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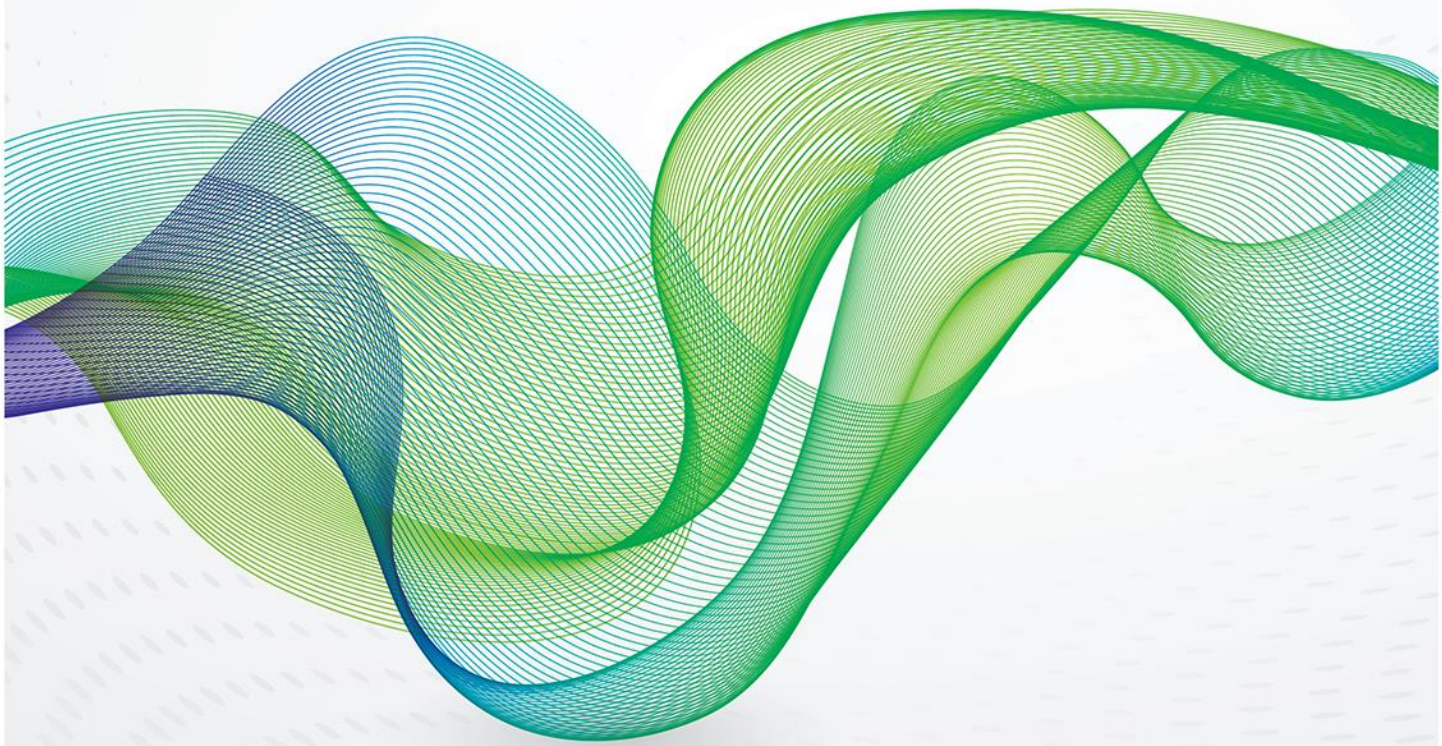
# Can Indonesia's policy of reconfiguring its energy mix by increasing natural gas usage support its initiatives to reform energy subsidies?



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## Abstract

Against a backdrop of rapidly growing oil and gas production and exports, the Indonesian government introduced fuel subsidies in the late 1950s to stimulate economic development. However, since the country ceased to be a net exporter of oil in 2004, increasing demand for oil products and political pressure to maintain subsidies has meant that government expenditure on subsidies has steadily escalated. Despite the various energy policy reforms implemented since 1998 to cut fuel subsidies and adapt to the evolution of the country's energy landscape, it is now clear that oil subsidies are no longer the stabilizers that once helped a young nation find its balance. Indonesia's dependence on subsidies is, instead, now weighing down a country pedalling hard towards the goal of economic success. This paper argues that increasing the production and consumption of natural gas will provide the much-needed momentum to cut Indonesia's reliance on oil and empower the incoming Widodo administration to tackle the challenges of reconfiguring its energy mix and establishing sustainable energy policies.

## Contents

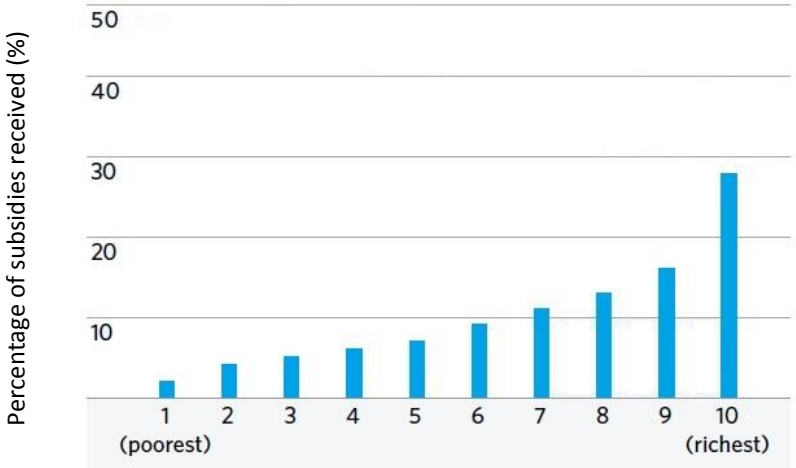


## Figures and Tables

## I. Introduction

Shortly after the nationalization of Dutch enterprises in 1957, the young nation of Indonesia under the Sukarno regime began subsidizing oil products used in the transportation, industrial, and power generation sectors in a bid to stimulate the economy and protect citizens from inflation (Beaton and Lontoh, 2010). But since Indonesia ceased to be a net exporter of oil in 2004, due to declining production, government expenditure on subsidizing oil products produced from imported crude oil has risen dramatically (MOF, 2014). Energy subsidies are expected to represent 18.66 per cent of Indonesia's total planned expenditure of 1,876.87 trillion IDR (US$160.47 billion) in 2014, based on the revised budget approved by parliament in June 2014 (Table 1 and MOF, 2014). Such a large sum could otherwise be deployed towards development goals such as: education, health care, and improvements in agricultural productivity. And while it can be argued that fuel subsidies do contribute, indirectly, to citizen welfare, Indonesia's energy subsidies are distributed on the basis of usage levels and therefore tend to benefit higher-income users who have greater usage and access to electricity (Agustina et al. 2012, Figure 1).[1]

**Figure 1: Distribution of subsidies by household income in 2010 (by deciles)**




Source: Agustina et al., 2012 and BPS, 2011

In the past, against a backdrop of healthy domestic oil reserves, the subsidization of oil products for citizens provided stabilizers for a newly independent Indonesia which was trying to find its balance. But now – almost 60 years after independence and with the decline of oil production together with escalating government expenditure on subsidies for imported oil products – it is time for the country to give up the false security that such subsidies offer and confidently pedal forward unaided towards sustainable economic growth, through energy policy reform. Indonesian policy makers are rightly now proposing to reconfigure the nation's energy policy, in order to cut expenditure on energy subsidies. The government plans to reduce reliance on oil in its energy mix by shifting to more cost-efficient fuels, such as natural gas and coal (SKK Migas 2013). But this is not without its challenges.

[1] 'Step by step they (subsidies) must be cut', said Widodo, only the second democratically elected president since the fall of the Suharto regime, when discussing plans for the future of the country's fuel subsidies in May 2014 (Moestafa and Maurung, 2014). 'Those who now receive fuel subsidies are the people who have', he said in the pre-election interview (2014).

The election of Widodo, a self-made furniture entrepreneur with no former links to the political elite or military background, is looked upon with mixed expectations. Cynical observers are hesitant to herald a new era of administrative reforms under a new leader who has limited support in parliament, while more optimistic supporters are hopeful that Widodo may bring positive changes to the nation's costly fuel subsidy programme, in order to benefit low-income Indonesians (Financial Times, 2014). Moreover, it is encouraging that in the run up to taking office in October 2014, Widodo has remained firm in his commitment to the implementation of gradual reforms to the country's costly fuel subsidy system (Bland, 2014).

This paper will establish that by changing its energy mix, Indonesia has a strong chance of being able to reform its energy pricing policy in order to ensure the cost efficient and sustainable usage of its natural gas resources. A stagnant oil-centric energy mix has hampered the fuel price subsidy reforms attempted by previous regimes. But now, with plans to adapt its energy mix to international fuel prices and its domestic production capabilities, Indonesia's shift away from dependency on oil to an alternative fuel such as natural gas offers the new administration a fresh opportunity to initiate positive change. In this analysis, reference to 'energy subsidies' will extend to subsidies on fuel prices in the domestic market and electricity tariffs.

This paper is divided into four parts. *Section 2* discusses the key reforms to Indonesia's energy subsidy system which have been attempted since 1998. These include: the 1998 fuel price hike following the Asian Financial Crisis (AFC) that precipitated the fall of the Suharto government, the Kerosene-to-LPG conversion programme of 2007, and the 2013 increase in electricity prices for high-volume home, business, and industrial users.

*Section 3* shows how natural gas could support the reconfiguration of the country's energy mix to cut dependency on oil. There are a number of factors that place Indonesia in an ideal position for initiating energy policy reform: the potential to divert expenditure on oil subsidies to investment in new energy infrastructure, the smaller number of existing subsidies for natural gas usage compared to those for oil products, the potential for higher domestic gas production, and recent government initiatives to increase natural gas usage. The government will, however, face challenges in this task such as: inadequate natural gas infrastructure, the high costs of sustaining and increasing natural gas production, difficulties associated with balancing domestic natural gas demand with exports, and the competition posed by coal as an alternative fuel. While these challenges are not insurmountable, the government will have to stay the course to ensure sustainable reforms are implemented.

The comparative analysis in *Section 4* of Thailand and Malaysia – two of Indonesia's neighbours similarly in the midst of reconfiguring their energy mix to meet growing domestic demand – illustrates the fact that Indonesia is in a relatively advantageous position. Increasing the usage of natural gas in Indonesia is likely to place less of a burden on government expenditure than in Malaysia, as Indonesians enjoy comparatively small subsidies on natural gas. And compared to Thailand, which holds limited indigenous natural gas supplies, Indonesia's potential for higher production from new discoveries and unconventional gas sources is a major advantage.

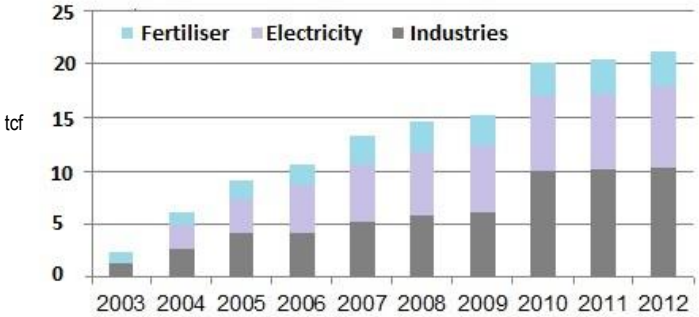
*Section 5* concludes by summarizing the main arguments and acknowledging that if the incoming Widodo administration is willing to take advantage of Indonesia's potential for transformation boldly, it will be able to make a positive and long-lasting change to its energy policies.

## II. Past success and failure in energy reforms

Indonesia was the world's largest LNG producer between 1977 and 2005. However, with declining natural gas production and new producers entering the international market Indonesia, with LNG exports of just 22.4 bcm in 2013, now ranks behind Qatar, Malaysia, and Australia (exports of 105.6 bcm, 33.8 bcm, and 30.2 bcm respectively) (BP, 2014).

Despite having produced and exported pipeline gas and LNG for what is now close to four decades, Indonesia's plans to increase domestic natural gas usage have only emerged in recent years, with the passing of the 2001 oil and gas law no. 22 (Nugroho, 2005). Domestic natural gas supplies currently fuel the country's power generation and industrial sectors, and are used as feedstock for petrochemical and fertilizer production, particularly in the western provinces (Figure 2, SKK Migas 2013, and IGA 2013).

**Figure 2: Indonesia's domestic gas utilization by sector (tcf)**

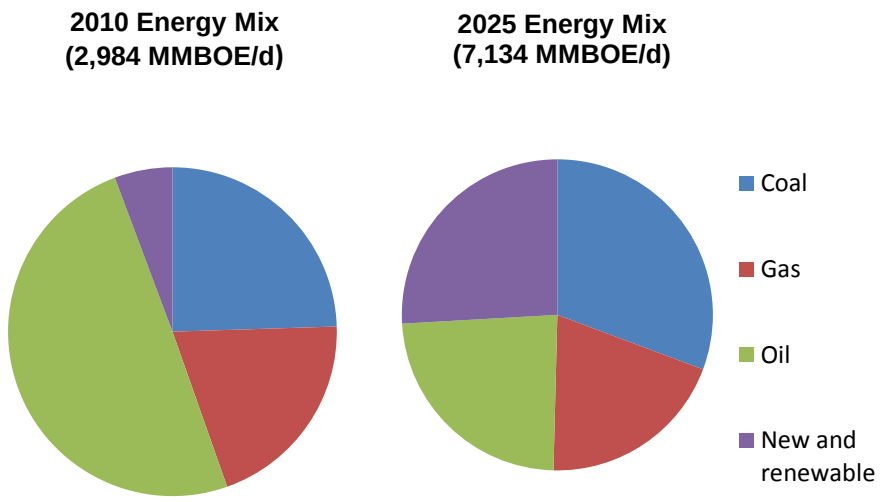



Source: SKK Migas 2013 and IGA 2013

Energy demand centres on Indonesia's most populous island of Java; this is expected to continue, with West Java expected to have the largest gas supply deficit of 30.87 mmcm/d by 2020 (MEMR, 2013). Natural gas reserves are connected to users by relatively sparse gas pipelines and transmission networks, as limited natural gas usage in the past meant that insufficient downstream infrastructure was built (Nugroho, 2005 and IEA, 2014). While the building of infrastructure offers long-term benefits, it is a costly and lengthy process that near-sighted government agencies, plagued by corruption, have in the past failed to invest in adequately (Beaton & Lontoh, 2010).

Spending on electricity increased from US$900 million in 2005 to US$3.4 billion in 2006 due to rising international crude prices and the high level of diesel consumption for power generation in Indonesia (IISD, 2012). Since then subsidies have been rising steadily, reaching 350.3 trillion IDR (US$29.8 billion) in the latest revised budget for 2014 (MOF, 2014 and Table 1). Going forward, the Indonesian government hopes to reduce its budget deficit by cutting expenditure on oil subsidies through a reconfiguration of its energy mix that will cut the oil component from 49.7 per cent to 23.7 per cent (SKK Migas, 2013). While the natural gas component is expected to shrink from 20.1 per cent in 2010 to 19.7 per cent in 2025, overall natural gas usage will increase by 134 per cent from 599.8 MMBOE/d in 2010 to reach 1405.4 MMBOE/d (Figure 3).

**Figure 3: Evolution of Indonesia's energy mix**




Source: SKK Migas, 2013

**Table 1: Central government expenditure and subsidies (trillion IDR)**

| | 2006 Audited | 2007 Audited | 2008 Audited | 2009 Audited | 2010 Audited | 2011 Audited | 2012 Audited | 2013 Revised | 2014 Revised |
|---|---|---|---|---|---|---|---|---|---|
| **Total expenditure** | 440 | 505 | 693 | 629 | 884 | 1,070 | 1,491 | 1,726 | 1,877 |
| **All subsidies** | 107 | 150 | 275 | 138 | 193 | 295 | 346 | 348 | 403 |
| **Energy subsidies** | 95 | 117 | 223 | 95 | 140 | 256 | 306.5 | 299.8 | 350.3 |
| **Fuel subsidies** | 64 | 84 | 139 | 45 | 82 | 165 | 212 | 200 | 246 |

Source: MOF, 2014

## 2.1 The 1998 fuel price hike following the Asian Financial Crisis (AFC)

The most notable fuel price hike in Indonesia's recent history occurred in 1998 in the wake of the Asian financial crisis. In the aftermath of the crisis and on the road to recovery, the Suharto government turned to the IMF for financial support. But the IMF's promise of a $43 billion rescue package came with a set of requirements, one of which was the cutting of fuel subsidies to reduce government expenditure and improve the country's fiscal deficit (IEA, 2014). Jakarta implemented these cuts in May 1998 in order to qualify for another $3 billion tranche of funding; gasoline prices consequently rose 70 per cent to 1,200 IDR/l, transport diesel rose 58 per cent to 600IDR/l, and industrial gasoil rose 39 per cent to 500 IDR/l (Argus, 1998). The riots that followed in response to the hikes contributed to the downfall of the long-standing Suharto regime.

Further fuel price hikes were implemented in October 2000 in a bid to qualify for another tranche of funding. This time, fuel prices increased by an average of 15 per cent – lower than the IMF's recommendation of 30 per cent. Earlier in the year, the government had planned for increases of up to 20 per cent, but in the end it backtracked to an average figure of 15 per cent and offered cash handouts to the poor (Argus, 2000).

In 2005, the government introduced the Unconditional Cash Transfer (UCT) programme to provide assistance to poor households when further subsidy cuts raised household fuel prices by over 125 per cent and gasoline, kerosene, and diesel fuel prices by 105 per cent (World Bank, 2012). These cash handouts, which were split into four instalments over a year, targeted households that enjoyed the fewest benefits under the former subsidy system. Over 19 million households (more than a third of households in Indonesia) received these cash transfers in 2005 (Beaton and Lontoh, 2010). This was the first time the government had turned to using cash handouts to assuage social grievances.

## 2.2 The Kerosene-to-LPG conversion programme of 2007

In 2007, the kerosene-to-LPG conversion programme encouraged the replacement of kerosene with LPG (which has the advantage of being both cleaner burning and cheaper) with hopes of reducing the burden of kerosene subsidy on the government. Under this scheme, the government supplied citizens with a start-up package of an LPG tank, stove, and accessories. LPG usage eventually overtook that of kerosene in 2010, bringing about savings of US$5.2 billion between 2007 and 2011, according to government estimates (Beaton and Lontoh, 2010).

## 2.3 Extended use of gas-based transport fuels

In 2007, the government initiated plans to widen the usage of gas-based transport fuels such as compressed natural gas (CNG) and liquid gas for vehicles (LGV) in the more populous Java–Bali region. Accumulated savings from these conversions reached IDR45.3 trillion (US$5.7 billion) between 2007 and April 2011 (IISD, 2012).

## 2.4 Effects of hikes in the international crude price

In response to hikes in the international crude price, the government cut fuel subsidies in May 2008; this resulted in a price hike of 22 per cent, 27 per cent, and 25 per cent for gasoline, kerosene, and diesel respectively. Despite the hikes being met with protests across the country from Indonesians already suffering from international food price hikes, it was necessary for the government to curb fuel subsidies as these were threatening to reach US$14 billion that year. The government, however, distributed monthly cash handouts of 10,000IDR to low-income families to help soften the blow of these hikes (Quiano, 2008).

In March 2012, in the first attempted fuel price increase in nearly four years, the Yudhoyono government announced plans to cut subsidies on 1 April, in response to international crude price hikes. But the planned increase in fuel prices (33 per cent for diesel and gasoline) was eventually scrapped due to public protests and parliamentary opposition (Bellman, 2012).

The government eventually raised gasoline prices by 44 per cent and diesel prices by 22 per cent, in June 2013. While protests initially erupted across the country, the government pressed on with the reforms, arguing that the increases were necessary to strengthen the rupiah and improve the trade balance by cutting oil imports and expenditure on subsidies. Low-income households also received cash handouts as a result of these hikes, which helped to soften the blow (Ho, 2013).

## 2.5 The 2013 increase in electricity prices for high-volume users

In addition to fuel-based subsidies, the electricity tariff system also subsidizes energy usage in the country. The electricity tariff system is set annually with different tariffs for industry, business, public services, and residential users. These subsidies represent the difference between the average cost of electricity for state-owned utility Perusahaan Listrik Negara (PLN) – consisting of fuel inputs, power plants, transmission, distribution, supply costs, and margin for the utility – and the average electricity tariff set by the government (IISD, 2012). In 2013, the Indonesian government successfully cut back electricity subsidies. Four groups were shortlisted for the removal of electricity subsidies: households with more than 6,600Va usage, businesses with 6,600–200,000Va usage, businesses with more than 200,000Va usage, and government buildings with 6,600–200,000Va. Poorer households with 450–900Va of usage were unaffected. The government phased in quarterly increases in tariffs of 4.3 per

cent up to October 2013 – reaching a total of 15 per cent in 2013 – when the subsidies were completely removed (Cahyafitri, 2014).

Plans were also made in 2013 for an increase in electricity tariffs for industrial users starting 1 May 2014, whereby tariffs would be increased by 38.9 per cent or 64.7 per cent depending on the scale of power consumption. This increase will be implemented gradually, with rises every two months until December 2014 (Global Business Guide, 2014).

## 2.6 Past energy reforms

Indonesia has seen both success and failure in implementing these reforms, a summary of which is set out in Table 2 below. The first major price reform dealt a large blow to the Suharto regime, in part due to the circumstances of the Asian financial crisis where citizens already facing economic turmoil were unwilling to accept further price increases. But in recent years, the government has managed to successfully implement reforms such as the kerosene-to-LPG programme and electricity tariff increments for businesses, industries, and wealthier users.

A common characteristic of successful energy reforms has been the implementation of targeted cash handouts, or UCTs, for the poor. The use of such payments stems from the growing recognition among policy makers of the fact that energy subsidies have not been particularly beneficial to Indonesia's poor. Starting with cash handouts to support households through subsidy cuts in 2005, through to the most recent 2013 electricity tariff reforms, the country's energy reforms are now slowly but surely starting to target those who Widodo views as the country's 'have-nots'.

The reforms of Indonesia's system of energy subsidies have undoubtedly been accompanied by political risk, but the country's unnecessary and unsustainable reliance on subsidies to fund its consumption of imported oil has only served to slow its development growth. During his election campaign Widodo pledged to gradually cut fuel subsidies, replace 90 per cent of diesel-fired power plants (with coal-fired, gas-fired, and geothermal generating plant) within three years, and reform or replace the corruption-plagued SKK Migas (Argus, 2014f).

**Table 2: Summary of Indonesia's major energy reforms**

| | |
|---|---|
| **1998** | First major fuel price hike, to meet IMF requirements for receiving funding following AFC. Resulted in violent riots and the fall of the Suharto regime. |
| **2000** | More fuel price hikes were implemented to qualify for another tranche of IMF funding. |
| **2005** | Unconditional Cash Transfer (Bantuan Langsung Tunai) programme introduced to provide support to low-income households. |
| **2007** | Kerosene-to-LPG conversion programme to encourage the replacement of kerosene with LPG (both cleaner burning and cheaper). |
| **2007** | Government starts widening the usage of gas-based transport fuels such as CNG and LGV in the more populous Java–Bali region. |
| **2008** | Government cut subsidies; this resulted in fuel price hikes averaging nearly 30%. Low-income families received monthly cash handouts. |
| **2012** | Plans to increase prices of subsidized products by 33% on 1 April 2012 were scrapped due to public protests and parliamentary opposition. |
| **2013** | Plans implemented to remove electricity subsidies for households with more than 6,600Va usage, businesses with 6,600–200,000Va usage, businesses with more than 200,000Va usage, and government buildings with 6,600–200,000Va. |
| **2014** | Starting 1 May 2014, tariffs for industrial users increased by 38.9% or 64.7% depending on the scale of power consumption. |

## III. How higher natural gas usage supports energy subsidy reform

Indonesia's plans to increase natural gas usage and reconfigure its energy mix in the next two decades offer a long-awaited opportunity to reform its failing energy subsidy system. This section will discuss how widening the usage of natural gas can reduce dependence on oil, hence allowing the government to cut expenditure on subsidizing costly oil imports. The rising costs of Indonesia's oil imports, its increasing expenditure on subsidies for the usage of oil products, the country's rising fuel demand, a growing need for cleaner-burning fuels, and the existence of over 3 tcm of proven gas reserves – all point to the importance of driving natural gas usage as a key part of the solution to Indonesia's fast growing energy deficit (IEA, 2014).

### 3.1 Why natural gas?

Indonesian politicians who support energy subsidies argue that subsidies contribute to economic growth through poverty reduction and increased security of supply. However, highly subsidized fuel prices also interfere with market mechanisms and divert government resources from investing in energy infrastructure – such as natural gas distribution networks and gas-fired power plants – that support natural gas usage and drive long-term growth and competitiveness (Agustina et al., 2012 and Braithwaite et al., 2012). The current system of subsidies, which is based on usage rate rather than on supplementing low income levels, means that wealthier urban citizens with a high rate of energy usage and access to electricity are the main beneficiaries. As of 2011, 66 million Indonesians (27 per cent of the population) did not have access to electricity (IEA, 2014).

Usage of natural gas enjoys fewer subsidies than that of oil products in Indonesia. And natural gas has been sold domestically to industrial users and power plants at a much smaller price differential (US$3–4/MMBtu or over 20 per cent lower than international prices) (SKK Migas, 2013) than has been the case for oil products,

Replacing the usage of highly subsidized oil products with natural gas has the potential to bring about savings in government expenditure; this was seen in the kerosene-to-LPG conversion programme and the 2007–2011 CNG and LGV for transportation programmes (Beaton and Lontoh, 2010 and Braithwaite et al. 2012). Politically, the maintenance of existing subsidies is also far more attractive to the Indonesian public than increasing oil product prices by cutting oil subsidies.

Fuel price hikes have always been politically unpopular with citizens, particularly in cities where demand for transportation fuel is higher. Reports of oil price hikes tend to be met with riots and have caused the government to slow down or retract policy changes, as was seen in the failed electricity price hike of 2012 (Bellman, 2012 and Ho, 2013). But the government's approach to communicating these price hikes has steadily improved in recent years, particularly with the introduction of cash handouts in 2005.

The smaller subsidies associated with natural gas could also mean that despite concerns of rising production and import costs (discussed later in this chapter) and even if demand increases, it is less likely that the government would need to make significant price adjustments to ensure the future economic feasibility of natural gas usage. Imported oil products require a far higher percentage of subsidization and this has already proven to be beyond the government's means (IISD, 2012).

In 2010, Indonesia's natural gas production and usage levels peaked to reach 82.0 bcm and 40.3 bcm respectively (BP, 2014). But production levels have since declined to reach 70.4 bcm in 2013, while usage fell in line to reach 38.4 bcm in the same year (BP, 2014). These figures suggest that natural gas demand can rally to absorb supplies if they are available. LNG exports declined to 22.4 bcm in 2013 from 24.8 bcm in 2012, due to a combination of reduced production and the government's plan to divert more natural gas to the domestic market by cutting back term contract commitments (BP, 2014).

Despite the current slow down in production and exports, more potential indigenous natural gas reserves are being discovered. Large new offshore projects, such as East Natuna and Gendalo-Gehem, are expected to drive output in the country after 2020, according to the IEA (2014). LNG liquefaction capacity in the country is also expected to strengthen to around 55 bcm by the 2020s (IEA, 2014). The IEA estimates that unconventional gas sources such as shale and coal bed methane are expected to contribute to production from the 2020s, with combined output from these sources reaching up to 20 bcm in 2035 (IEA, 2014).

Indonesia's overall electricity demand is expected to triple between 2011 and 2035, with average annual growth of 4.8 per cent, according to IEA forecasts (2014). Natural gas usage will see the biggest growth for industry users – such as the fertilizer and petrochemicals sectors – with the share of gas in the industry fuel mix increasing from 28 per cent in 2011 to an expected 47 per cent in 2035 (IEA, 2014, Table 4). While power generation is mostly fuelled by diesel, Indonesia has some power plants that were initially designed to run on natural gas but which are currently running on oil due to the lack of natural gas supply. It is therefore possible to switch back to natural gas if the supplies are available (IEA, 2014).

**Table 3: Primary energy demand in Indonesia by fuel (mtoe)**

| | 1990 | 2011 | 2020 | 2025 | 2035 | 2011–2035* |
|---|---|---|---|---|---|---|
| **Coal** | 4 | 31 | 60 | 78 | 115 | 5.5% |
| **Oil** | 33 | 73 | 84 | 87 | 95 | 1.1% |
| **Gas** | 16 | 35 | 46 | 53 | 71 | 3.0% |
| **Hydro** | 0.5 | 1.1 | 1.6 | 2.1 | 2.7 | 4.0% |
| **Bioenergy**** | 34 | 40 | 39 | 37 | 38 | –0.3% |
| **Other Renewables** | 2 | 16 | 21 | 25 | 37 | 3.5% |
| **Total** | 89 | 196 | 252 | 282 | 358 | 2.5% |

*Compound average annual growth rate.
** Includes traditional and modern biomass uses.
Source: IEA, 2014

Natural gas is therefore an ideal fit for Indonesia's future energy needs, based on current and potential availability of supplies and the presence of strong and growing demand.

The success of Indonesia's drive to increase natural gas usage will be determined by the availability of natural gas infrastructure in the form of import terminals and gas distribution networks to industrial users and power plants. State-owned utility PLN has also agreed to pay more for gas, to secure domestic gas supplies (Argus, 2011b).

The floating storage and regasification unit (FSRU), Satu Regas LNG import terminal, started up in 2013. This has up to 3.8 mmt/yr in processing capacity and 1.5 mmt/yr LNG contracted from the Bontang LNG plant to supply PLN's Muara Karang and Tanjung Priok power plants, with around 3mmt/yr of joint demand in West Java (Argus, 2013a).

Indonesia's second LNG receiving terminal, Lampung FSRU, is expected to commission in the third quarter of 2014, while another import terminal, East Central Java FSRU, is targeted to start up post 2014 (Argus, 2014e). The conversion of the 6.5 mmt/yr Arun LNG plant into an import and regasification terminal by 2015 will also increase the country's capacity for LNG imports and regasification (Argus, 2011c and GIIGNL, 2014). Two more FSRUs, a 3 mmt/yr central Java project operated by Pertamina and a 1.5 mmt/yr terminal at Cilegon in north-west Java run by the private-sector Indonesian firm Energi Dian Kemala, are also likely to come on stream over 2014–15 (IEA, 2013). GDF Suez also signed an agreement, in June 2014, with state-controlled Indonesian gas distributor Perusahaan Gas Negara (PGN) to study the feasibility of an onshore LNG import terminal. The potential terminal would be in northern Java, Indonesia's most densely populated island (Argus, 2014a).

FSRUs are ideal for Indonesia's plans to deliver small amounts of LNG to its domestic users. Not only are they cheaper to build, but they also allow importers to fast track supply networks as it takes around two to three years to construct a newbuild floating terminal compared to seven years for an onshore terminal (Oil and Gas Investments Bulletin, 2012).

## 3.2 Challenges of driving natural gas

### *A. Improving energy infrastructure*

In the short term, Indonesia's efforts to drive natural gas usage have to be carried out in parallel with improvements to its energy infrastructure. Diverting more natural gas production to the domestic market would not be possible without sufficient distribution pipelines to reach industrial users and increased gas-fired power generation to boost demand (Nugroho, 2004).

Natural gas infrastructure expansion by Pertamina and the former upstream regulator BPMigas has set plans in motion to cut oil usage. The potential savings from reduced oil subsidies could be deployed towards further infrastructure developments such as LNG import terminals and gas-fired power plants (Patel, 2013).

Natural gas volumes for the domestic market are increasingly being made available through the non-renewal of long-term LNG supply contracts. Domestic demand, however, has not yet entirely caught up with the increase in supply; as a result Pertamina has offered more LNG cargoes on the international spot market in 2013 and 2014 (Argus, 2013b).

Electricity price controls in Indonesia have also slowed the expansion of generating capacity, together with the grid extensions and upgrades that would allow the country to meet its electrification targets. PLN purchases electricity from IPPs using government subsidies that are determined annually. Moreover, without the assurance that PLN can continue to afford to purchase electricity from them through government subsidies in the long term, private initiatives to drive power generation growth in the country are dampened, as IPPs lack the confidence to invest in longer-term projects, the IEA suggests (IEA, 2014).

Reductions in LNG and pipeline gas exports will bring few benefits if distribution networks and centres of demand are unable to support government natural gas usage targets. The plans of both Indonesia's outgoing and incoming administrations to increase natural gas production and consumption in the coming years highlight the urgency of expanding energy infrastructure. Such an expansion is required to ensure that natural gas reserves located on the outer islands – away from the centres of demand in Java – will be able to reach consumers to support increased gas usage (Nugroho, 2005). In the near term, Indonesia's main challenge is to drive domestic and foreign investment in its energy infrastructure by reforming its energy subsidy system; government expenditure can thus be diverted towards funding much-needed energy infrastructure rather than providing subsidies (Braithwaite et al., 2012).

### *B. Sustaining production*

As more natural gas is diverted away from exports to fulfil domestic demand, the potential loss of revenue generation from exports in the long term has to be offset by higher domestic natural gas prices, in order to encourage new exploration and production (E&P) projects (Nugroho, 2004). If higher domestic demand calls for an increase in the allocation – currently 25 per cent under Indonesian law – of production to the less lucrative domestic market, it could affect the attractiveness of new projects to international banks, which offer financing on the basis of the expected price of gas produced (Mujiyanto and Tiess, 2013). Upstream projects will therefore struggle to secure financing if they are expected to supply the domestic market at low prices. The government must be mindful of the need to keep domestic natural gas prices at levels that maintain the profitability of both new production coming on stream and of LNG imports.

Across the world, the costs of upstream gas projects increase and are set to rise further – due to a combination of competition for skilled E&P workers, high equipment costs, and the need to access new gas reserves in more challenging geographical terrain – and Indonesia will no doubt also experience this trend (GIIGNL, 2014). Competition is also growing in the LNG export market: various US shale gas-to-LNG projects are to come on stream starting 2016, there are plans for increased production and exports by Russia and Australia, and a large number of potential East African gas and LNG projects are in the pipeline (GIIGNL, 2014). All of this suggests that Indonesia is unlikely to be able to rely entirely on higher export prices to balance out lower domestic revenue, as producers will also need to maintain export prices that are competitive on the international market.

### *C. Balancing natural gas demand and exports*

In order to keep production economically feasible, it will be important to find the right balance between export and domestic revenue to compensate for lower domestic prices. Increased natural gas usage will also mean diverting natural gas from the lucrative LNG and pipeline gas export markets to the domestic market (Nugroho, 2004).

LNG is the country's main form of natural gas export, alongside pipeline gas. Oil exports have been on the decline for the last decade and natural gas exports are an increasingly important component of the country's GDP (EIA, 2014b). The fuel's revenue generation ability, both internationally and domestically, will determine how successful the country can be in driving investment in energy infrastructure to support natural gas usage and in ensuring sustainable domestic consumption. Domestic gas demand is, however, expected to exceed the natural gas supplies allocated to the domestic market and as a result Indonesia will have to turn to the import market for additional supplies (Table 4 and MEMR, 2013).

**Table 4: Indonesia Gas Balance Projection for 2020 (mmcm/d)**

| | Aceh | South Sumatra | West Java | East Java | East Kalimantan | Papua | Masela |
|---|---|---|---|---|---|---|---|
| **Supply** | 0.906 | 27.33 | 30.39 | 6.68 | 44.77 | 29.34 | 16.99 |
| **Demand** | 4.276 | 46.24 | 61.25 | 30.61 | 21.63 | 29.62 | 0 |
| **Balance** | –3.37 | –18.2 | –30.87 | 23.93 | 23.14 | –0.283 | 16.99 |

Source: MEMR, 2013

An expected two-year delay in the expansion of production at the BP-operated Tangguh LNG plant will make more LNG imports possible in 2018. This expansion will add another 3.8 mmt/yr production train to the project – from which 40 per cent of production will go towards supplying the domestic market (Argus, 2013b). In a bid to secure LNG imports for this plant, Pertamina signed a contract in July 2014 to double its long-term LNG purchases from US firm Cheniere Energy's planned 13.5 mmt/yr Corpus Christi terminal in Texas to as much as 1.52 mmt/yr (Argus, 2014c).

### *D. King coal*

Keeping energy production costs low is a priority for any country, especially for a low-income developing country like Indonesia. As the world's largest coal producer, coal will remain a more attractive fuel than natural gas for Indonesia, as it is cheaper and more readily available. Consequently, coal will maintain a larger share of the energy mix and that share will continue to grow. It accounted for 24.7 per cent of the country's 2,894 MMBOE/d usage in 2010 and is projected to reach 30.7 per cent of 7,134 MMBOE/d for 2025 (Figure 3 and SKK Migas, 2013). Indonesia's natural gas consumption was only up 9 per cent in the last decade and natural gas accounted for 21 per cent of overall fuel usage in 2013 (BP, 2014).

## 3.3 Indonesia's natural gas future

Achieving a sustainable balancing point – at which the growing export revenue from natural gas drives domestic demand – is now increasingly possible for Indonesia but such an achievement is not without its challenges. The government needs to ensure that additional energy infrastructure is built to

sustain the country's plans to increase gas usage. Rising upstream costs and international LNG prices would mean that Indonesia needs to set sustainable prices for natural gas, to ensure that production and imports remain economically viable.

Indonesia has been making much-needed progress in its contract price renegotiations, ensuring that its exports are sold at current international prices. In July 2014, the Indonesian government secured a long-awaited upwards revision of long-term prices for Indonesian LNG exports to China. Indonesia agreed higher term prices for the 7.6 mmt/yr Tangguh LNG facility with China's state-owned CNOOC, and removed the oil ceiling price from the contract in July (Argus, 2014d). The successful negotiation of higher prices with CNOOC will also strengthen Indonesia's position in upcoming contract talks with the South Korean LNG buyers K Power and Posco (Argus, 2014d).

Contract prices for Indonesian LNG deliveries to China will rise by an estimated $5/MMBtu this year, assuming an average Japan Customs Cleared (JCC) price of $100/bl. The price formula for 2014 is 0.0650 × JCC + 1.5, followed by 0.090 × JCC + 1.3 for 2015, 0.1050 × JCC + 1.50 in 2016, and 0.110 × JCC + 2.3 in 2017 (BP Migas website). The previous CNOOC contract, agreed in 2002, was for 2.6 mmt/yr of LNG from Tangguh LNG at 5.25 per cent of JCC, plus a premium of $1.35/MMBtu, based on a JCC ceiling price set at $26/bl. The contract was renegotiated in 2006, when the JCC ceiling price was revised upwards to $38/bl. Renegotiations in 2010 and 2012 did not result in a price increase (SKK Migas, 2014a).

A number of supporting factors point to natural gas being the key to the successful reconfiguration of Indonesia's energy mix. By starting with cuts to government subsidies on oil production and oil-fired power generation, more funds can be diverted towards the building of energy infrastructure that supports higher natural gas usage. The country's smaller subsidies on natural gas compared with those on oil products potentially offers the government some leeway in implementing domestic natural gas prices that can sustain both production and import costs.

Overall, energy supply security is a priority for the Indonesian government and while increasing natural gas usage has its advantages, the debate will repeatedly return to energy prices. Electricity tariffs need to target the wealthier higher consumption groups and domestic natural gas prices need to be high enough to ensure the continued feasibility of future E&P projects (IISD, 2012). The need to import LNG will also require the government to ensure that domestic natural gas is sold at sustainable prices so as not to incur huge losses on these imports (IEA, 2014).

Alongside the growing momentum to divert more natural gas to the domestic market, Indonesia has to ensure that electricity and natural gas prices remain relatively close to international market levels, to avoid the costly mistakes that previous governments have made with fuel subsidies for oil products. Indonesia has made some headway in terms of increasing its domestic natural gas prices in recent years. PLN has indicated its willingness to pay prices on a par with the international market price for cargoes delivered to the country's new LNG terminals (Argus, 2011b). In 2012, SKK Migas increased Indonesia's average natural gas price by 28.76 per cent bringing it to US$10.59/MMBtu (Figure 4 and SKK Migas, 2013), as a result of price renegotiations with PLN and allocating more LNG volumes from Tangguh LNG to the domestic market.

The Indonesian government has made progress in its efforts to increase domestic gas supplies and this bodes well for the Widodo administration. In early October this year, SKK Migas announced the signing of five new domestic gas supply contracts valued at US$10.5 billion. The largest contract was signed between PLN and Tangguh LNG for a total of 400 LNG cargoes, to be delivered over a period of 19 years; this is the largest domestic gas supply contract signed to date. The four other, smaller, deals are: a 14,160 cubic metres per day supply contract secured by PLN for Tana Tidung in East Kalimantan, a five-year 0.34–1.416 mmcm/d contract for gas supplies to East Java, a 1.81 mmcm/d supply contract to for the Pacific Ammonia plant in East Kalimantan up to December 2019, and a 0.3 mmcm/d contract to supply the Mont Megang Muara Enim power plant in South Sumatra for 21 months (SKK Migas, 2014b).

Domestic gas supplies will increase to meet demand, but infrastructure expansion will be necessary to bring gas to domestic users, warned J Widjonarko, the acting head of SKK Migas. Natural gas supplies directed to the domestic market are expected to overtake exports this year according to SKK Migas, with an estimated 110.7 mmcm/d delivered to domestic users compared to 95.0 mmcm/d that will be exported (SKK Migas, 2014b).

**Figure 4: Indonesia gas lifting and prices (2012)**


Source: SKK Migas, 2013

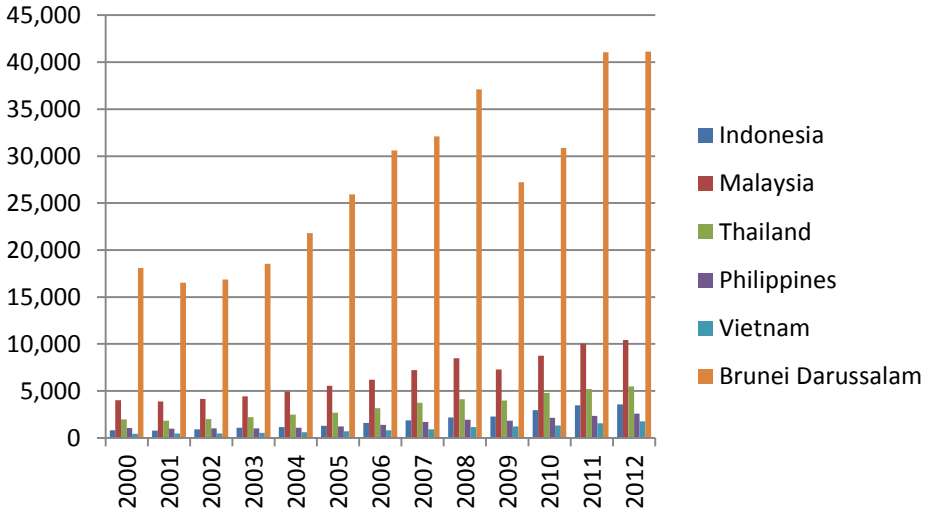
While natural gas production and exports appear to have slowed in the short term, Indonesia's is expected to have a lasting relationship with the fuel in the long term, with more potential reserves being discovered. The country's new and planned LNG import terminals will also support domestic natural gas usage, while the rise of new production plants will ensure supplies are available to sustain demand. Natural gas maintains an advantage over coal in terms of environmental performance, as its consumption can lower local pollution and carbon emissions, bringing with it overall long-term health benefits for Indonesians (IEA, 2014). And gas-fired power plants, despite burning a more expensive fuel, have the benefit of lower capital costs and shorter construction times compared to coal-fired power plants (IEA, 2014).

In short, increasing Indonesia's domestic natural gas usage can support the reconfiguration of the country's energy mix, as lower oil consumption and demand for oil imports translates into lower government spending on oil subsidies (Mujiyanto and Tiess, 2013). This will not only reduce the overall burden of this expenditure on the government's budget but will also allow more funds to be made available for building natural gas infrastructure. Improvements to the country's natural gas infrastructure will not only increase production levels but also boost demand capacity. The hope of freeing up government expenditure through the replacement of oil usage by that of natural gas and alternative fuels is, however, not without its challenges.

## IV. Natural gas reforms in Malaysia and Thailand

Malaysia and Thailand are more developed than Indonesia in terms of both GDP (Figure 5, World Bank, 2014) and electrification rates (Table 5), but the three countries share a common plan to increase overall natural gas demand to cope with growing domestic energy needs as their economies expand. Thailand and Malaysia are more reliant on natural gas than Indonesia; their governments therefore face slightly different issues in managing the challenge of increasing natural gas usage.

**Figure 5: ASEAN GDP per capita US$ (2000–12)**




Source: World Bank, 2014

**Table 5: Access to modern energy services in ASEAN 2011**

| | Population without electricity (m) | Electrification rate (%) | Urban electrification rate (%) | Rural electrification rate (%) |
|---|---|---|---|---|
| **Brunei** | 0 | 100 | 100 | 99 |
| **Cambodia** | 9 | 34 | 97 | 18 |
| **Indonesia** | 66 | 73 | 85 | 60 |
| **Laos** | 1 | 78 | 93 | 70 |
| **Malaysia** | 0 | 100 | 100 | 99 |
| **Myanmar** | 25 | 49 | 89 | 29 |
| **Philippines** | 28 | 70 | 89 | 52 |
| **Singapore** | 0 | 100 | 100 | 100 |
| **Thailand** | 1 | 99 | 100 | 99 |
| **Vietnam** | 4 | 96 | 100 | 94 |

Source: IEA, 2014

This section examines the main objectives of each country's energy policies, to emphasize how Indonesia's present energy scenario places it at a relative advantage in reconfiguring its energy mix and reforming its subsidy system. The discussion will begin by examining the overall energy landscape for the three countries, before moving on to sections analysing the energy policies of

Malaysia and Thailand. The discussion will then close by drawing comparisons between these countries' energy policies and those of Indonesia.

## 4.1 South-east Asia's three largest energy consumers

The energy polices of Malaysia, Thailand, and Indonesia are unique; they reflect country-specific demand patterns and resource availability. Indonesia is the largest energy user in south-east Asia, with 196 mtoe of demand in 2011, ahead of Thailand and Malaysia at 119mtoe and 74mtoe respectively (IEA, 2014). But all three share the common goals of energy security, affordability, and efficiency, which they hope to achieve by diversifying their energy mix and reducing reliance on oil (IEA, 2014).

Increasing usage of natural gas in Malaysia, Thailand, and Indonesia is part of an overall increase in south-east Asia, and has contributed to the emergence of LNG demand. Between 2011 and 2013, first Thailand, then Indonesia, and then Malaysia became LNG importers (IEA, 2014). Previously, Asian LNG importers – Japan, South Korea, China, Taiwan and India – accounted for most of the world's LNG demand (GIIGNL, 2011).

Thailand and Malaysia, like Indonesia, are looking to cut costly fuel subsidies that distract from investment, with the goal of greater long-term benefits such as improved energy infrastructure and efficiency. In keeping with most nations in south-east Asia, Indonesia, Malaysia, and Thailand rely on a system of blanket energy subsidies that apply to the entire nation. As already argued in relation to Indonesia, these subsidies are inefficient and should be replaced with targeted financial support for the poor (IISD, 2012). In 2012, fossil fuel subsidies amounted to $51 billion in south-east Asia, despite ongoing reform efforts by various nations (IEA, 2014).

Another disadvantage of subsidies at an international level is the prevalence of fuel smuggling in the region. Subsidized fuels from one country are resold in neighbouring countries where prices are higher. Indonesia, Malaysia, and Thailand are all suffering from this phenomenon. Not only does the country supplying the subsidized fuel products see a decline in legitimate sales, its government forgoes taxes and excise duties from the countries receiving the smuggled products. Illegitimate sales in countries receiving a large amount of smuggled fuel also translate into losses for the government due to unpaid tax revenues (IEA, 2014 and IISD 2012). The issue of fuel smuggling in south-east Asia shows that the negative effects of fuel subsidies are not constrained to a country's borders and can become a region-wide problem.

While there may be price or even supply concerns among south-east Asian nations when considering natural gas as an option, natural gas remains a more economical and accessible choice than oil products. Malaysia and Thailand, in comparison to Indonesia, have a smaller margin of growth potential for natural gas usage, as they have lower production levels and natural gas consumption has already placed some constraints on their government budgets. But their comparatively higher current penetration of gas usage also means that they have significant infrastructure available to support the preference of natural gas above oil products.

As is the case in Indonesia, overall natural gas demand in Malaysia and Thailand will increase, but the share of natural gas in each of these countries' energy mix will shrink as these countries drive their plans to expand into renewables and unconventional gas sources to ensure the sustainable growth of their economies. Natural gas in the meantime will remain an important choice of fuel as these governments attempt to cut their reliance on oil products.

## 4.2 Malaysia

Malaysia's initiatives to increase energy supplies and reconfigure its energy mix by shifting away from costly oil products bear closer resemblance to Indonesia's experience than Thailand's. As a large producer of oil and gas for many years, the government had for decades provided citizens with highly subsidized oil and gas products. But with energy needs rising in Malaysia its government now, like its Indonesian counterpart, faces the challenge of balancing export revenue generation with the need to supply domestic gas requirements at subsidized prices (IEA, 2014).

While Malaysia's oil products might not be as highly subsidized as Indonesia's, the former's subsidies for natural gas are more entrenched as domestic prices have been subjected to government price caps as a means of attracting foreign investment (MGA, 2013). As the main power generation fuel in Malaysia, demand for natural gas has increased alongside economic growth (Table 6 and Figure 5). Malaysia's natural gas consumption stood at 34.0 bcm in 2013, up from 27.2 bcm in 2003 (BP, 2014).

**Table 6: Primary energy demand in Malaysia by fuel (mtoe)**

| | 1990 | 2011 | 2020 | 2025 | 2035 | 2011–35* |
|---|---|---|---|---|---|---|
| **Coal** | 1 | 15 | 24 | 29 | 39 | 3.9% |
| **Oil** | 11 | 28 | 33 | 35 | 40 | 1.6% |
| **Gas** | 6 | 28 | 34 | 37 | 41 | 1.5% |
| **Hydro** | 0.3 | 0.7 | 1.6 | 1.9 | 2.9 | 6.4% |
| **Bioenergy**** | 1.8 | 2.2 | 2.8 | 3.2 | 4.4 | 3.0% |
| **Other Renewables** | 0.0 | 0.0 | 0.1 | 0.1 | 0.4 | 48.1% |
| **Total** | 21 | 74 | 96 | 106 | 128 | 2.3% |

* Compound average annual growth rate
** Includes traditional and modern biomass uses
Source: IEA, 2014

Domestic natural gas prices in Malaysia have historically been lower than export prices, and this in turn has dampened the revenues of state-owned oil and gas company Petronas (MGA, 2013). The cap on domestic natural gas prices has also meant that with international LNG prices rising on the back of stronger demand in recent years, Petronas has incurred significant loss of revenue by forgoing exports. Between 2008 and 2010, Petronas was estimated to have lost RM100 billion in potential LNG export revenues by supplying natural gas to the domestic market (MGA, 2013).

Increasing domestic demand for natural gas has also meant that despite being a long-time LNG and pipeline gas exporter, Malaysia started importing LNG from Qatar and Australia in 2013 (Argus, 2013c). The inclusion of costly imported LNG to counteract shortages faced by the industrial sector could translate into increased revenue losses for importer Petronas, due to domestic price controls (MGA, 2013). Action should be taken to raise domestic natural gas and electricity prices to reflect rising costs. There are, however, some encouraging developments. In December 2013, the Malaysian government approved electricity price hikes by state-owned utility TNB for the first time in over two years (Chong and Ramasamy, 2013).

In addition to reducing the pressure on state-owned companies, raising natural gas prices would also help drive investment in upstream production, as the promise of higher domestic prices improves the attractiveness of upstream projects to financial institutions and investors.

In the longer term, natural gas production in Malaysia is still expected to grow, but more natural gas supplies will likely be diverted to the domestic market. Malaysia's gas production is projected to rise to 71 bcm in 2020, before declining slightly to 65 bcm in 2035 due to depleting reserves (Table 7). Net natural gas exports are forecasted to increase to about 30 bcm by 2020, before declining to 17 bcm by 2035 due to rising domestic demand, according to IEA estimates (Table 8).

**Table 7: Gas production by country (bcm)**

| | 1990 | 2011 | 2020 | 2025 | 2030 | 2035 | 2011–35* |
|---|---|---|---|---|---|---|---|
| **Brunei** | 9 | 13 | 16 | 15 | 15 | 14 | 0.5% |
| **Indonesia** | 48 | 81 | 108 | 118 | 129 | 139 | 2.3% |
| **Malaysia** | 17 | 56 | 71 | 68 | 67 | 65 | 0.6% |
| **Philippines** | 0 | 4 | 5 | 5 | 4 | 4 | 0.2% |
| **Thailand** | 6 | 28 | 19 | 15 | 11 | 7 | –5.5% |
| **Vietnam** | 0 | 9 | 13 | 12 | 12 | 12 | 1.3% |
| **Rest of ASEAN** | 1 | 12 | 18 | 19 | 21 | 22 | 2.6% |
| **Total ASEAN** | 82 | 203 | 249 | 252 | 258 | 264 | 1.1% |
| **Share of the world** | 4.0% | 6.0% | 6.3% | 5.8% | 5.6% | 5.3% | n.a. |

* Compound average annual growth
Source: IEA, 2014

**Table 8: Fossil fuel net trade by country**

| | Oil bn b/d | | | Gas bcm | | | Coal Mtce | | |
|---|---|---|---|---|---|---|---|---|---|
| | **2012** | **2020** | **2035** | **2011** | **2020** | **2035** | **2011** | **2020** | **2035** |
| **Indonesia** | –0.6 | –1.0 | –1.4 | 42 | 56 | 58 | 251 | 363 | 385 |
| **Malaysia** | 0.1 | –0.1 | –0.4 | 22 | 30 | 17 | –22 | –33 | –54 |
| **Philippines** | –0.2 | –0.3 | –0.6 | 0 | –1 | –7 | –12 | –22 | –4 |
| **Thailand** | –0.6 | –0.9 | –1.5 | –11 | –30 | –57 | –26 | –40 | –67 |
| **Rest of ASEAN** | –0.5 | –0.8 | –1.1 | 9 | 13 | 4 | 29 | 20 | –6 |
| **All of ASEAN** | –1.9 | –3.1 | –5.1 | 62 | 68 | 14 | 220 | 288 | 217 |

*Positive values are exports and negative values are imports
Source: IEA, 2014

Despite the stress that natural gas usage has placed on Petronas, natural gas has its benefits as a cleaner burning fuel and, based on international prices, it remains a more economical option than oil products. Having to finance heavy subsidies on imported oil products concurrently with heavy subsidies on natural gas adds to the Malaysian government's financial burden. The government needs to encourage more efficient usage of its natural gas resources via the unpopular option of raising natural gas prices. These higher prices will also generate more funds for state-owned companies to drive infrastructure (such as import terminals and gas distribution networks) investment in the country, as discussed above for Indonesia.

Conversely, losses incurred by Petronas in their natural gas sales translate into fewer funds being available to finance expansion of the country's natural gas infrastructure (such as the provision of LNG import terminals and distribution networks that will connect these terminals to consumers). Other than supporting natural gas distribution infrastructure, Petronas also needs to drive its E&P efforts in the unconventional gas sector and this in turn will support future demand as existing gas reserves continue to be depleted.

## 4.3 Thailand

The historic availability of indigenous natural gas, together with a government policy to direct supplies to the domestic market, resulted in Thailand's natural gas consumption increasing rapidly in the 1990s and 2000s (IEA, 2014). Following the oil price hikes of 2004, the Thai government introduced initiatives to encourage the use of natural gas for transportation by subsidizing the conversion of taxi and car engines to CNG fuel use (Barta, 2008).

The country's strong environmental lobby groups have also driven the preference for cleaner-burning natural gas over coal in the past few decades (Barta, 2008). But as the country faces shrinking domestic supplies and rising international gas prices, the choice of natural gas has become more costly. Natural gas, however, maintains its price competitiveness over oil products and Thailand's overall natural gas usage will continue to increase.

Thailand's natural gas production has seen an improvement in recent years due to new output from the Cakerawala joint development gas project with Malaysia (MTJA, 2009). And more supplies could potentially come from the Overlapping Claims Area with Cambodia; this, however will hinge on the resolution of a long-standing dispute between the two countries over claims to the reserves (Chuwiruch et al., 2011).

The country's natural gas usage increased from 5 mtoe in 1990 to 31 mtoe in 2011 (Table 9), moving towards dominating its energy mix. However, due to declining indigenous production as reserves dwindled, its domestic gas supplies were inadequate and it became increasingly reliant on natural gas imports. Thailand started supplementing its pipeline imports with imports of LNG in 2011 (Argus, 2011a); in that year it imported 11 bcm of natural gas (Table 8) the majority of which were pipeline supplies from Myanmar (IEA, 2014).

Urbanization and expectations that its economy will nearly triple by 2035 are expected to see Thailand's primary energy demand rising by an overall 75 per cent in the 2011–35 period (Table 9), with natural gas demand rising from 42 bcm in 2012 to 65 bcm in 2035 (IEA, 2014). However, due to high international LNG prices and concerns over disruptions to pipeline gas supplies from Myanmar, natural gas demand growth in Thailand is expected to slow in the next two decades as the government tries to increase the share of coal and nuclear in the energy mix (EIA, 2013). While overall gas consumption will still increase, the share of natural gas in Thailand's energy mix will fall from the current 26.3 per cent in 2011 to 24.8 per cent by 2035 (Table 9 and IEA, 2014).

**Table 9: Primary energy demand in Thailand by fuel (mtoe)**

| | 1990 | 2011 | 2020 | 2025 | 2035 | 2011–35* |
|---|---|---|---|---|---|---|
| **Coal** | 4 | 18 | 28 | 34 | 47 | 4.0% |
| **Oil** | 18 | 47 | 57 | 63 | 74 | 1.9% |
| **Gas** | 5 | 31 | 38 | 42 | 51 | 2.1% |
| **Hydro** | 0.4 | 0.7 | 0.9 | 1.0 | 1.2 | 2.1% |
| **Bioenergy**** | 15 | 22 | 26 | 27 | 30 | 1.4% |
| **Other Renewables** | 0.0 | 0.0 | 0.2 | 0.5 | 0.9 | 21.2% |
| **Total** | 42 | 118 | 151 | 168 | 206 | 2.3% |

* Compound average annual growth rate
** Includes traditional and modern biomass uses
Source: IEA, 2014

In light of rising energy prices, the Thai government in September 2013 started to implement plans to regularly adjust electricity prices. Electricity tariffs in the country are now subject to revisions every four months. Going forward, the government also hopes to tap renewable energy as a means to cut energy costs (EIA, 2013).

## 4.4 Reflecting on Indonesia

Indonesia is better placed than Malaysia and Thailand in reconfiguring its energy mix due to two main factors: its subsidies for natural gas prices are smaller compared to those in Malaysia, and it has a much larger reserve of indigenous natural gas compared to Thailand.

Compared to Malaysia where domestic natural gas prices are currently around three times below export prices, natural gas in Indonesia is sold to industrial users and power plants at much smaller subsidies (IEA, 2014). While the Indonesian government has regularly faced opposition to price hikes for heavily subsidized oil products, going forward, it can avoid having to implement further significant domestic gas price hikes by limiting subsidies on natural gas now and ensuring that domestic prices maintain a conservative and sustainable differential with export prices. Policy improvements that have emerged from the experience of energy price reforms since the AFC, such as the distribution of cash handouts to low-income households, will no doubt stand the government in good stead for future reforms.

Indonesia's vast natural gas reserves and potential for revenue generation from exports also gives it a significant advantage over Thailand. While Indonesia is able to divert more natural gas to the domestic market to meet higher energy demand, Thailand's issues of declining indigenous supplies and expectations of rising natural gas import prices have meant that the Thai government has to look to alternative fuel sources such as nuclear and renewables.

However, Indonesia's ability to maintain sustainable domestic gas prices and its large indigenous gas reserves are still not sufficient to drive natural gas usage. Malaysia and Thailand have been able to increase domestic gas consumption significantly due to their relatively more developed energy infrastructure. Ultimately, Indonesia will require adequate infrastructure to support natural gas expansion. At the moment, its infrastructure is the least developed of the three countries (Table 5). Indonesia now faces the challenge of diverting government expenditure from costly oil-linked energy subsidies towards building infrastructure, to ensure that it does not squander its relatively advantageous starting position.

## V. Conclusion

Since its independence in 1945, Indonesia's current energy landscape offers the country its best opportunity yet to reconfigure its energy mix and establish sustainable energy policies. This paper has argued that Indonesia today has a strong chance of successfully reforming its energy subsidies through cost-efficient and sustainable deployment of its natural gas resources.

Oil subsidies have acted as stabilizers, helping to support Indonesia's development in its early years. Successive governments have kept them while trying to find their balance. But almost 60 years after achieving independence these subsidies are now holding back the pace of Indonesia's growth, as burgeoning expenditure on oil subsidies threatens to increase the country's budget deficit. It is time for Indonesia to cast off these stabilizers in order to accelerate growth and achieve greater manoeuvrability. The Widodo administration should take full advantage of its position as a maturing nation with the privilege of owning significant natural gas reserves. Reconfiguring its energy mix by increasing natural gas usage will free Indonesia from a dependence on heavily subsidized oil products that is not only costly to the government but hindering development growth.

Despite policy reform efforts in the last 16 years, government expenditure on oil subsidies has grown dramatically beyond control and is unsustainable (MOF, 2014). If oil is allowed to maintain a large share of Indonesia's energy mix as the country's energy demand grows, it will only translate into an increasingly costly dependence. The country will continue to be subjected to price volatility in the international market and the government will thus have little control over expenditure on energy subsidies. The only solution is to cut reliance on oil by turning to alternative fuels such as natural gas.

The experiences of past governments in implementing energy policy reforms show that initiating bold reform comes with significant political risk. However, Widodo has the advantage of building on Indonesians' increasing familiarity with fuel price adjustments over the last decade. The lessons of past fuel price reforms also highlight the importance of policies such as cash handouts for low-income families, to ensure that subsidies target Indonesia's 'have-nots' effectively.

Indonesia is in an advantageous position to initiate further policy reform:

- There is potential to divert oil subsidies to energy infrastructure;
- It has smaller existing subsidies on natural gas prices than other countries;
- It has potential for higher domestic gas production;
- It has seen recent government initiatives to drive natural gas usage.

These factors will all also help the government to tackle the challenges – such as inadequate infrastructure, high costs of sustaining and increasing production, balancing domestic demand with exports, and the competition posed by coal as an alternative fuel – of adopting natural gas.

Indonesia's advantages over Malaysia and Thailand – such as a less entrenched natural gas subsidy system and more available indigenous reserves – further underline the point that natural gas can play a powerful role in reconfiguring the country's energy mix and make a positive long-term change to its energy landscape. But these advantages will only enable these goals to be achieved if Indonesia does indeed develop adequate infrastructure to support higher natural gas consumption – otherwise these advantages will be squandered.

Widodo won his political mandate in no small part because of his bold stance on cutting energy subsidies during his presidential campaign. It will be interesting to see if the first 100 days of his administration, starting October 2014, produce a landmark decision on energy reform (Financial Times, 2014). While the 'people who have' (in other words, the recipients of the majority of the

country's oil subsides) are likely to react against higher energy prices, there is now a real chance that future reform will effectively address the needs of close to 30 per cent of the country that still, somewhat tragically, do not have access to electricity.

## Glossary

| | |
|---|---|
| **AFC** | 1998 Asian Financial Crisis |
| **bcm** | billion cubic metres |
| **BP Migas** | Indonesia's upstream oil and gas regulator 2001–12 |
| CNG | compressed natural gas |
| **EIA** | Energy Information Administration, USA |
| **Energy subsidies** | Fuel and electricity subsidies |
| **E&P** | Exploration and Production |
| **FSRUs** | Floating Storage and Regasification Units |
| **IEA** | International Energy Agency |
| **IDR** | Indonesian Rupiah |
| **IDR/l** | Indonesian Rupiah per litre |
| **IPPs** | Independent Power Producers (privately owned) |
| **IISD** | International Institute for Sustainable Development |
| **Kerosene** | Fuel used mainly for household cooking and lighting |
| **LGV** | Liquid gas for vehicles |
| **LNG** | Liquefied Natural Gas |
| **LPG** | Liquefied Petroleum Gas |
| **MMBtu** | Million British Thermal Units |
| **MMBOE/d** | Million barrels of oil equivalent per day |
| **mmcm** | Million cubic metres |
| **mcf/d** | Million cubic feet per day |
| **mtoe** | Million tonnes of oil equivalent |
| **mmt** | Million metric tonnes |
| **MOF** | Ministry of Finance, Indonesia |
| **Pertamina** | Indonesia's state-owned oil and gas firm |
| **Petronas** | Malaysia's state-owned oil and gas firm |
| **PLN** | Indonesia's state-owned utility, Perusahaan Listrik Negara |
| **PGN** | Indonesia's state-owned gas distributor, Perusahaan Gas Negara |

| | |
|---|---|
| **SKK Migas** | Indonesia's upstream oil and gas regulator 2012 – present |
| **tcf** | trillion cubic feet |
| **tcm** | trillion cubic metres |
| **UCT** | Unconditional Cash Transfer |
| **Va** | Volts ampere, measurement of power for electricity |

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