

An Own Coal?

Energy policy in Indonesia

With exports to key markets declining, Indonesia's huge coal industry is pinning its hopes on expansion of domestic coal use. Current policy would triple numbers of coal-fired power stations and ignore Indonesia's huge renewable energy potential.

Discussion paper

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Summary

Indonesia mined 435 million tonnes of coal in 2014, more than every country except China, India and the USA. In the decade between 2005 and 2015, Indonesian coal production doubled. Indonesia vies with Australia as the world's largest coal exporter, exporting 359 million tonnes in 2014.

However, in 2015 exports to the key Chinese and Indian markets dropped 40% and 23% respectively. With exports declining, Indonesia's coal industry has pinned its hopes on the domestic market. Indonesia's energy needs are projected to grow at a rate of 7.8 per cent per year until 2022.

At the 2016 Paris climate talks Indonesia committed to reduce greenhouse emissions by 29 percent from business as usual levels by 2030. Yet alarmingly, in the decade to 2012 the share of renewables in electricity generation actually fell, from 15 per cent to 11.4 per cent. Indonesia's energy policy does not address this trend. Instead, it would see coal generation triple.

The country's two major energy policies, the National Energy Policy (Kebijakan Energi Nasional - KEN) and National Power Plan (Rencana Umum Ketenagalistrikan Nasional - RUKN), look to add 70,000MW of total capacity, 40,000MW of which would come from coal. Renewable sources will produce less than 10 per cent, including 6.8 per cent from geothermal. Most of the remainder comes from oil and gas.

Current policy would see Indonesia miss a huge opportunity. According to the International Energy Agency, Indonesia, has the fourth largest potential supply of renewable power in the world with its significant reserves of geothermal, hydro, solar and biofuel resources. Indonesia's renewables potential ranks behind only New Zealand, Norway, and Sweden.

Geothermal energy has the biggest potential. Thanks to its position along the Pacific Ring-of Fire, Indonesia has an estimated 40 percent of the world's geothermal reserves. Crucially, most of this is located near the major population centres of Java, Sumatra, Bali and Sulawesi, so geothermal could provide electricity to most of Indonesia's large and growing urban areas. Solar also promises to deliver power to the remotest hamlets in the dispersed archipelago, with an estimated capacity of 4.8kWh per square metre per day.

One key obstacle to Indonesia's transition to cleaner energy is the monopoly power of the national electricity company Perusahaan Listrik Negara (PLN). All power grids

across the nation, and about 70 per cent of power generating assets, are controlled by PLN. Its stranglehold on Indonesia's electricity infrastructure means that smaller independent power producers (IPPs) that may want to provide renewable energy must enter into power-purchase agreements with the state-owned provider. PLN has right of first-refusal, has great power to dictate terms favourable to itself, and of course is pursuing the pro-coal agenda of its own ten-year plan.

PLN is a loss-making entity supported by government subsidies. Subsidies to PLN cost the Indonesian government IDR99.3 trillion Rupiah in 2014 (over USD7.5 billion). As a result of these subsidies, PLN can generate electricity from low-grade domestic coal for less than half of what it would cost it to use renewables. If a viable renewable energy industry is to develop in Indonesia, these subsidies must be removed or redirected to renewables.

The Indonesian Coal Mining Association is calling for 'long-term cost-based pricing' subsidies to coal miners, which would cost the government of US\$400 million, this policy would further hinder the development of a renewables industry. It should of course not be implemented.

Other obstacles include:

- Government guarantees to investors and international development banks building new coal fired power, such as the controversial Batang Power Station.
- Bureaucratic processes - no fewer than 13 government institutions have some involvement in renewables development.
- Lack of technical knowledge and financing needed to develop renewable infrastructure.

Although these problems could be address through policy changes, perhaps the biggest obstacles to Indonesia's clean energy future are vested political interests and corruption. The coal industry's influence on politics is not to be underestimated. Over the past two years Indonesia's Corruption Eradication Commission (KPK) has revoked 478 coal mine permits.

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Introduction

With coal import demand from China and India falling, Indonesia's domestic coal miners are banking their future on government policies that would see the number of coal-fired power plants across the archipelago nearly triple. Under one plan, initiated by the Jokowi government in 2015,¹ 35,000MW (35GW) of new electricity would be added to the Indonesian grid by 2019 (the same year as the nation's next presidential election). Twenty-thousand megawatts, or nearly 60 percent of this, is slated to come from coal,² and this is just one of several policies intended to increase the use of the dirty fossil fuel. A 10-year plan published by state-owned electricity utility PT Perusahaan Listrik Negara (PLN Persero) stipulates that a second 35,000MW is to be built between 2019 and 2024 – also dependent on coal.³

But these plans cannot be reconciled with the detrimental environmental and social impacts such a vast expansion of coal use would have, nor with Indonesia's pledge to cut emissions by 29 percent from business as usual levels by 2030.⁴ Indonesia's wealth of renewable energy resources (principal among them being geothermal) have the potential to meet both the growing energy needs of the world's fourth most populous nation, as well as its responsibility to help mitigate the impacts of global climate change. The development of Indonesia's renewables industry, however, faces several obstacles including government subsidisation of coal, the monopoly power of state utility PT Perusahaan Listrik Negara, and a lack of financing and technological know-how. The international community, including Australia, can help remedy this by providing financial and technological support for projects that will help Indonesia prosper in a clean energy future.

¹ Syaifullah 2016; AKSET 2015

² <http://www.pln.co.id/35000mw/en/>

³ In 2014 total national installed capacity was between 43,457MW (PT PLN (Persero) pg 1) and 53,000MW (Pricewaterhouse Coopers 2015 pg. 7). In comparison, Australia's installed electricity generation capacity is just over 50,000 MW (Satchwell 2016). The Loy Yang Power Station in Victoria has a capacity of 3,000MW, the Liddell Power Station in NSW has a capacity of 2,000MW, and the Gladstone Power Plant, Queensland's largest, has a capacity of 1,680MW.

⁴ Government of Indonesia 2015

Indonesia: an increasingly large energy producer and consumer

With by far the largest population in the region, it is perhaps no surprise that Indonesia is already the largest consumer of energy in Southeast Asia, accounting for more than 36 per cent of the region's energy demand.⁵ In spite of this, per capita electricity consumption in Indonesia ranks sixth out of 11 Southeast Asian countries.⁶ Given this discrepancy, and thanks to rapid industrialisation and increasing access to energy by the rural population, demand for electricity is projected to grow at a rate of 7.8 per cent per year⁷ until 2022: it is to meet this demand that the Jokowi Government announced its plan to develop 35,000MW of new capacity by 2019.⁸

An estimated 28.6 million Indonesians, or 11.3 per cent, live below the poverty line, and approximately 40 per cent are “clustered around the poverty line,” set at 330,776 Indonesian Rupiah (IDR), or US\$22.6 a month.⁹ More than a quarter of Indonesians (25.2 per cent or 63 million people)¹⁰ live without electricity. The developmental needs of everyday Indonesians, which includes access to reliable electricity, must be met if they are to participate in the 21st century economy. More than half of Indonesia's population live on the island of Java and it is here that the demand for electricity is greatest. Electricity produced for the Java-Bali power grid accounts for about 80 per cent of the national total. It is also on Java that industry is most heavily concentrated, and more than 40 percent of electricity from the Java-Bali power grid is purchased by industry¹¹ – its needs must too be met. So while the goal of producing as much power as called for by the Indonesian government cannot be condemned, the use of coal to do so can.

Although the domestic market pales in comparison to the export market,¹² demand for coal within Indonesia is growing - from 90 million tonnes in 2015 to as much as 110

⁵ International Energy Agency 2015, pg. 131

⁶ Pricewaterhouse Coopers 2016, pg. 17

⁷ Note that this is the forecast growth for Java and Bali, the most populous islands of Indonesia. Growth in other areas of the nation is more than 11 per cent. (PT PLN (Persero) 2015, pg. 4)

⁸ Pricewaterhouse Coopers 2016, pg. 18

⁹ <http://www.worldbank.org/en/country/indonesia/overview>

¹⁰ International Energy Agency 2015, pg. 99

¹¹ PT PLN Persero 2015, pg. 4

¹² In 2013 63 million tonnes of Indonesian coal was consumed domestically, a paltry 12.8 per cent of the 489 million tonnes it exported in the same year (International Energy Agency 2015, pg. 71).

million tonnes in 2016.¹³ As export markets crumble, the Indonesian coal industry is pegging its hopes of continued growth on domestic consumption to compensate for the woeful international situation - and the policies of the Indonesian government look set to assist by locking the nation into a coal-fired future.

¹³ International Energy Agency 2015, pg. 71

Coal in Indonesia

Indonesia vies with Australia as the world's largest coal exporter overall and it is the largest exporter of thermal coal for electricity generation. In 2014 it exported 359 million tonnes of the 435 million tonnes it produced domestically, generating US\$22.3 billion in export earnings.¹⁴ Indonesia is the fourth largest coal producing country in the world (behind China, the United States of America, and India), with its exports accounting for 35 per cent of the global steam coal trade.¹⁵ In the decade between 2005 and 2015, production of coal in Indonesia doubled.¹⁶

Indonesia has the second highest amount of recoverable coal reserves in the Southeast Asia-Pacific region (an estimated 13.3 thousand million tones of oil equivalent (Mtoe) compared to Australia's 36.3 thousand Mtoe).¹⁷ Coal is abundant across the archipelago and can be found in most of Indonesia's provinces, but the biggest reserves are found on the islands of Sumatra (particularly the south) and Kalimantan (particularly the southeast); Sulawesi, Papua, Java and Maluku also have significant reserves. Most of Indonesia's coal is sub-bituminous (used in electricity generation) and bituminous (used in steel making), although the latter accounts for only one per cent of coal exports.¹⁸ The majority (64 per cent) of Indonesia's coal reserves are categorized as 'medium rank' (meaning a caloric value of 4,700 - 5,700 kcal/kg), with 'low rank' (meaning a caloric value of less than 4,700 kcal/kg) accounting for a further 28 per cent.¹⁹

Lax law enforcement, particular in remote areas, means that coal mining has severe social and environmental impacts on the people of Indonesia. Many mines open without going through the proper legal and environmental processes, and plenty operate without a permit at all. In April a government review found that over 1,000 coal mines did not have legitimate permits, leading President Jokowi to declare a moratorium on coal exploration.²⁰ Corruption and bribery is a major problem, particularly given the decentralisation of Indonesian governance, which has given leaders at the regional and provincial level greater power over the resources in their area.

¹⁴ Pricewaterhouse Coopers 2016, pg. 13

¹⁵ International Energy Agency 2015, pg. 71 - 72

¹⁶ *ibid*, pg. 81

¹⁷ <https://www.worldenergy.org/data/resources/region/southeast-asia-pacific/coal/>

¹⁸ International Energy Agency 2015, pg. 71-72

¹⁹ Pricewaterhouse Coopers 2016, pg. 15

²⁰ Sundaryani 2016; edsm.go.id 2016

Average Indonesians are often powerless to stop the will of mining companies, and the money offered by mining companies can divide communities. Many mines operate check-by-jowl with long-established villages, rice farms, and forests, and coal mining pollutes the air, water and soil that such people depend on. Over 99 per cent of Indonesia's coal is surface mined, a process which significantly increases land-based carbon dioxide emissions. To give one example of the scale of the problem, it is estimated that more than one million people along Kalimantan's Mahakam River are potentially exposed to coal dust from uncovered coal barges every day. A report from Indonesia's National Audit Bureau (BPK) found that because of unchecked expansion of mining and plantation agriculture, Indonesia's forests have been exploited beyond their ability to regenerate.²¹

INDONESIAN COAL ON THE INTERNATIONAL MARKET

Indonesian coal exporters are heavily reliant on the Indian and Chinese markets. Indonesia is the largest supplier of coal to both of Asia's giants, accounting for 18 per cent of coal imports to China, and 60 percent to India²² - yet demand for Indonesian coal is declining in both nations. Although exports of Indonesian coal to China rose 800 per cent between 2008 and 2014,²³ in 2015 they dropped 40 percent.²⁴ The decline in trade with India has not been as severe – coal imports dropped a mere 23 per cent in 2015-16²⁵ - but India's Minister for Power, Coal, New and Renewable Energy and Mines said in April he would like to cease importing coal altogether.²⁶ The Indonesian reference price for coal, which tracks domestic and international spot prices, has fallen from a high of US\$127 a tonne in 2011 to \$58 a tonne in August 2016.²⁷

The collapse in these markets is sending smaller Indonesian producers out of business and seeing medium-sized producers decrease production in an effort to rein in costs.²⁸ Thanks to economies of scale, Indonesia's largest coal mining companies, six of which

²¹ International Energy Agency 2015, pg. 77-78

²² Russell, C 2015

²³ International Energy Agency 2015, pg. 75

²⁴ Russell, C 2015

²⁵ hellenicshippingnews.com, 2016

²⁶ Loh, T 2016

²⁷ Ministry of Energy and Mineral Resources (minerba.esdm.go.id) 2016

²⁸ Pricewaterhouse Coopers 2016, pg. 9

together account for 75 percent of production,²⁹ are faring somewhat better. But even these big players are changing strategy to cope with the changed market conditions. Expansion has ground to a halt, and the practice of mining the 'shallow seams' (easily reachable coal on the top of deposits) of existing mines has increased as a way of cutting costs to remain profitable (this practice, for better or for worse, 'sterilises' the coal remaining underneath, rendering it effectively unrecoverable).³⁰

²⁹ The six are: PT Adoro, Kaltim Prima Coal, PT Kideco Jaya, PT Arutmin, and PT Berau, and Bukit Asam. In addition to legitimate companies, illegal, small-scale coal mining produces as much as 50Mt a year and employes as many as 30,000 people (International Energy Agency 2015, pg. 76-77)

³⁰ Pricewaterhouse Coopers 2016, pg. 31. This has to do with 'stripping ratios' - the amount of overburden (i.e. soil) needed to be removed to extract one tonne of coal.' These are being reduced in an effort to cut production costs. However this practice makes it a lot more difficult to mine deeper seams in the future.

Indonesia's Renewables

But Indonesia's wealth of renewable resources gives it the potential to become a clean energy powerhouse. According to the International Energy Agency, Indonesia, with its significant reserves of geothermal, hydro, solar and biofuel resources, has the fourth largest potential supply of renewable power in the world, behind only New Zealand, Norway, and Sweden.³¹

Geothermal energy has the biggest potential. Thanks to its position along the Pacific Ring-of Fire, Indonesia has an estimated 40 percent of the world's geothermal reserves - an estimated potential of 27,000MW. Crucially, most of this is located near the major population centres of Java (where over 50 percent of the population is located), Sumatra, Bali and Sulawesi, so geothermal could provide electricity to most of Indonesia's large and growing urban areas. However, 42 per cent of these reserves are in forest conservation areas and, as geothermal exploration is considered a mining activity, presidential approval is required for exploration.³²

With an estimated total capacity of 75,000MW, hydropower is the single largest source of renewable power in Indonesia.³³ However, given the social and environmental impacts of large scale hydropower projects, much of this cannot be considered genuinely renewable. In addition, most of Indonesia's hydropower capacity is located in remote areas such as Papua, and therefore is not a viable solution for highly populated areas in the west of the archipelago. This significant obstacle is the primary reason that only five percent of potential hydro power capacity is currently utilized. Hydropower does offer some promise for providing power in remote areas, but only if it can be developed in a socially and environmentally responsible way.

Solar, with an estimated capacity of 4.8kWh per square metre per day,³⁴ also promises to deliver power to the remotest hamlets in the dispersed archipelago. Indeed the potential is already beginning to be realised - between 2010 and 2011 the Indonesian government constructed more than 100 PV systems, with a total capacity of 80MW,

³¹ International Energy Agency 2015, pg. 117. This is renewable energy as a percentage of total primary energy supply (TPES).

³² International Energy Agency 2015, pg. 122. There are some very legitimate concerns about the development of geothermal projects within forestry areas, particularly as these are also often indigenous areas.

³³ *ibid*, pg. 123

³⁴ *ibid*, pg. 126

mostly in small and medium sized off-grid systems; the government aims for solar to deliver 1000MW by 2025.³⁵ There is additional potential for utility scale solar.

Indonesia's biogas, biomass and waste resources also offer promise not just for electricity generation but for the transportation sector too, although an exact total figure of potential resources is hard to establish. Biofuels also come with a big catch, as most these are generated by agriculture waste, particularly from palm oil plantations. Indonesia is the world's largest producer of palm oil, which is a significant contributor to climate-changing deforestation.³⁶

Despite this diverse treasure trove of resources, use of renewable energy in Indonesia ranks sixth lowest of the 29 countries rated by the International Energy Agency. In telling contrast to coal, the market share of renewables in electricity generation is actually falling - from 15 per cent in 2002 to 11.4 per cent in 2012.³⁷

³⁵ *ibid*, pg. 126

³⁶ *ibid*, pg. 123-125

³⁷ *ibid*, pg. 116-117

Energy policy in Indonesia

Like so many other areas of governance in Indonesia, energy policy (or policies as is the case) is complex and opaque. The Jokowi government's 35,000MW plan is just one part of a web of overlapping policies that guide the development of energy use in Indonesia. These policies have different timeframes and are administered by different parts of the Indonesian government. But the critical point is that all of these policies call for the use of coal to be increased. A breakdown of these policies - and the 35,000MW plan within them - looks something like this:

The National Energy Policy (Kebijakan Energi Nasional - KEN) is a broad, overarching policy that includes strategies for all energy use (electricity as well as fuel). The National Energy Policy is overseen by the National Energy Council (Dewan Energi Nasional), which is comprised of seven government ministries involved in the energy sector.³⁸ Once the National Energy Council agrees on the National Energy Policy, it is reviewed for approval by the principle parliamentary body that deals with energy policy (Commission VII of the Indonesian House of Representatives).³⁹

The National Energy Policy's goals are then broken down into two five year plans known as National Energy General Plans (RUEN or Rencana Umum Energi Nasional), which in turn become part of general national development planning undertaken by the Ministry of National Development Planning (BAPPENAS).⁴⁰

Meanwhile, based on the National Energy Policy, the Ministry of Energy and Mineral Resources (Kementerian Energi dan Sumber Daya Mineral) devises the General National Power Plan (Rencana Umum Ketenagalistrikan Nasional - RUKN). Based on the RUKN, the National Electricity Company (Perusahaan Listrik Negara - PLN), the state-owned enterprise that has a near-total monopoly on Indonesia's power grid, annually issues a 10-year National Energy Supply Plan (Rencana Usaha Penyediaan Tenaga Listrik - RUPTL).⁴¹ The 35,000MW plan is a separate initiative issued by the Jokowi

³⁸ Including the Co-ordinating Ministry for Economic Affairs, the Ministry of National Development Planning, the Ministry of Finance, the Ministry of Environment, the Ministry of Forestry, the Ministry of Transport and the Ministry of Industry. However, the National Energy Council does not include all potential stakeholders - the Ministry of Energy and Mineral Resources, for example, is not part of the National Energy Council, nor is the Ministry of National Development Planning (BAPPENAS), which is ultimately responsible for implementing the policy

³⁹ Which also deals with all matters relating to energy, mineral resources, research and technology and environmental affairs (International Energy Agency 2015, pg. 25)

⁴⁰ International Energy Agency 2015, pg. 26

⁴¹ *ibid*, pg. 106 -107

government in 2014 that has, in practice, been incorporated into the RUPTL for 2015-2024⁴², and which is also supported by a number of executive orders (peraturan presiden - perpres).⁴³ Further complicating things, the decentralisation of governance that has taken place since the end of the Suharto era means that regional and local governments also have the authority to develop regulations on energy use.

So no single part of government has responsibility for the formulation or implementation of energy policy (which makes accountability a real problem), and these various policies, and the laws which underwrite them, overlap and contradict one another.⁴⁴ In short: energy policy in Indonesia is a dog's breakfast, and the goals of the National Energy Policy, the RUPTL, the 35,000MW plan, or any other, must therefore be taken with a grain of salt. Nevertheless, all of these policies call for the use of coal to increase. The following sections explore each plan in greater detail.

THE 2015-2024 RUPTL & THE 35,000MW PLAN

The 35,000MW plan, which was initiated by President Jokowi and his cabinet, is essentially the basis for the first five-year plan (2015-2019) of PLN's 2015-2024 RUPTL.⁴⁵ So to talk about one is to talk about the other - the only variable being the five or ten-year time scale. The RUPTL calls for more electricity generating capacity than Australia currently has in its entire network to be constructed in just ten years, and for most of it to be from coal.

The first five years: The 35,000MW plan

Coal accounts for the majority of power to be generated through the 35,000MW plan. Approximately 20,000MW (nearly 60 per cent) of new power generating capacity is slated to come from coal.⁴⁶ To reach this goal, dozens of new coal-fired power plants would have to be constructed.⁴⁷ By the end of 2019, coal-fired-power-plants are expected to account for approximately 60 per cent of all power generation in Indonesia (an increase from 53 per cent in 2015).⁴⁸ In May, the then Energy and

⁴² PT PLN (Persero) 2015

⁴³ Sambijantoro, S 2016

⁴⁴ International Energy Agency 2015, pg. 11; 34-35

⁴⁵ This happened after President Jokowi 'encouraged' PLN to make the 35,000MW plan a priority. (Sekretariat Kabinet Republik Indonesia 2015). Note that this excludes an additional 6.6GW of projects that were already underway when the RUPTL was released (PT PLN (Persero) 2015, pg. 7-8).

⁴⁶ <http://www.pln.co.id/35000mw/en/#s6>; Pricewaterhouse Coopers 2016, pg. 2

⁴⁷ For a full list see: <http://www.pln.co.id/35000mw/en/>

⁴⁸ Pricewaterhouse Coopers 2016, pg. 19

Mineral Resources Minister, Sudirman Said, said that the 35,000MW plan will mean that half of Indonesia's coal will be consumed domestically.⁴⁹ This is so much coal that a Pricewaterhouse Coopers report commissioned by the Indonesian Coal Mining Association (Asosiasi Pertambangan Batubara Indonesia - APBI) states that there will not be enough coal available from domestic miners to meet the demands of the project past 2036, and that subsidies (long-term cost-based pricing) may be necessary - at a cost of US\$400 million to PLN.⁵⁰ Publications related to the 35,000MW program show that renewable energy would account for a paltry 200MW of new power, and hydro for just over 1200MW. The remaining 14,000 odd megawatts would be produced using oil and gas.⁵¹

As over two-thirds of the 35,000MW is to be produced by 'independent power producers' funded by private investors, the Indonesian government estimates that more than Rp 1,1000 trillion in investment will be required.⁵² Indeed PLN states that the success of the 35,000MW program depends on the government's ability "to approve direct loans from international development banks for PLN with warranty from the government."⁵³ It is here that Australia and other foreign countries have the power to make or break Indonesia's clean energy future.

The next five years: 35,000MW more.

After 2019, the RUPTL states that another 35,400MW of electricity generating capacity will be built, meaning a total of 70,400MW is planned over the full 10 years of PLN's 2015-2024 plan.⁵⁴ PLN is only expected to build 21,400MW of this, with 35,500MW built by 'independent-power-producers' (IPPs) who would be expected to sell their power onto PLN's grid.⁵⁵ New coal-fired power plants will account for 42,000MW, or 59.8 per cent of the planned capacity. Renewable sources will produce less than 10 per cent - geothermal will provide 4800MW, or 6.8 per cent, and mini hydro will account for just 1000MW.⁵⁶ This is despite the fact that Indonesia's abundant sources of renewable energy have the potential to provide much more than this.

⁴⁹ The Jakarta Post 2016 '35,000 MW power plants to boost coal consumption'

⁵⁰ Pricewaterhouse Coopers 2016, pg. 2; 9-10; 36

⁵¹ <http://www.pln.co.id/35000mw/en/>

⁵² ibid

⁵³ PT PLN (Persero) 2015, pg. 8

⁵⁴ ibid, pg. 5

⁵⁵ ibid, pg. 5 (The source of funding for the remaining 13.5GW has not been established).

⁵⁶ Hydropower, which because of its environmental and social impacts should not be considered renewable, will provide 9.3 GW, or 13.1%. Planned Combined cycle gas-fired power plants will provide 9.1 GW, or 13.0 per cent of the total. PT PLN (Persero) 2015, pg. 5-6

If the plan is completed successfully, in 2024 Indonesia would have an energy mix of 63.7 per cent coal, 19.2 per cent natural gas (including LNG), nine per cent geothermal, 6.6 per cent hydroelectric, and 1.5 per cent oil and other fuels.⁵⁷ To reach these targets PLN is calling for US\$62.8 billion in investment from the private sector⁵⁸, most of which will go toward the construction and operation of new coal fired power plants. International investors, from China, Korea, and Japan in particular, are getting involved.

THE 2014 NATIONAL ENERGY POLICY

Adopted as government regulation in 2014, the National Energy Policy - which is technically Indonesian law⁵⁹ - is the broadest reaching and, arguably, most significant document dictating the development and use of electricity in Indonesia. Like the 35,000MW plan and PLN's RUPTL, it favours the use of coal over renewables. The National Energy policy is focused on gaining energy independence and aims to do so by redirecting exports of Indonesia's natural resources to the domestic electricity market⁶⁰ - this would be great for struggling coal exporters.

The policy aims for an energy mix by 2025 of 30 per cent coal, 22 per cent oil, 23 per cent renewable resources, and 25 per cent natural gas. To reach this goal the use of gas would need to double, use of coal would need to more than triple, and the use of renewables would have to grow more than 11 fold.⁶¹

⁵⁷ PT PLN (Persero) 2015, pg. 6

⁵⁸ *ibid*, pg. 10

⁵⁹ The National Energy Policy 2014 was adopted by the Indonesian house of representatives in February 2014, and was signed on 17 October 2014 as Government Regulation No.79/2014. (International Energy Agency 2015, pg. 25). According to the Energy Law of 2007, the National Energy Policy must pass through parliament every four years, which would mean these current goals would be up for revision in 2019. However, the policy, which was first established in 2006, was not updated until in 2014.

⁶⁰ International Energy Agency 2015, pg. 25

⁶¹ *ibid*, pg. 25

The Central Java Power Project: the shape of things to come

Indonesia currently has 50 coal-fired thermal plants. The use of coal is growing faster than any other energy resource,⁶² and the development of new plants is already underway. The Batang power station (also known as the Central Java Power Project), the construction of which is actively contested,⁶³ is a good example of how an expansion of domestic coal consumption would work. Adoro Energy (Indonesia's single largest coal miner), through its subsidiary Adaro Power (its 'downstream' power plant business) has entered into an agreement with the Japanese utility Electric Power Development Co. (J-Power) and Itochu, a conglomerate with major coal interests, to form the joint venture PT Bhimasena Power Indonesia (BPI), which will construct and operate the new station.⁶⁴ Financial deals were signed in June.⁶⁵ The Japan Bank for International Cooperation (JBIC) is providing project finance and the World Bank's Indonesia Infrastructure Guarantee Fund is providing a guarantee.⁶⁶ Such international investors reportedly consider investments in Indonesian coal-power plants reasonably safe, as PLN gives a 30 year power-purchase agreement backed by government guarantees. So Japan will supply the capital and technology to build the plant, Adoro will supply the coal that it can't sell overseas, and together they will sell electricity to PLN. If the above mentioned policies are followed, many more of these deals will be made. Indeed the first plant built as part of the 35,000MW plan - a 100-megawatt gas-fired power plant in Gorontalo, Sulawesi - opened in February 2016,⁶⁷ and the China Development Bank has pledged to provide a US\$10 billion loan to PLN to build power plants as part of the 35,000MW plan.⁶⁸

The Batang Power Station would consist of two 1,000MW generators, making it the largest power plant of any kind in Indonesia and the largest coal-fired power plant in South-East Asia. But the plant's developers are contending with persistent opposition - and for good reason. Long running land disputes have held the project up - five villages

⁶² *ibid*, pg. 72

⁶³ Anna 2015; Greenpeace 2014

⁶⁴ J-Power and Adaro each own 34 percent of the venture, while Itochu has the remaining 32 percent stake (Urabe, E, Inajima, T, & Wilandari, F, 2013).

⁶⁵ Ribka, S, 2016

⁶⁶ Oil Change International 2013

⁶⁷ Prakoso, R 2016

⁶⁸ Amianti, G & Khoirul, Amin 2016

would have to be demolished, along with rice fields and jasmine plantations - and locals are refusing to move. Furthermore, the plant is in the Ujungnegoro-Roban coastal area marine reserve and, according to Greenpeace, waters off the coast would be detrimentally impacted.⁶⁹ And, of course, the plant will significantly increase Indonesia's carbon emissions.⁷⁰ Nevertheless, the company insists it will go ahead with the plan, and a ground breaking ceremony attended by Indonesian President Joko Widodo was held in August 2015. More Batangs can be expected if the National Energy Plan is implemented.

⁶⁹ Greenpeace 2013

⁷⁰ The Batang Plants would release 16,000 tonnes of sulphur oxides, 20,000 tonnes of nitrogen oxides, over 600 tonnes of particulates, and over 200 kilogrammes of mercury each year. International Energy Agency 2015, pg. 78

The nascent renewables industry

Despite all this, there have been some positive developments in Indonesia's renewables sector. A renewable energy task-force has been established to develop new feed-in tariffs, set-up an energy security fund, and consider the establishment of a second 'green' PLN to purchase renewable energy. In 2009, a US\$400 million Clean Technology Fund was established to promote renewable energy, particularly geothermal.⁷¹ And, of course, there is the Indonesian government's commitment, made at the UN Climate Conference in Copenhagen in 2009, to cut emissions from business as usual levels by 29 per cent by 2030.

On the ground, the Energy Self Sufficient Village (ESSV), Solar Home System Programmes, and the 1,000 Island Solar Photovoltaic Project are providing renewable power to remote villages far from large-scale grids.⁷² Subsidies for transport biofuels have been introduced. Interestingly, but perhaps not surprisingly given PLN's inflexibility, these small scale projects are where the biggest changes are taking place. Renewable energy's ability to provide reliable electricity to the archipelago's widely dispersed population, much of which lives far from PLNs grid, is perhaps its greatest promise. Indeed the real challenge is to provide reliable electricity to the Java-Bali grid, which accounts for about 80 per cent of the nation's total load.⁷³

⁷¹ International Energy Agency 2015, pg. 120

⁷² International Energy Agency 2015, pg. 115

⁷³ However it should also be noted that almost half (41.4 per cent) of total sales of electricity on this grid is to industrial customers (PT PLN Persero 2015, pg. 4).

Obstacles to a renewable-energy industry

PT PLN'S MONOPOLY

Despite all this, many obstacles remain to the development of a renewable energy industry in Indonesia, perhaps the most significant of which is the monopoly power of the national electricity company Perusahaan Listrik Negara (PLN).

PLN, a state-owned limited liability company (Persero), has a monopoly on the transmission, distribution, and retail sale of electricity throughout Indonesia. It controls all power grids across the nation, and about 70 per cent of power generating assets.⁷⁴ PLN's stranglehold on Indonesia's electricity infrastructure means that smaller independent power producers (IPPs) which may want to provide renewable energy, must enter into power-purchase agreements with the state-owned provider, which has right of first-refusal, which has great power to dictate terms favorable to itself, and which of course is pursuing the pro-coal agenda of its own ten-year plan (RUPTL).

PLN is a loss-making entity. It is under pressure to maximise returns to the state (numerous PLN officials are facing charges, or already in prison, for losses to the state) and the use of cheap coal is one way to do this.

If renewables such as geothermal and solar are to be competitive, the price PLN pays for them need to be higher. However the government, through the electricity directorate at the Energy and Mineral Resources Ministry (Kementerian Energi dan Sumber Daya Mineral), which sets prices, is not doing this. Government subsidies mean that PLN can generate electricity from low-grade domestic coal for less than half of what it would cost it to use renewables.⁷⁵ Although the Indonesian government has established a feed-in tariff (FiT) system to encourage PLN to purchase power from renewable generators, thanks to government regulations designed to keep electricity affordable, the tariffs are less than what PLN is allowed to sell electricity to end-users for.⁷⁶ If a viable renewable energy industry is to develop in Indonesia, these subsidies must be removed or redirected to renewables. Having said that, subsidies to PLN cost

⁷⁴ Pricewaterhouse Coopers 2015, pg. 14

⁷⁵ International Energy Agency 2015, pg. 128

⁷⁶ *ibid*, pg. 128. In 2014, PLN sold electricity for 922 Rupiah per kilowatt hour, even though the cost of production was 1,424 Rupiah per kilowatt hour. The difference was covered by an estimated US\$5.6 billion in subsidies. (Pricewaterhouse Coopers 2015, pg. 6)

the Indonesian government IDR99.3 trillion Rupiah in 2014 ⁷⁷ (over USD7.5 billion), and the state's ability to maintain this high expenditure over the long term is questionable. The 'long-term cost-based pricing' subsidies to coal miners called for by the Indonesian Coal Mining Association, which would cost US\$400 million, should of course not be implemented.⁷⁸

OTHER OBSTACLES

Arduous and convoluted bureaucratic processes - for exploration licenses, access to and acquisition of land, and permits to operate - and inconsistent structures of government also hamper development of the sector. No fewer than 13 government institutions have some involvement in renewables and there are at least five other government regulations not mentioned in this paper that relate to energy use.⁷⁹

Other impediments to the development of a renewable energy industry in Indonesia include a crucial lack of both the technical knowledge needed to develop renewable infrastructure, and the private financing needed to get it off the ground (this is in stark contrast to coal, as illustrated by the Batang example).⁸⁰ Micro-finance for small scale projects, especially on smaller, more remote islands, could and should be encouraged by the Indonesian government.⁸¹ Another problem is that local government authorities, enterprises and financial institutions lack knowledge of renewable technology.⁸²

Although the policy changes needed to remedy these problems are straightforward enough, vested political interests and corruption are perhaps the biggest obstacles to Indonesia's clean energy future. It is thought that coal interests are tied to the military, and the lobby's influence on politics must not be underestimated. Over the past two years Indonesia's Corruption Eradication Commission (KPK) has revoked 721 mining permits in 12 provinces (including 478 for coal) as part of an ongoing investigation into

⁷⁷ Pricewaterhouse Coopers 2015, pg. 6

⁷⁸ Pricewaterhouse Coopers 2016, pg. 2; 9-10; 36

⁷⁹ Including the Blueprint for National Energy Implementation 2005-2025; the Green Energy Policy; and Ministerial Regulations No. 2/2006 on Medium-Scale Power Generation Using Renewable Energy; No. 31/2009; No. 4/2012; and the Ministerial Regulation on Small Distributed Power Generation Using Renewable Energy (International Energy Agency 2015, pg. 119 - 120).

⁸⁰ International Energy Agency 2015, pg. 127

⁸¹ *ibid*, pg. 127

⁸² *ibid*, pg. 126

the corruption in the mining sector.⁸³ However some speculate that these permits will only be redistributed to bigger miners and further concentrate the industry.

⁸³Tempo.co 2016

Conclusion

Demand for electricity in Indonesia is projected to grow at a rate of 7.8 per cent per year until 2022.⁸⁴ To meet this demand a number of policies have been developed - the 35,000MW plan, an initiative of the Jokowi Government, the National Energy Policy, which is passed into law by the national representative council (Dewan Perwakilan Rakyat), and PLN's 10-year plan (RUPTL). These policies may be unrealistically ambitious, unclear, contradictory, and overlap each other, but one thing is clear: Indonesia is set to dramatically increase its use of coal to generate electricity.

Indonesia requires a lot of new electricity to meet the growing demands of its large, increasingly wealthy, industrialised, urbanised population. There is no question that a lot more power is needed, only as to how it will be generated - by dirty coal or through renewables? Indonesia has plenty of both, but only renewables offer a clean, sustainable future.

If Indonesia goes down the coal road, the consequences are severe. The nation will be locked into the use of dirty, deadly coal for generations. According to research conducted by Harvard University and Greenpeace Indonesia, air pollution from coal plants kills more than 7,000 Indonesians a year. If the goal of adding 20,000MW of new coal-fired power plants by 2019 is reached, this would rise to around 28,000 per year - the Batang plant alone could cause as many as 30,000 premature deaths over its 40-year lifespan.⁸⁵ This is not to mention the impact such a monumental expansion of coal power would have on the global climate.

Indonesia's vast reserves of renewable energy, on the other hand, could provide power to Indonesia's 260 million people - who live widely dispersed across the vast archipelago in massive urban areas, in remote villages, and on isolated islands - without costing lives or the planet. Once established, geothermal power can provide cheap, clean, reliable power on a large scale. Solar and micro-hydro power can supply endless clean electricity to more remote areas. Biomass from agricultural and municipal waste can provide electricity while reducing greenhouse gas emissions - indeed waste from Indonesia's plantations is already exported to Japan and Europe to provide them with renewable energy.

But if the goal of a clean energy future for Indonesia is to be realised, several things need to happen. Subsidies on fossil fuels need to be removed or redirected to

⁸⁴ Pricewaterhouse Coopers 2016, pg. 18

⁸⁵ Greenpeace 2015

renewables. Bureaucratic and regulatory processes that hold up the development of the renewable energy industry, particular those related to exploration and land acquisition, must change in order to facilitate the development of the sector. Modern regulations, including pollution controls, should be imposed on coal power plants not only for the benefit of public health and the environment, but so that their competitiveness with renewables reflects their actual financial and social costs. This would make feed-in tariffs for renewables financially viable for PLN without any additional government spending. The international community has a responsibility to help nations such as Indonesia develop clean technology by providing the technical know-how and finance necessary to ensure the competitiveness of renewables.

Indonesia is set to vastly expand its production of electricity. How the nation decides to do so will determine whether it scores an own coal or achieves a clean victory.

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