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INDEPENDENT STRATEGIC ANALYSIS OF AUSTRALIA'S GLOBAL INTERESTS

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Indonesia's Energy Requirements – Part One: Current Energy Dynamics

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Key Points

- Domestic consumption has been a key driver of Indonesian economic growth and, should growth remain stable, result in increased demand for energy in the future.
- Energy supply broadly has not been sufficient to meet increasing demand and consumption trends, both internationally and domestically.
- Electricity generation will be a core consumer of energy as Indonesia's middle class grows.
- Alternative energy sources constitute a relatively small proportion of the Indonesian energy matrix, despite abundant sources such as geothermal and hydro.

Summary

Indonesia's stable economic growth over the last decade has been primarily driven by domestic consumption and services. Underpinning that growth has been increased domestic energy consumption and demand, the drivers of which include greater numbers of people entering the middle class, with accompanying energy-intensive lifestyles, and a process of electrification across the archipelago. Part One of this paper will examine Indonesia's current energy dynamics by sector and the strategic drivers influencing the Indonesian

Government's approach to the energy industry. Indonesia's future energy demands, energy reserves and the possible opportunities for Australian business will be discussed in Part Two.

Analysis

Indonesia's stable economic growth since the turn of the millennium has been a global success story. Despite being severely affected by the 1997 Asian Financial Crisis, subsequent reforms across all aspects of the Indonesian economic and political system have led to a vibrant economy. Over the last decade, Indonesia has undergone an annual GDP growth rate of five to six per cent – an economic performance that has gained significant praise from economists for its lack of volatility. Most analysts suggest that a continued annual growth rate of between five and six per cent is likely through to 2030.

Unlike other countries in the region, this strong performance can be attributed to growth in domestic consumption and services, rather than manufacturing and exports. These factors were critical in the Indonesian economy weathering the global financial crisis, in which those countries most reliant on global markets experienced the most severe impacts.

This growth is also linked to a number of key social changes within the archipelago. Population migration from rural areas to urban areas has been the most significant trend, with Indonesians migrating to cities in search of better employment and living conditions. Cities have been the engine of Indonesian economic growth; the approximately 53 per cent of the population residing in cities produces around 86 per cent of GDP. It is also in the cities where the middle class has grown, a trend replicated across Asia. The middle class has higher disposable incomes, vehicle ownership and greater demands for Western-style consumer lifestyles, including housing and goods and services. This expanding – and more demanding – urban population has been one of the main contributing factors to increased energy demand within Indonesia. More specifically, it has placed increased demand on infrastructure, transport fuels and electricity supply.

The *Economist* estimates that, even though only 70 per cent of households in Indonesia are supplied with electricity, demand grew at an estimated rate of 6.4 per cent per year on average in 2009-13, far outstripping supply and leading to power shortages in many areas. The residential sector accounts for around 40 per cent of total electricity consumption and this is only likely to grow, with the Indonesian Government implementing ambitious plans to provide 98 per cent of all villages with electricity by 2015 (up from 85 per cent currently). Approximately one-third of national electricity demand is from the industrial sector, reflective of Indonesia's smaller manufacturing sector, proportionate to other South-East Asian countries. A lack of reliable electricity for the industrial sector has been attributed as a key factor in limiting manufacturing in Indonesia.

Along with growing domestic consumption, international demand for Indonesian energy has also been strong. While exports of energy, and natural resources, have increasingly been less important as a driver of Indonesian economic development, an energy-hungry Asia has continued to provide Indonesia with lucrative markets for energy sales. Its main export

markets have been China, Japan, South Korea and Taiwan.

That growing domestic demand and changing patterns of consumption are posing a significant challenge for the Indonesian Government. Understanding the complexity of its own changing domestic consumption patterns, and ensuring that there is sufficient production supply to meet both domestic and export demand, will be critical challenges to economic growth in the future. Where, and how, the government supports future developments in the energy sector will be an important factor in determining the course and strength of continued Indonesian growth.

Oil

Oil is used both for electricity generation and as a transport fuel and accounts for approximately 32.5% of Indonesian domestic primary energy consumption. While this proportion is expected to fall as a percentage of total energy consumption, real consumption of petroleum is expected to increase over the period 2014-20 by approximately 1.5 per cent per year. Growth to date has been primarily driven by the transport and household sectors, with fuel prices held in check by government subsidies at the same time that the customer base has increased. By the same token, industry consumption and demand for oil has slowly declined.

Despite increased consumption, Indonesia's oil production is in decline, steadily reducing from a peak in the mid-1990s. This is partly driven by ageing oil fields, an unwieldy regulatory framework (particularly around licensing and permit issues), and poor or degraded infrastructure, as well as a lack of new investment. In addition, refining capacity is currently insufficient to meet demand growth. Pertamina, the state oil company, currently operates the eight national refineries, but no new capacity has been added since 1994. These factors have resulted in Indonesia being a net oil importer since 2004, primarily sourcing supply from Saudi Arabia, Nigeria and Azerbaijan. Despite that, Indonesia continues to export crude oil. New oil fields and production centres are likely to come online in the next decade but, in the short term, a shortfall between production and demand is very likely.

Gas

Gas accounts for around 17.3% of total energy consumption in Indonesia. It is primarily used for power generation and in the fertiliser manufacturing industry. In the short term, gas consumption is expected to continue to increase as a government-directed shift from oil to gas for base load electricity generation takes effect. As with oil, consumers enjoy subsidised prices for gas, both at an individual and industrial level, within a government-regulated pricing system. Debate is currently occurring over allowing gas producers to charge higher prices, but it remains unclear at this stage whether that will occur.

Domestic natural gas production is expected to rise only slightly from the 67,900 kilotonnes of oil equivalent (ktoe) produced in 2013 to 70,200 ktoe in 2020. A lack of investment, combined with production problems in many plants, has limited the growth of the gas sector and its ability to meet demand. Partially driven by that, in late 2013, Indonesia signed an

agreement with US company Cheniere Energy to begin importing LNG in 2018, and construction has commenced on infrastructure facilities to receive imported shipments. Indonesia was previously the world's largest exporter of LNG, but has since fallen to fifth place behind Qatar, Malaysia, Australia and Nigeria.[1] The *Economist* notes that 'LNG export volumes in 2013 were about 40 per cent below the peak level reached in 1999.' Imported LNG will also likely be used to meet export agreements.

A number of Indonesia's liquefaction plants are planned to undergo conversion to re-gasification plants, a reflection of the increasingly domestic, rather than export, focus of the gas industry. Plants in Papua and Kalimantan are likely to be to become solely focussed on domestic production of LNG. A surge in LNG infrastructure is underway, with pipelines, floating re-gasification plants and eight small LNG terminals also announced by the government. It is expected that these initiatives will, for the most part, support the growth of electricity generation for the domestic market.

Coal

Coal consumption and demand has risen steadily in recent years, and that trend is expected to continue. This has partially been driven by a switch from oil to coal as the main fuel source in the private sector, a move fostered by the government due to the country's large coal reserves. The largest consumer of coal within Indonesia is the domestic electricity generation sector, with approximately 44 per cent of domestic electricity generation derived from coal, and domestic power plants accounting for around two-thirds of total coal sales.

As of 2012, the national grid had an estimated 44 gigawatts of installed capacity. In line with government plans for increasing electrification, plans were initiated in 2011 for an extra seven gigawatts of coal-fired capacity to add to the grid, further increasing coal demand. Coal production quadrupled between 2002 and 2012, with approximately two-thirds of production coming from East Kalimantan. Some of the largest coal mines in the world are located in Indonesia.

From an international perspective, demand for coal remains strong, despite environmental initiatives to curb its use. Indonesia's main markets for coal are India, its biggest customer, and China. Despite increased domestic demand, Indonesia remains the world's largest exporter of coal by weight and exports approximately 75 per cent of its production of thermal coal, estimated to have been worth between US$22 to US$28 billion in 2014.

Alternatives

Nuclear power does not currently factor in the Indonesian energy matrix. The government has, however, raised the possibility of a nuclear reactor being built by 2017. Similarly, solar and wind power generation exist only on a small scale in predominantly remote and less-urbanised areas. Hydropower accounts for approximately 11 per cent of total generation capacity, although the sector has remained static for over a decade, with little development or investment. All of these fields have considerable potential for further development.

[1] International Gas Union, 'World LNG Report - 2013 Edition', p. 9.

The production and usage of biofuels, with palm oil as the main input, is rapidly increasing. Of the 72,317 ktoe of renewable energy consumed in 2013, combustible renewables and waste accounted for 55,674 ktoe. This growth has been underpinned by strong government support. As with other alternative fuels, biofuels are particularly prevalent in the rural areas of Indonesia, where there is little connection to existing energy infrastructure and poor or non-existent grid electrification.

Indonesia has a significant geothermal component to its energy mix, and is the third-largest geo-thermal energy producer behind the United States and the Philippines. Geothermal primarily provides energy generation to the electricity sector, with about 3.7% of the country's total electricity generation sourced from geothermal plants.

Conclusion

Indonesia's energy production, supply and consumption patterns are changing rapidly. An abundance of energy reserves places Indonesia in a strong position to address growing demand. Assuming, however, that economic growth continues at expected levels, Indonesia will need to draw upon all of its available energy reserves to ensure that future energy consumption does not outstrip supply. Recognising emerging trends and overcoming the barriers to generating sufficient supply will thus be key challenges for Indonesia in the years ahead.

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About the Author: Mr Patterson has written extensively on the Asia-Pacific region for a number of publications. Mr Patterson has taught Political Science and Security Studies at a number of universities and is currently completing a PhD in International Relations.

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