnam is betting heavily on RE technologies. By 2030, it is expected to add capacities in the range of 12 GW of solar, 6 GW of wind, and about 3.5 GW of biomass and geothermal (combined) energy. Vietnam does not have a dedicated ministry or department to oversee the development of its RE sector. The Ministry of Industry and Trade is currently driving the country's RE efforts. Vietnam is one of the most politically stable countries in Southeast Asia, ruled by a single party, the Communist Party of Vietnam. Vietnam also fares well on ease of doing business and contract enforceability rankings.

Based on an assessment of these countries according to the above-mentioned parameters, Indonesia was found to be the most suitable Asian country for CEEW's risk-profiling work. The relatively large scale of the country's RE ambitions suggest that a risk-profiling study would have the greatest impact there. In addition, Indonesia has considerable institutional support for RE in terms of dedicated government machinery, and it fares relatively well in overall ease of doing business and corruption indicators.

## 2.2 Methodology for analysis

This study will begin by outlining the RE ecosystem in the two countries, through detailed secondary research. Identifying key stakeholders in the RE sector in the two countries and market interactions helped supplement our understanding of RE-specific issues.

Indonesia was found to be the most suitable Asian country for CEEW's risk-profiling work. The relatively large scale of the country's RE ambitions suggest that a risk-profiling study would have the greatest impact there. In addition, Indonesia has considerable institutional support for RE in terms of dedicated government machinery, and it fares relatively well in overall ease of doing business and corruption indicators

# 3. South Africa

## Market Overview and Principal Challenges

South Africa has been actively building its renewable energy market, encouraging growth in the sector through policy measures and regulatory reforms. In 2018, the South African RE sector experienced a boom following a reorientation in policy. This included the approval of 27 solar projects to be set up by independent power producers (IPPs)-projects that had been stalled under the previous president, Jacob Zuma, who favoured nuclear power. With the change in political leadership in 2018, under the new president, Ramaphosa, several new RE projects have been approved. Further, the new political leadership has announced a new phase of the Renewable Energy Independent Power Producer Procurement Programme (REIPPP).

The REIPPP is the South African state-run competitive auction for renewable energy projects, first initiated in 2011. In South Africa, it is the task of the Department of Energy to produce an electricity plan, Integrated Resource Plan (IRP), and REIPPP is aligned with this plan. Based on the IRP, the Minister of Energy issues periodic notices regarding how much new power generation is needed, and from which sources. The National Energy Regulator of South Africa (NERSA) can licence new capacity only within the range set by these ministerial determinations. The most recent IRP for the years 2010-30 included renewable energy options, with a target of developing 17.8 GW of solar and wind energy capacity by 2030.

Since the inception of REIPPP in 2011, 6.3 GW of RE has been tendered, representing approximately 15 per cent of South Africa's installed power generation capacity. By the end of 2015, 2.2 GW of the 6.3 GW procured had been installed, connected to the grid, and made operational.[7]

REIPPP is being managed and facilitated by the Public Private Partnership unit of the Department of Energy. Bid evaluation under REIPPP involves a two-step process. First, bidders need to satisfy certain minimum threshold requirements in six areas: environment, land, commercial and legal, economic development, financial, and technical. On clearing the first stage, the next step of evaluation pertains to bid prices, which accounts for 70 per cent of the total score. The remaining 30 per cent of the score is determined by various factors, including the project's potential for job creation, local content, ownership, management control, preferential procurement, enterprise development, and socio-economic development.

The first four REIPPP bid rounds attracted a wide variety of domestic and international project developers, sponsors, and equity shareholders. Banks, insurers, development finance institutions' (DFIs), and even international utilities (mostly European) participated in the programme.

South Africa represents a potentially conducive environment for the large-scale deployment of RE; however, a number of policy-and market-related challenges could constrain the deployment of RE in the country. These are described briefly below.

### 3.1 Demand risk

Electricity planning in any country not only looks at the current electricity demand but also considers what is required in order to keep the economy growing at a sustainable pace in the short, medium, and long term. South Africa is no different. Projections with regard to anticipated demand also inform the decisions of the entire energy ecosystem, including power generators,

[7] Eberhard, A., J. Kolker, and J. Leigland (2014) "South Africa's Renewable Energy IPP Procurement Program: Success Factors and Lessons," *World Bank Group*. Available at https://www.gsb.uct.ac.za/files/ppiafreport.pdf; accessed on 20 June 18.

transmission companies, and capital goods manufacturers. An important point to note is that the comparison between the projected and actual electricity demand is what matters, and not just the absolute change in electricity demand.

Four main factors govern electricity demand: electricity sales within South Africa, export sales to other countries, latent demand in the form of new households getting electrified, and energy efficiency initiatives (See Table 1).

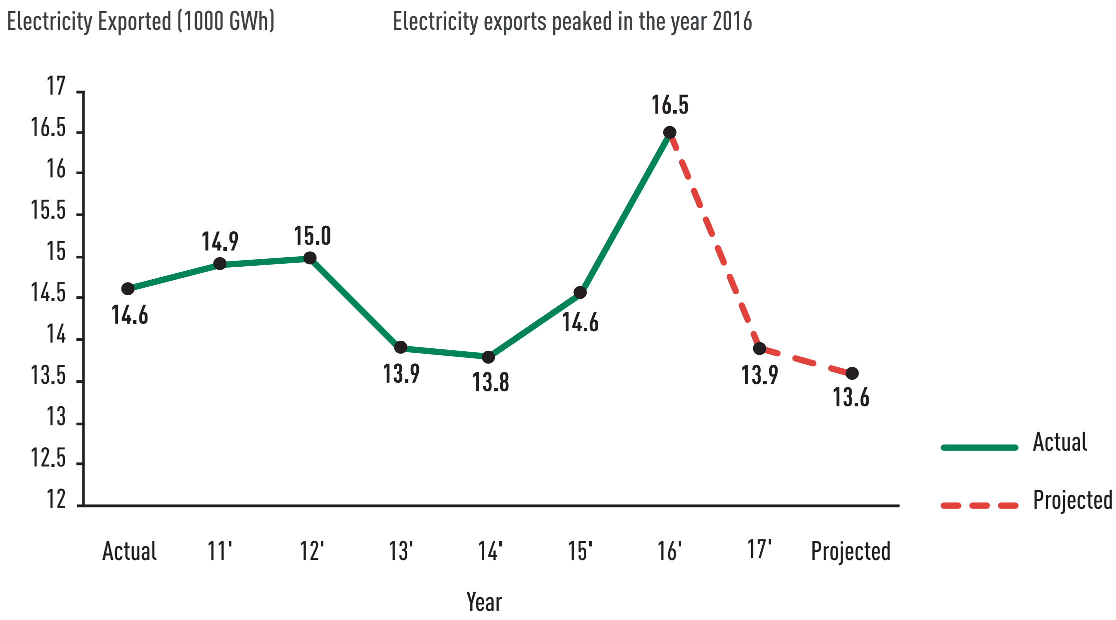
**Table 1: Prospects of electricity demand rising in South Africa are very bleak**

| Parameters | Effect on electricity demand | Prospects of parameters (see Figure 1) |
|---|---|---|
| Economic Growth (GDP) | ↑ | Overestimated |
| Electricity exports to neighbouring countries | ↑ | Declining |
| Latent Demand | ↑ | Not much scope |
| Energy Efficiency | ↓ | Underestimated |

*Source: CEEW analysis, Eskom*

Latent demand does not play a huge role in South Africa as the electrification rates in the country already stand at 90 per cent.[8] The movement on the other three parameters is shown in Figure 1, below.

**Figure 1: Eskom's projections of a reduction in electricity exports (a positive driver of electricity demand)**

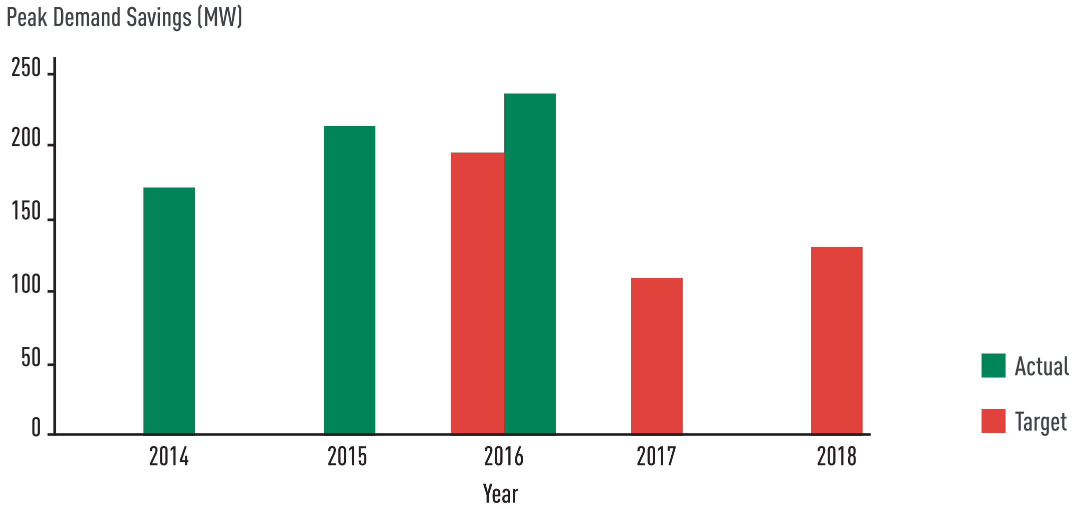



*Source: CEEW analysis, Eskom, Statistics South Africa*

[8] Department of Energy South Africa (2018) "Integrated National Electrification Programme," Department of Energy South Africa. Available at http://www.energy.gov.za/files/INEP/inep_overview.html; accessed on 8 June 18.

**Figure 2: Energy efficiency (a negative driver of electricity demand) is underestimated**

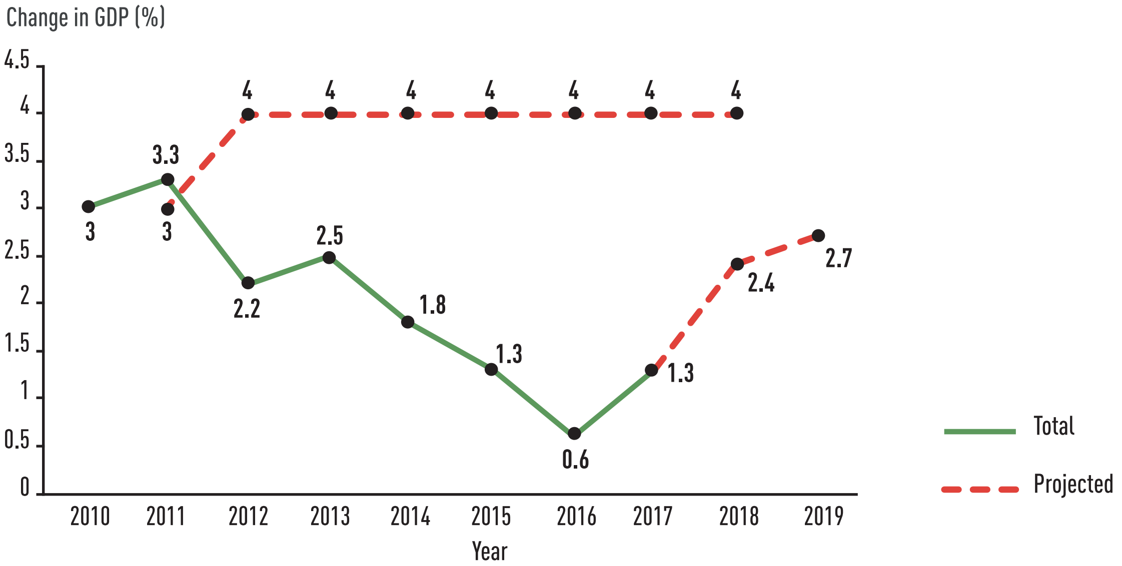
**Actual Energy efficiency savings breached the last set targets**




*Source: CEEW analysis, Eskom, Statistics South Africa*

**Figure 3: GDP (a positive driver of electricity demand) is overestimated**

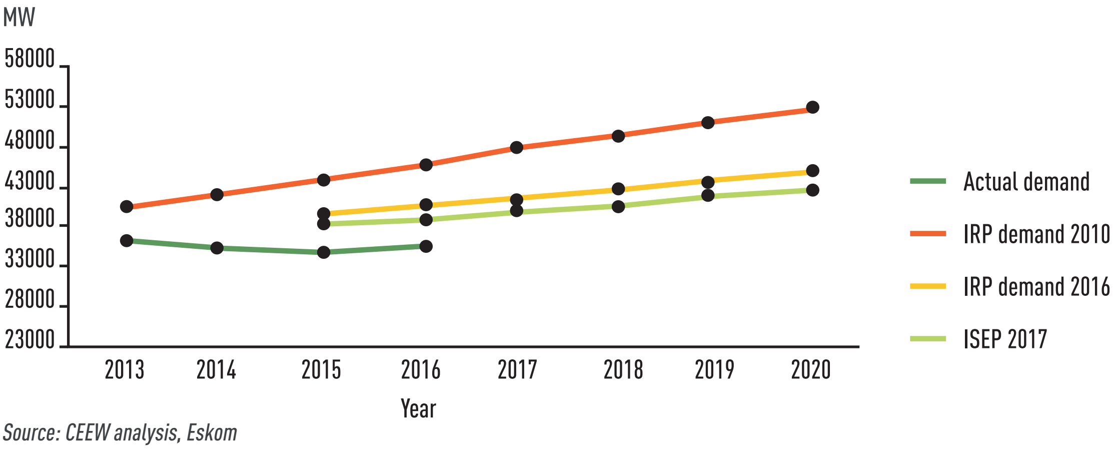
**Gross overestimation of GDP growth**




*Source: CEEW analysis, Eskom, Statistics South Africa*

The movement of different parameters, explained in Figures 1, 2, and 3, and Table 1, resulted in a gross overestimation of electricity demand in South Africa by various governmental agencies (See Figure 4).

**Figure 4: Overestimated electricity demand in South Africa**




*Source: CEEW analysis, Eskom*

However, demand risk was not listed as a major concern by the stakeholders consulted, and it did not influence market interactions in the first phase of this analysis. This is possibly because it was seen to be the responsibility of the off-taker to assess the demand.

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## 3.2 Transmission and Evacuation risk

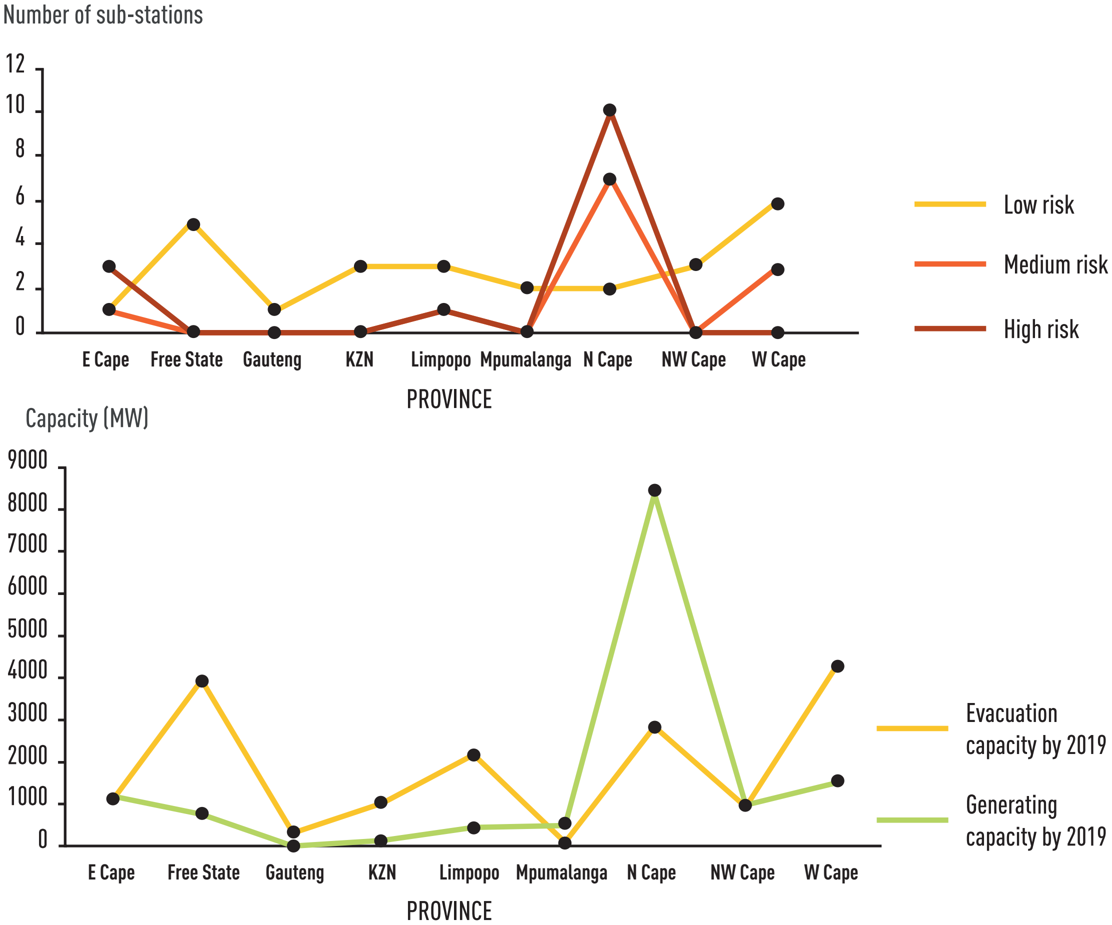
Transmission and evacuation risk is of two types, pre-and post-connectivity risk. Pre-connectivity risk means that RE generators are not able to connect their plants to the designated substation within a predictable time period and at predictable prices. Post-connectivity risk means that RE generators are not able to inject all the electricity that their plants could have produced. This phenomenon is called "curtailment".

South Africa has relatively advanced and transparent transmission planning. Eskom regularly publishes a highly detailed report showing the available evacuation capacity at each substation. This assessment provides forecasts up for to 2022 for different loads in the course of a day.[9] It also publishes reports on the available evacuation capacity and the interest shown by RE developers in connecting their RE capacities (see Figure 5 for generating capacity) at each substation under the control of Eskom.[10] In Figure 5, a high-risk substation refers to one where the interest shown by developers in installing RE capacities exceeds the available evacuation capacity by a significant margin, and the installation of any reinforcements to upgrade the system is difficult. On the other hand, substations at medium risk are those where the interest shown by developers exceeds the available evacuation capacity by a margin. But data availability and planning allow for necessary upgradation of the system in line with capacity addition. Substations at low risk are those where the interest shown by the developers do not exceed the evacuation capacity.

[9] Eskom South Africa (2018) "Generation Connection Capacity Assessment Report 2022," Eskom South Africa. Available at http://www.eskom.co.za/Whatweredoing/GCCAReport/Pages/Default.aspx; accessed on 8 June 18.

[10] Eskom South Africa (2015) "Expedited Bid Window Programme Access Risk Assessment (Regarding risk to connect to the transmission grid for respondents to the registration request)," Eskom, Transmission, Grid Planning.

**Figure 5: Northern Cape has the highest solar potential and is also the most constrained in terms of evacuation capacity**




*Source: CEEW analysis, Eskom*

Most of South Africa's solar and wind potential is concentrated in the southern region, especially in districts such as Western Cape, Northern Cape, and Eastern Cape.[11,12] As was seen in Figure 3, Northern Cape, which has the maximum solar potential, is also the most constrained in terms of evacuation capacity. However, most of the stakeholders consulted did see this as a risk in the short to medium term. The primary reason for this is that construction has not started on any of the RE capacities auctioned during the fourth round of REIPPP. The power purchase agreements (PPAs) for the RE capacity auctioned in 2016 were only signed in April 2018.[13]

Market interaction highlighted the risks posed by Eskom changing its pricing after the initial contract for the use of transmission infrastructure. None of the stakeholders consulted identified curtailment risk as significant. This, again, can be attributed the low base of installed RE capacities. However, going forward, mismatch in the RE potential and the evacuation capacity could prove to a major challenge for the South African RE market.

Market interaction highlighted the risks posed by Eskom changing its pricing after the initial contract for the use of transmission infrastructure. None of the stakeholders consulted identified curtailment risk as significant.

[10] E CRSES (2009) "Solar Resource Mapping in South Africa,"Stellenbosch: Centre for Renewable and Sustainable Energy Studies.

[12] "DoE-SANEDI-CSIR-SAWS-UCT-DTU (2017) "Wind Atlas for South Africa," DoE-SANEDI-CSIR-SAWS-UCT-DTU. Available at http://www.wasaproject.info; accessed on 8 June 2018.

[13] Beetz, Becky (2018), "South Africa Finally Signs 27 Outstanding Renewable PPAs," *PV-Magazine* (April 4). Available at https://www.pv-magazine.com/2018/04/04/south-africa-finally-signs-27-outstanding-renewable-ppas/; accessed on 8 June 2018.

## 3.3 Macro risk

Macro risks comprise all economy-wide risks that are not specific to the RE and power sector. In this case, South Africa's macro risks may include: credit rating downgrade; sudden changes in the economic landscape; sharp movements in the South African currency (forex risk); political risks such as the government imposing capital controls or nationalising assets; and potential uncertainty arising from future trade disputes.

Market interaction indicated that political uncertainty surrounding RE is the topmost risk in South Africa. The adverse impact of a volatile political climate on investor confidence and industry growth is well-known in South Africa. The resignation of President Zuma in February 2018 due to long-standing corruption allegations[14] revealed the mismanagement of state-owned firms such as Eskom, a vertically integrated utility.[15] Eskom is the single off-taker of all utility-scale RE in South Africa. To generate more nuanced data, stakeholders were asked to list the other pressing risks surrounding utility-scale RE in South Africa besides political uncertainty.

Most of the stakeholders consulted recognised that the highly sophisticated and advanced project finance teams in South Africa resulted in most of the financing being in the local currency, resulting in no forex risk for borrowers

South Africa's credit rating on its local-currency long-term sovereign debt slid to the sub-investment (junk) grade last year.[16,17] Only Moody's rates South Africa as an investment-grade country now. This could have a disastrous effect on Eskom, since its rating is linked to the rating of the sovereign. Eskom requires R 60 billion (USD 4.6 billion) annually to meet its operational requirements.[18] The poor rating would increase Eskom's interest cost and would severely affect its financial health. This, in effect, would lead to RE developers signing PPAs with Eskom to build higher buffers against any defaults on the part of Eskom.

Further, the South African economy is dependent on commodities,[19] and many commodities are cyclical: low GDP growth leads to lower business activity, and in turn lower household income.[20] Both, electricity demand and the ability of people to pay for the consumed electricity, match the commodity cycle. This poses a huge macro risk for electricity generators as it may lead to potential cyclicality in the revenue stream of Eskom and, in turn, in that of RE generators. This makes demand estimation difficult, and to meet peak demand, energy generators will need to endure long periods of excess generating capacity.

Most of the stakeholders consulted recognised that the highly sophisticated and advanced project finance teams in South Africa resulted in most of the financing being in the local currency,[21] resulting in no forex risk for borrowers. The European utilities invested only towards the end of transactions and acted as an aggregator of already-developed projects. These portfolio-level investments by foreign utilities do not face much currency fluctuation or forex risk.[22]

[14] Al Jazeera (2018) "Cyril Ramaphosa sworn in as South Africa's President," *Al Jazeera* (February 15). Available at https://www.aljazeera.com/news/2018/02/cyril-ramaphosa-sworn-south-africa-president-180215153138278.html; accessed on 8 June 2018.

[15] Reuters (2018) "Factbox: The Big Issues Facing South Africa's New President," Reuters (February 15). Available at https://www.reuters.com/article/us-safrica-politics-challenges-factbox/factbox-the-big-issues-facing-south-africas-new-president-idUSKCN1FZ1K3; accessed on 8 June 2018.

[16] Greve, Natalie (2017) "Will SA Slide Deeper Into Junk?" *Finweek* (November 10). Available at https://www.fin24.com/Finweek/Business-and-economy/will-sa-slide-deeper-into-junk-20171110; accessed on 16 June 2018.

[17] Reuters (2017) "Fitch Downgrades South Africa to 'BB+'; Outlook Stable," *Reuters* (April 7). Available at https://www.reuters.com/article/fitch-downgrades-south-africa-to-bb-outl-idUSFit995526; accessed on 8 June 2018.

[18] Eskom South Africa (2017) "Eskom 2018/19 Revenue Application Stakeholder Discussion," Eskom South Africa (September 20).

[19] Davies, Rob (2017) "Breaking the Grip of Commodity Dependence—Minister Davies," Business Report (September 27). Available at https://www.iol.co.za/business-report/economy/breaking-the-grip-of-commodity-dependence-minister-davies-11372416; accessed on 21June 2018.

[20] Damodaran, Aswath (2009) "Ups and Downs: Valuing Cyclical and Commodity Companies," Stern School of Business, New York University. Available at http://people.stern.nyu.edu/adamodar/pdfiles/papers/commodity.pdf.

[21] CEEW Analysis.

[22] CEEW Analysis.

## 3.4 Off-taker risk

Eskom, the South African state power utility, performs three broad functions: generation, transmission, and distribution of power. Eskom generates around 95 per cent of South Africa's electricity.[23] For projects being auctioned under REIPPP, Eskom is the designated off-taker.

There are clear indicators of Eskom's impending financial troubles, with both Moody's[24] and Standard & Poor downgrading its creditworthiness in 2018.[25] Eskom's future presents obvious risks to a programme like REIPPP. From 2016 to 2018 the Eskom board did not sign any power purchase agreements with IPPs, citing reasons including inadequate demand, refurbishment of its existing generation assets, and the anticipated commercial operation of its newly installed plants by 2022. These reasons combined would lead to a surplus power position by 2022, without the addition of any renewable energy capacity.[26]

A solution long promoted by the international development community is to break up the utility by unbundling its key functions into generation, transmission, and distribution companies, some or all of which can eventually be privatised.[27] If Eskom's financial health continues to deteriorate, the government's sovereign guarantee may have to be called on to pay IPPs. In turn, that could affect the government's credit standing and will have a severe, adverse impact on the power system of South Africa.

## 3.5 Political risk

Political risks, including currency inconvertibility, post-hoc changes to tariffs, and changes in the regulatory and tax regimes, can derail RE projects in South Africa. Some level of comfort is provided by the government involvement in power projects through a contract called the implementation agreement (IA), which is signed between the government and the IPP, and is in addition to the PPA. The IA guarantees the payment of any sum due from Eskom to the IPP as an energy payment or otherwise, as defined in the PPA, within 40 business days of the first written demand. The IA also determines the contractual obligations of the IPP in terms of socio-economic and enterprise development, including obligations pertaining to job creation, local content, ownership, management control, preferential procurement, enterprise development, and socio-economic development.

The IA significantly alleviates political risk, while adding a new facet of compliance risk vis-à-vis development obligations, since failure to comply will result in penalties and, eventually, termination in the case of prolonged non-compliance. However, most of the stakeholders consulted did not consider political risk a major risk.

Most of the stakeholders consulted did not consider political risk a major risk

[23] A Buckley, Tim, and Simon Nicholas (2017) "Eskom – a Laggard in Electricity Utility Transition," *Daily Maverick, Op-ed* (October 8). Available at https://www.dailymaverick.co.za/article/2017-10-08-op-ed-eskom-a-laggard-in-electricity-utility-transition/#.Wx-qYFOFPVo; accessed on 21June 2018.

[24] Moody's (2018) "Moody's downgrades Eskom's ratings to B1/B2/Baa2.za NSR; review for downgrade. Available at https://www.moodys.com/research/Moodys-downgrades-Eskoms-ratings-to-B1B2Baa2za-NSR-review-for-downgrade--PR_378663; accessed on 21 June 2018.

[25] Prinsloo, Loni (2018) "S&P Sees 'Clear Danger' of Default by South Africa's Eskom," *Bloomberg* (January 18). Available at https://www.bloomberg.com/news/articles/2018-01-18/s-p-sees-clear-danger-of-default-by-south-africa-s-eskom; accessed on 21 June 2018..

[26] Oliphant, John (2016) "A Too Powerful Eskom Undermines Green Energy," *Business Day* (November 24). Available at https://www.pressreader.com/south-africa/business-day/20161124/281509340785021; accessed on 21 June 2018.

[27] Eberhard, Kolker and Leigland (2014) "South Africa's Renewable Energy IPP Procurement Program."

# 4. Indonesia

## Market overview and principal challenges

### 4.1 Inadequacy of tariff regime

The MEMR implemented Regulation No. 50/2017, passed in the second half of 2017, provides and overarching regulatory framework for tariffs for all RE sources, except for geothermal energy, which is governed by a separate regulation. Prior to the implementation of this regulation, solar photovoltaic (PV), small hydro, and bioenergy were subject to a feed-in tariff (FiT) regime, whereas wind and ocean energy were not covered under any specific regulation.[28]

The new tariff regime stipulates maximum benchmark tariffs for electricity procurement from RE sources, as outlined in Table 2. The applicable RE tariffs vary from region to region, depending on the magnitude of the average regional generation cost. The regional and national electricity generation costs are published by the MEMR every year, with the tariffs corresponding to a particular year constituting the basis for determining the tariffs for the next year.

**Table 2: Benchmark RE tariffs**

| RE technology | Maximum benchmark tariff | |
|---|---|---|
| | Regional generation cost > national generation cost | Regional generation cost ≤ national generation cost |
| Solar<br>Wind<br>Biomass/biogas<br>Ocean power<br>Hydro | 85 per cent of regional generation cost | Negotiations between IPPs and PLN |
| Geothermal | Regional generation cost | |

*Source: PwC (2017) "Power in Indonesia: Investment and Taxation Guide, 2017."*

For regions with average electricity generation costs greater than the national average, the new regime links RE tariffs to regional generation costs. Given that Indonesia's electricity mix is dominated by fossil fuels, this forces RE tariffs to compete with thermal energy tariffs. This new tariff regime has considerably reduced the attractiveness of RE investments, particularly for solar PV and bioenergy, and to a lesser degree for small hydro. Depending on the location of the plant, the previous FiT regime provided for solar PV tariffs in the range of USD 0.145-0.25/kWh, for bioenergy in the range of USD 0.108-0.272/kWh, and for small hydro in the range of USD 0.12-0.144/kWh (for the

The new tariff regime has considerably reduced the attractiveness of RE investments, particularly for solar PV and bioenergy

[28] IRENA (2017)"Renewable Energy Prospects: Indonesia."
[29] IRENA (2017) "Renewable Energy Prospects: Indonesia."

first eight years with tariffs declining to USD 0.075-0.09/kWh for years nine to twenty).[29] Box 1 illustrates the indicative tariffs under the new regime for regions with generation costs higher than the national average, which highlights the relative unattractiveness of the new tariff regime.

In addition, in cases where the regional generation cost is lower than the national average, tariffs are not tied to any specific benchmarks, but are to be determined by direct negotiations between PLN and developers. Such a process could create uncertainties regarding the applicable tariffs for RE generation and thereby constrain investments.

## Box 1: Indicative benchmark RE tariffs

The average regional generation cost for national electricity generation in 2016 stood at USD 0.074/kWh. The regional generation cost for the Lampung region stood at USD 0.078/kWh (greater than the national average electricity cost). These costs constitute the basis for the calculation of tariffs for the period of April 2017 to March 2018. The benchmark solar tariff for the Lampung region would be USD 0.066/kWh (85 per cent of the regional electricity generation cost), considerably lower than the range of tariffs under the FiT regime. Regional average electricity generation costs in 2016 varied from USD 0.056/kWh to USD 0.169/kWh, with the regions towards the higher end of the range typically being remote locations with insufficient grid infrastructure. Even the region with the highest regional generation cost would be eligible for a solar PV tariff below the lower end of the tariff range under the previous regime.

[30] Kamarudin, Yanto, Tim Boothman (2017), "Investing in Power: Risks Under the New PPA and Tariff Regulations for Renewables," PwC. Available at https://www.pwc.com/id/en/publications/assets/eumpublications/newsflash/2017/eum-newsflash-2017-61.pdf; accessed on 20 June 2018.

[31] Kamarudin and Boothman, "Investing in Power."

## 4.2 Demand risk

This risk stems from uncertainties associated with projections of energy demand growth, which constitute the basis of capacity-addition plans. PLN had factored in an 8.4 per cent per annum growth in electricity demand over the period 2017-2026 in its estimations.[32] However, the growth in electricity sales stood at only 3.6 per cent in 2017, raising concerns over potential oversupply if the planned capacity addition is implemented.[33] The assumption of high growth in electricity demand was based on assumptions of higher economic growth, which have not been realised. [34]

The growth in electricity sales stood at only 3.6 per cent in 2017

The mismatch between demand growth assumptions and actual demand growth prompted PLN to revise downwards its estimate for annual electricity demand growth to 6.9 per cent per year and lower planned capacity addition by 21.9 GW, to 56 GW over the next ten years.[35] The scrapped capacity-addition plans included a reduction in the planned deployment of 6.6 GW of RE capacity.[36] Since Indonesia includes large hydro in its definition of renewables, the planned reduction in non-hydro RE capacity addition is hard to ascertain. However, the downward revision of demand growth estimates and capacity-addition plans is likely to adversely impact the appetite for RE deployment.

## 4.3 Land acquisition risk

Land acquisition has traditionally been a challenge for Indonesian infrastructure projects.[37] Land records are often unclear as to ownership, particularly in rural areas,[38] which complicates land acquisition, as do lengthy legal processes and opposition from local communities.[39]

While Law No. 2/2012 on Land Procurement for Public Interest Development enables the government to force the sale of privately owned land for the construction of projects in the public interest and mandates the completion of land acquisition within 583 working days,[40] the actual implementation of this law has not been smooth. For example, land acquisition for the 2 GW Batang coal plant, scheduled to be completed in 2012, was still only partially completed by 2015.[41] Land acquisition disputes have delayed around 35 projects as of January 2017, indicating that the land acquisition law has failed to effectively address land acquisition risks.[42] Thus, land acquisition remains a hindrance for infrastructure projects.[43]

Land acquisition disputes have delayed around 35 projects as of January 2017

[32] PwC (2017) "Power in Indonesia Investment and Taxation Guide, 2017."

[33] "PLN Halts 22GW of Power Projects in Indonesia Over Sluggish Demand," *Asianpower* (March 16, 2018): 00. Available at https://asian-power.com/power-utility/news/pln-halts-22gw-power-projects-in-indonesia-over-sluggish-demand; accessed on 8 June 2018.

[34] Kapoor, Kanupriya and Gayatri Suroyo (2018) "Indonesian President Turns to Populist Policies Ahead of Tough 2019 Election," *Reuters* (April 25). Available at https://www.reuters.com/article/us-indonesia-politics-policy-analysis/indonesian-president-turns-to-populist-policies-ahead-of-tough-2019-election-idUSKBN1HW0XQ; accessed on 12 June 2018.

[35] Kapoor and Suroyo (2018) "Indonesian President Turns to Populist Policies."

[36] Kapoor and Suroyo (2018) "Indonesian President Turns to Populist Policies."

[37] Global Business Guide "Indonesia's Land Acquisition Laws; On Paper Only?" *Global Business Guide*. Available at http://www.gbgindonesia.com/en/property/article/2016/indonesia_s_land_acquisition_laws_on_paper_only_11365.php; accessed on 6 June 2018.

[38] IRENA (2017) "Renewable Energy Prospects: Indonesia."

[39] IRENA (2017) "Renewable Energy Prospects: Indonesia."

[40] Ward, Oliver (2017) "Widodo's Infrastructure Drive is Close to Spiralling Out of Control," *ASEAN Today* (December 4). Available at https://www.aseantoday.com/2017/12/widodos-infrastructure-drive-is-close-to-spiralling-out-of-control/; accessed on 6 June 2018.

## 4.4 Transmission infrastructure risk

Being an archipelago, Indonesia has highly fragmented grid infrastructure, which consists of eight major grid networks and 600 isolated grid systems.[44] The Java-Bali grid system is the largest, accounting for 40 GW of installed capacity.[45] The remaining grids together account for 19.6 GW of installed capacity. Further, existing regulations require limited energy generation forecasting and monitoring of power plants[46] - this could hinder the large-scale integration of variable RE sources under planned RE capacity addition. The fragmented nature of Indonesia's grid, and the inadequacy of other measures of grid integration, make the integration of a large share of variable RE generation, as envisioned by Indonesia's 2025 RE targets, challenging.

Indonesia has highly fragmented grid infrastructure, which consists of eight major grid networks and 600 isolated grid systems

Delays in projects to strengthen transmission infrastructure would further hinder the integration of a potential increase in variable RE generation capacity. For example, the planned interconnection of the islands of Java and Sumatra through a 500 kV HVDC transmission line has been delayed as PLN is reassessing its feasibility.[47]

## 4.5 Freezing of retail electricity tariffs

In April, the MEMR announced the freezing of retail electricity tariffs for 2018 and 2019 - perhaps for political reasons in the run-up to provincial and national elections.[48] Since PLN is an integrated electricity utility, the adverse impact that frozen tariffs will have on the organisation's financial health (if inadequately compensated by government subsidies) could negatively influence its ability to fund transmission infrastructure.[49] Moreover, lower revenue collections from electricity sales (through PLN) could also indirectly impact the ability of state-owned developers to invest in power projects, including RE investments.

[41] Indonesia-Investments (2015) "Batang Plant: Test Case for Indonesia's Land Acquisition Act," *Indonesia Investments* (November 30). Available at https://www.indonesia-investments.com/news/todays-headlines/batang-plant-test-case-for-indonesia-s-land-acquisition-act/item6238?; accessed on 11 June 2018.

[42] Ward (2017) "Widodo's Infrastructure Drive."

[43] Reuters (2018) "UPDATE 2—Indonesia Expected to Drop $19 Bln Worth of Infrastructure Projects," *Reuters* (April 16). Available at https://www.reuters.com/article/indonesia-infrastructure/update-1-indonesia-expected-to-drop-19-bln-worth-of-infrastructure-projects-idUSL3N1RT44H; accessed on 6 June 2018.

[44] ADB "Indonesia: Energy Sector Assessment, Strategy, and Road Map," *Asian Development Bank* (July,2016). Available at https://www.adb.org/documents/indonesia-energy-sector-assessment-strategy-and-road-map; accessed on 20 June 2018.

[45] IRENA (2017) "Renewable Energy Prospects: Indonesia."

[46] IRENA (2017) "Renewable Energy Prospects: Indonesia."

[47] PwC (2017) "Power in Indonesia Investment and Taxation Guide, 2017."

[48] Guild, James (2018) "Jokowinomics vs Reality: a Look at PLN," *New Mandala* (April 4). Available at http://www.newmandala.org/jokowinomics-vs-reality-look-pln/; accessed on 7 June 2018.

[49] Brown, Melissa and Elrika Hamdi (2018) "Research Brief: PLN's Coal IPP Funding Gap Suggests Tariffs Must Rise in 2020,"Institute for Energy Economics and Financial Analysis. Available at http://ieefa.org/wp-content/uploads/2018/05/PLNs-Coal-IPP-Funding-Gap-Suggests-Tariffs-Must-Rise-in-2020.pdf; accessed on 20 June 2018.

## 4.6 Local content requirements

Indonesian regulations require developers to use a certain proportion of locally sourced goods and services (in terms of value of local goods and services as a proportion of project costs) in the development of electricity infrastructure. These local-content requirements vary by type of power generation technology and power plant capacity. For grid-connected solar power systems, the requirements for domestic content are a minimum 37.47 per cent in terms of goods, and 100 per cent of services. However, there are concerns over the availability of adequate skilled manpower within Indonesia to meet these requirements.

For grid-connected solar power systems, the requirements for domestic content are a minimum 37.47 per cent in terms of goods, and 100 per cent of services

Amendments to local content requirement regulations in 2017 increased the requirement for solar PV modules to 50 per cent by 2018, and 60 per cent by 2019. In comparison, the previous regulation stipulated a much lower requirement based on the type of application (30.14 per cent was the highest requirement, applicable to off-grid solar home-system modules). Compliance with the enhanced local-content requirements for PV modules could be challenging given that Indonesia has been historically dependant on imported Chinese and Japanese modules. Indonesian PV module manufacturing capacity is in the order of 90 MW, which is inadequate for the annual capacity addition required to achieve the 6.4 GW solar PV target by 2025. Moreover, locally produced modules may not be as cost-competitive as imported Chinese modules, whose manufacturers enjoy economies of scale. This could push up project costs and make it harder for developers to meet the requirement of lower tariffs, as applicable under the revised tariff regime for solar energy.

Indonesian PV module manufacturing capacity is in the order of 90 MW

[50] PwC (2017) "Power in Indonesia Investment and Taxation Guide."

[51] PwC and APLSI (2017) "Powering the Nation: Indonesian Power Industry Survey 2017," PwC and APLSI (May).

[52] PwC (2017)"Power in Indonesia Investment and Taxation Guide, 2017."

[53] PwC (2017) "Power in Indonesia Investment and Taxation Guide, 2017."

[54] Global Business Guide, "PLN Invites Blanket Prequalification for Indonesian Renewable IPPs,"Global Business Guide Indonesia (n.d.). Available at http://www.gbgindonesia.com/en/main/legal_updates/pln_invites_blanket_prequalification_for_indonesian_renewable_ipps.php; accessed on 20 March 2018.

[55] Global Business Guide,"PLN Invites Blanket Prequalification."

# 5. Next steps and their value addition

Building on these country profiles, the next phase of work will involve a detailed mapping of the risks and roadblocks that hinder investment in RE, as perceived by stakeholder groups. These will then be analysed in the context of their drivers, with specific financial and non-financial interventions proposed to underwrite short-term risk, and to systemically address longer-term risks. These findings and recommendations aim to decrease information asymmetry in the RE markets-which causes the risk perception to be greater than the actual risk-and to create market depth in RE markets in the countries being analysed.

The next steps in the workplan for the analysis of South Africa is to undertake additional stakeholder interviews, and then critically analyse the findings and emerging trends. The immediate next steps for the Indonesia study are concluding the preliminary research and commencing stakeholder interviews. Based on an analysis of the interview responses, CEEW will aim to identify the major risks for RE investment in both South Africa and Indonesia, from the perspectives of both financiers and non-financiers. The analysis will highlight any potential misalignment between the two groups of stakeholders. Building further upon its study of risks, CEEW will analyse the policy implications of these findings and develop recommendations to address the risks constraining RE investments in South Africa and Indonesia.

# 6. References


- *Al Jazeera* (2018) "Cyril Ramaphosa sworn in as South Africa's President," February 15, 2018. Available at https://www.aljazeera.com/news/2018/02/cyril-ramaphosa-sworn-south-africa-president-180215153138278.html; accessed on 8 June 2018.
- Asian Development Bank (2016) "Indonesia: Energy Sector Assessment, Strategy, and Road Map" *Asian Development Bank*. Available at https://www.adb.org/documents/indonesia-energy-sector-assessment-strategy-and-road-map; accessed on 20 June 2018.
- *Asianpower*(2018) "PLN Halts 22GW of Power Projects in Indonesia Over Sluggish Demand" *Asianpower* (March 16). Available at https://asian-power.com/power-utility/news/pln-halts-22gw-power-projects-in-indonesia-over-sluggish-demand; accessed on 8 June 2018.
- Beetz, Becky (2018) "South Africa Finally Signs 27 Outstanding Renewable PPAs," *PV-Magazine* (April 4). Available at https://www.pv-magazine.com/2018/04/04/south-africa-finally-signs-27-outstanding-renewable-ppas/; accessed on 8 June 2018.
- Brown, Melissa and Elrika Hamdi (2018) "Research Brief: PLN's Coal IPP Funding Gap Suggests Tariffs Must Rise in 2020," *Institute for Energy Economics and Financial Analysis* (May). Available at http://ieefa.org/wp-content/uploads/2018/05/PLNs-Coal-IPP-Funding-Gap-Suggests-Tariffs-Must-Rise-in-2020.pdf; accessed on 20 June 2018.
- Buckley, Tim and Simon Nicholas (2017) "Eskom—a Laggard in Electricity Utility Transition," *Daily Maverick, Op-ed* (October 8). Available at (https://www.dailymaverick.co.za/article/2017-10-08-op-ed-eskom-a-laggard-in-electricity-utility-transition/#.Wx-qYFOFPVo; accessed on 21 June 2018.
- Centre for Renewable and Sustainable Energy Studies (2009) "Solar Resource Mapping in South Africa," South Africa: University of Stellenbosch.
- Damodaran, Aswath (2009) "Ups and Downs: Valuing Cyclical and Commodity Companies," *Stern School of Business, New York University*. Available at http://people.stern.nyu.edu/adamodar/pdfiles/papers/commodity.pdf.; accessed on 21 June 2018
- Davies, Rob (2017) "Breaking the Grip of Commodity Dependence—Minister Davies," *Business Report* (September 27). Available at https://www.iol.co.za/business-report/economy/breaking-the-grip-of-commodity-dependence-minister-davies-11372416. ; accessed on 21 June 2018
- Deloitte (2016) "35,000 MW: A Light for the Nation," *Infrastructure and Capital Projects, PT Deloitte Konsultan Indonesia*. Available at https://www2.deloitte.com/content/dam/Deloitte/id/Documents/finance/id-fas-35000mw-a-light-for-the-nation-noexp.pdf; accessed on 20 June 2018
- Department of Energy South Africa (2018) "Integrated National Electrification Programme," Available at http://www.energy.gov.za/files/INEP/inep_overview.html; accessed on 8 June 18.

- DoE-SANEDI-CSIR-SAWS-UCT-DTU (2017) "Wind Atlas for South Africa." Available at http://www.wasaproject.info; accessed on 8 June 2018.
- Eberhard, A, J. Kolker, and J. Leigland (2014) "South Africa's Renewable Energy IPP Procurement Program: Success Factors and Lessons," *World Bank Group*. Available at https://www.gsb.uct.ac.za/files/ppiafreport.pdf; accessed on 20 June 18.
- Eskom South Africa (2017) "Eskom 2018/19 Revenue Application Stakeholder Discussion," Eskom (September 20). Available at http://www.eskom.co.za/OurCompany/stakeholderNews/Documents/RevenueApplFY2018-19_20092017.pdf; accessed on 20 June 2018.
- Eskom South Africa (2018) "Generation Connection Capacity Assessment Report 2022." Available at http://www.eskom.co.za/Whatweredoing/GCCAReport/Pages/Default.aspx; accessed on 8 June 18.
- Eskom, Transmission, Grid Planning (2015) "Expedited Bid Window Programme Access Risk Assessment (Regarding Risk to Connect to the Transmission Grid for Respondents to the Registration Request)." Available athttp://www.eskom.co.za/Whatweredoing/Documents/ExpeditedBidWindowProgramme.pdf; accessed on 21 June 2018.
- Frankfurt School-UNEP Centre (2018) "Global Trends in Renewable Energy Investment 2018," *Bloomberg New Energy Finance*. Available at http://fs-unep-centre.org/sites/default/files/publications/gtr2018v2.pdf; accessed 20 June 2018.
- *Global Business Guide Indonesia* (n.d.)"PLN Invites Blanket Prequalification for Indonesian Renewable IPPs,"*Global Business Guide Indonesia*. Available at http://www.gbgindonesia.com/en/main/legal_updates/pln_invites_blanket_prequalification_for_indonesian_renewable_ipps.php; accessed on 20 March 2018.
- *Global Business Guide Indonesia (n.d.)* "Indonesia's Land Acquisition Laws; On Paper Only?"*Global Business Guide Indonesia*. Available at http://www.gbgindonesia.com/en/property/article/2016/indonesia_s_land_acquisition_laws_on_paper_only_11365.php; accessed on 6 June 2018.
- Greve, Natalie (2017) "Will SA Slide Deeper into Junk?" *Finweek*,(November 10). Available at https://www.fin24.com/Finweek/Business-and-economy/will-sa-slide-deeper-into-junk-20171110; accessed on 16 June 2018.
- Griffith-Jones, Stephany, Jose Antonio Ocampo, and Stephen Spratt (2011) "Financing Renewable Energy in Developing Countries: Mechanisms and Responsibilities," *European Report on Development*. Available at http://policydialogue.org/files/publications/Financing_Renewable_Energy_in_Developing_Countries.pdf; accessed on 20 June 18.
- Guild, James (2018) "Jokowinomics vs Reality: a Look at PLN," *New Mandala,* (April 4). Available at http://www.newmandala.org/jokowinomics-vs-reality-look-pln/; accessed on 7 June 2018. Available at https://www.reuters.com/article/indonesia-infrastructure/update-1-indonesia-expected-to-drop-19-bln-worth-of-infrastructure-projects-idUSL3N1RT44H; accessed on 6 June 2018.

- Hussain, Mustafa Zakir (2013) "Financing Renewable Energy—Options For Developing Instruments Using Public Funds," *The World Bank Group*, *Climate Investment Funds*. Available at http://documents.worldbank.org/curated/en/196071468331818432/Financing-renewable-energy-options-for-developing-financing-instruments-using-public-funds; accessed on 5 June 18.
- Indonesia-Investments (2015) "Batang Plant: Test Case for Indonesia's Land Acquisition Act," (November 30). Available at https://www.indonesia-investments.com/news/todays-headlines/batang-plant-test-case-for-indonesia-s-land-acquisition-act/item6238?; accessed on 11 June 2018.
- International Energy Agency (2017) "Key World Energy Statistics 2017." Available at https://www.iea.org/publications/freepublications/publication/KeyWorld2017.pdf; accessed on 21 June 2018.
- International Renewable Energy Agency (IRENA) (2017) "Renewable Energy Prospects: Indonesia." Available at http://www.irena.org/publications/2017/Mar/Renewable-Energy-Prospects-Indonesia; accessed on 21 June 2018.
- Kamarudin, Yanto and Tim Boothman (2017) "Investing in Power: Risks Under the New PPA and Tariff Regulations for Renewables," *PwC*. Available at https://www.pwc.com/id/en/publications/assets/eumpublications/newsflash/2017/eum-newsflash-2017-61.pdf; accessed on 20 June 2018.
- Kapoor, Kanupriya and GayatriSuroyo (2018) "Indonesian President Turns to Populist Policies Ahead of Tough 2019 Election," *Reuters* (April 25). Available at https://www.reuters.com/article/us-indonesia-politics-policy-analysis/indonesian-president-turns-to-populist-policies-ahead-of-tough-2019-election-idUSKBN1HW0XQ; accessed on 12 June 2018.
- Moody's (2018) "Moody's Downgrades Eskom's Ratings to ???????". Available at https://www.moodys.com/research/Moodys-downgrades-Eskoms-ratings-to-B1B2Baa2za-NSR-review-for-downgrade--PR_378663.
- Oliphant, John (2016) "A Too Powerful Eskom Undermines Green Energy," *Business Day* (November 24). Available at https://www.pressreader.com/south-africa/business-day/20161124/281509340785021.
- PwC (2017) "Power in Indonesia: Investment and Taxation Guide 2017." Available at https://www.pwc.com/id/en/pwc-publications/industries-publications/energy--utilities---mining-publications/power-indonesia-2017.html; accessed on 20 June 2018.
- PwC and APLSI (2017) "Powering the Nation: Indonesian Power Industry Survey 2017." Available at https://www.pwc.com/id/en/energy-utilities-mining/assets/power/power-survey-2017.pdf; accessed on 21 June 2018.
- PwC (2017) "The Long View: How Will the Global Economic Order Change by 2050?" Available at https://www.pwc.com/gx/en/issues/economy/the-world-in-2050.html; accessed on 20 June 2018.
- Prinsloo,Loni (2018) "S&P Sees 'Clear Danger' of Default by South Africa's Eskom," *Bloomberg* (January 18). Available at https://www.bloomberg.com/news/articles/2018-01-

- 18/s-p-sees-clear-danger-of-default-by-south-africa-s-eskom; accessed on 21 June 2018.
- *Reuters*, “Factbox: The Big Issues Facing South Africa’s New President,” February 15, 2018. Available at https://www.reuters.com/article/us-safrica-politics-challenges-factbox/factbox-the-big-issues-facing-south-africas-new-president-idUSKCN1FZ1K3; accessed on 8 June 2018.
- *Reuters*, “Fitch Downgrades South Africa to ‘BB+’; Outlook Stable,” April 7, 2017. Available at https://www.reuters.com/article/fitch-downgrades-south-africa-to-bb-outl-idUSFit995526; accessed on 8 June 2018.
- *Reuters*, “UPDATE 2—Indonesia Expected to Drop $19 Bln Worth of Infrastructure Projects,” April 16, 2018. Available at
- Suzuki, Jun (2017) “After 3 years, Widodo Achieves Some Success, But Infrastructure Stalled,” *Nikkei Asian Review* (October 20). Available at https://asia.nikkei.com/Politics/After-3-years-Widodo-achieves-some-success-but-infrastructure-stalled; accessed on 12 June 2018.
- U.S. Energy Information Administration (2017) “International Energy Outlook 2017.” Available at https://www.eia.gov/outlooks/ieo/; accessed on 20 June 18.
- Ward, Oliver (2017) “Widodo’s Infrastructure Drive is Close to Spiralling Out of Control,” *ASEAN Today* (December 4). Available at https://www.aseantoday.com/2017/12/widodos-infrastructure-drive-is-close-to-spiralling-out-of-control/; accessed on 6 June 2018.
- Wolfram, Catherine, OrieShelef, and Paul Gertler (2012) “How Will Energy Demand Develop in the Developing World,” *University of California at Berkeley*.Available at http://faculty.haas.berkeley.edu/wolfram/papers/JEP%20NBER%202.pdf; accessed on 20 June 18.

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