



# Emerging among giants

**The energy and commodity opportunity  
as ASEAN turns 50**

September 2017

## **ASEAN up next in 'flying geese' formation**

Economic growth and demographic advantages will underpin region's ascent

## **50th Anniversary**

ASEAN celebrates half-century but where to from here?

## **Lighting up the region**

Power Grid plan underway but cooperation and investment needed

## **Commodities outlook**

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This report explores the opportunities and challenges presented by ASEAN's developing economies over the next decade, and outlines how S&P Global Platts can help you achieve your growth ambitions.

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S&P Global Platts



Mohd Ramthan Hussain  
Senior Editor, LPG (Asia Pacific  
and Middle East)  
S&P Global Platts



Mriganka Jaipuriyar  
Associate Editorial Director,  
Asia & Middle East  
S&P Global Platts

**Contributors**

Mia Corazon Aureus, Vincent Conti, Martin Daniel, Marc Howson, Deepak Kannan, Andre Lambine, Ross McCracken, Mark Mozur, Samar Niazi, Pradeep Rajan, Vishrut Rana, Manjot Singh, Prema Viswanathan, Eshwar Yennigalla, Mok YuenCheng and Surabhi Sahu

With analysis and forecasts from across the S&P Global group.

**Design and Production**

Martina Klančičar

**Content Project Manager**

Carrie Bharucha

**Senior Market Engagement Specialist, ASEAN**

Jarek Młodziejewski, jarekm@spglobal.com

**S&P Global Platts**

20 Canada Square, 9th Floor  
London, E14 5LH, UK

**President**

Martin Fraenkel

**Chief Financial Officer**

Hywel Thomas

**Chief Operating Officer**

Sue Avinir

**Global Head of News, Metals, Agriculture & Head of Asia Content**

Sarah Cottle

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# Foreword



**Ramon M Lopez**

*Trade and Industry Secretary of the Philippines, and Chairman of ASEAN*

With the heightened interest in ASEAN today, *Emerging Among Giants - The Energy and Commodity Opportunity as ASEAN turns 50*, serves as a valuable resource. The report provides information and analysis on the key industry sectors of ASEAN, a huge market of 630 million people.

The report comes at an opportune time as ASEAN's strong economic growth is expected to drive the energy and commodities sectors in the region. This will be driven by high manufacturing output, strong consumer demand, and steady population growth.

Meanwhile, regional integration initiatives through the ASEAN Economic Community (AEC), and the ongoing negotiations on the Regional Comprehensive Economic Partnership (RCEP) with Australia, China, India, Japan, South Korea and New Zealand, are also expected to boost regional output, and consequently demand in the energy and commodities sectors.

As the world's third-largest market in the world after China and India, ASEAN's large population base will drive strong demand for goods and services.

According to the World Bank, household final consumption from selected ASEAN member states grew at an annual average ranging from 3.3% to 7.4% over 2000-2015. Consumption will be propelled by low unemployment rates, growth in disposable income, lower commodity prices, and macroeconomic stimulus in some economies, based on the International Monetary Fund's 2016 Regional Economic Outlook.

The Philippines government's push to significantly increase infrastructure spending through its 'Build, Build, Build' project is expected to increase demand in the energy sector by a total of 43,000 MW from 2016 to 2040. To further encourage the development of the country's energy sector, and to meet its growing demands, qualified power generation projects will be granted fiscal incentives under the 2017 Investment Priorities Plan.

Indeed, there is a favorable landscape for the energy and commodities markets in the Southeast Asian region. This report will definitely contribute to the decision-making processes of policymakers, businesses and investors, and industry players in fueling growth in ASEAN and beyond.





# Introduction



**Sarah Cottle**

*Global Head of News, Metals, Agriculture  
& Head of Asia Content  
S&P Global Platts*

Watch Sarah Cottle discuss ASEAN  
as it reaches 50 years



Celebrating its 50th anniversary this year, the Association of Southeast Asian Nations (ASEAN) is growing in importance. It has developed substantial political and economic architecture, allowing it to emerge as a player on the global stage and act as both a beneficiary and counterpoint to growing Chinese influence in the region.

ASEAN is politically, culturally and economically diverse, encompassing a population of close to 630 million, spanning the regional economic powerhouse of Singapore through to emerging nations Laos and Myanmar. It includes countries with mature oil and gas industries, major, long-established LNG exporters, first generation biofuels producers and the world's largest exporter of coal, Indonesia.

Moreover, ASEAN is increasingly a dynamic regional economy in its own right. Managing its diversity through common political and economic institutions, including the ASEAN Free Trade Agreement, ASEAN's developing economies present a growing range of investment opportunities over the next decade. Its potential should not be overlooked.

ASEAN enjoys a number of significant advantages:

- First, geographical proximity to the markets and supply chains of larger Asian economies – including China.
- Second, in Singapore, it has a highly-developed financial market center.
- Third, it has a rich diversity of natural resources both conventional and unconventional.
- And, fourth, it has highly favorable demographics on its side.

The region's combined population is projected to reach around 680 million within three years. In contrast to China, the number of participants in the workforce – particularly in Indonesia, Vietnam and the Philippines – is set to grow significantly over coming decades.

Manufacturing costs in Vietnam are estimated to be roughly half those of China. Countries further back on the development path, such as Laos and Myanmar, will offer an even lower cost base as they build up their manufacturing capabilities.

The 'Big-6' ASEAN countries – Singapore, Thailand, Malaysia, Vietnam, the Philippines and Indonesia – averaged 5% GDP growth over the past five years, easily outpacing major Asia-Pacific economies Japan, South Korea and Australia. By comparison, Latin America's eight largest economies grew just 1% over the same period.

Educated, dynamic, and increasingly well-travelled, a rising ASEAN middle-class will demand goods and services of a similar quality to



peers in other countries, creating major opportunities for domestic and international companies.

However, ASEAN needs investment. The Asian Development Bank estimates the bloc will require \$60 billion annually to develop new road, rail, ports, power and water.

ASEAN struggles to speak with a single voice to the international investment community. Foreign direct investment shrank 8% to \$120 billion in 2015 from \$130 billion the year before, as a lack of integration and cross-border M&A activity put off financiers. In contrast, intra-ASEAN investment rose slightly, comprising 18.4% of regional investment flows, up from 17.0% in 2014.

Foreign investors can be deterred by concerns around resource nationalism. The implementation and then sudden reversal of export bans, for example, makes for an uncertain and unpredictable investment environment. Potential investors also need to navigate sometimes confusing laws around foreign ownership and environmental obligations. Policy consistency and clarity are integral to attracting investors, as are transparent and multilateral pricing mechanisms for energy and commodities.

In a volatile commodity pricing environment, ASEAN countries and companies cannot be complacent about attracting investment. Yet the ASEAN 'story' remains extremely positive and dynamic. It is one with deep roots and demographic impetus, which, if its member nations work together, promises a rich harvest.









# Executive summary

The Association of Southeast Asian Nations (ASEAN) is set to become the world's fourth largest regional economy by the middle of this century. A young population and rapidly expanding workforce will attract industry and drive growth in the region, creating a vast new middle-class along the way.

This will generate demand for housing and infrastructure, for cars and appliances, and for other goods and services. Energy will be required to underpin this growth, as will steel and other commodities. ASEAN is entering an exciting new era, full of opportunities as the region expands its global economic footprint and influence.

But it is not without its challenges. This report explores and discusses some of the key issues and themes applying to ASEAN in the energy and resources space, drawing upon forecasts and market intelligence from across the S&P Global group.

## Key findings

### Growing demand hub

The region's oil imports are forecast to rise to 3.53 million barrels/day by 2025, up from 1.96 million b/d in 2015. The world's top crude oil suppliers are investing in refinery projects in a bid to capture greater value downstream in ASEAN markets.

Even with a stronger push into renewable energy, coal will account for more than a quarter of ASEAN's energy mix by 2020 and overtake oil to become the major fossil fuel by 2035.

Of particular note is that LNG demand is expected to treble to 30 million mt/year by 2022. ASEAN will be both a major importer and exporter of the fuel, with the potential to develop a major regional trading hub.

### 'Lighting up' the region

ASEAN's per capita electricity consumption is around half the world average, and although it varies enormously between members, the average electrification rate is just under 80%, leaving millions of people literally in the dark. The ASEAN Power Grid (APG) initiative was established to support the region's growing power demand – forecast to expand by 5–6% over the next five years – but progress has been relatively slow.

A lack of mutual confidence between member states, and concern that energy sector subsidies represent unfair competition, have held back transnational market integration. This needs to improve to optimize the potential of the APG, and to support the region's economic development.

However, if ASEAN is to meet its target of sourcing 23% of its energy from renewables by 2025, it will need to attract billions of dollars in investment to build about 80 GW of new hydro capacity and more than 40 GW of new solar, in addition to other energy technology investments. The falling unit cost and small project size of solar in particular represents a major potential opportunity for investors.

### Pricing and policy transparency

Prospective financiers will need greater clarity and transparency around electricity and energy pricing before committing funds. Subsidized prices in domestic, regulated markets are a deterrent to new operations, technologies and capacity expansions.

Investors also want to see consistency around government policy, and are concerned when policies are suddenly reversed. Sovereign risk is a key factor when making investment decisions and financiers need reassurance that their interests will not be compromised in the years ahead.

### China represents both opportunity and risk

Tensions in the South China Sea, where ASEAN and Chinese maritime borders overlap and lack legal definition, pose potential risks to shipping and global trade routes, to future exploration for energy resources, and, at worst, regional conflict. Under its One Belt, One Road strategy, China is set to wield even greater influence in the region.

However, ASEAN nations could benefit from Chinese help to develop new infrastructure, such as much-needed ports. As China matures into a domestic-consumption, rather than export-driven economy, ASEAN is well placed to attract manufacturing investment, playing a key role within wider Asian supply chains and as a major exporter of manufactured goods to world markets.

# ASEAN energy and commodity outlook

**Oil demand** is set to rise by approximately 1.2 million barrels/day in 2025 from 2015 levels. The region's **LNG** demand will reach 30 million mt/year by 2022, three times the level of 2016, outstripping production growth and shrinking net exports to 25 million mt. **Coal** will account for 26.3% of the energy mix by 2020 before rising to 33% by 2035. **Steel** consumption in ASEAN will hit at least 90 million mt by 2018-2019. **Electricity** demand will grow by 38% by 2025 to 1.42 million GWh, while the region's electricity supply will rise by 35% by 2025 to 4.86 million GWh.

## Vietnam

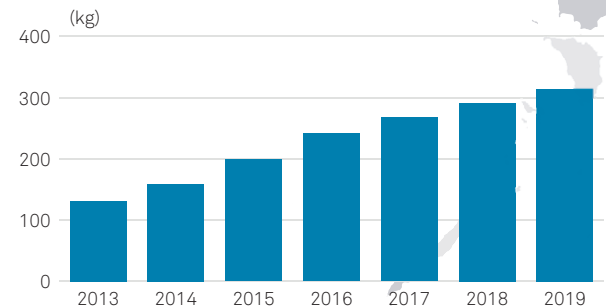
Steel consumption to double to

**36**

million mt by 2025.



**VIETNAM'S STEEL CONSUMPTION PER CAPITA**



## Thailand

Biodiesel production to rise to

**14**

million l/year by 2036



## Singapore



LNG demand to grow to

**4.6**

million mt by 2022

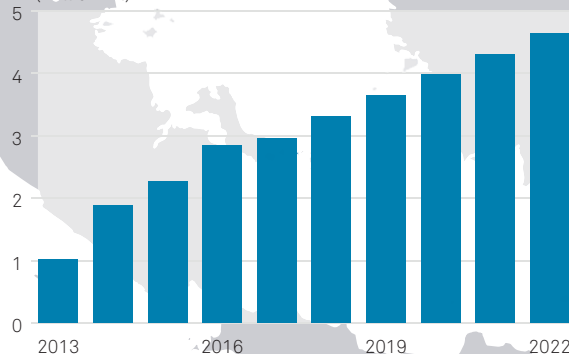
Capacity at SLNG Jurong Island terminal to reach

**11**



million mt/year by the end of 2017

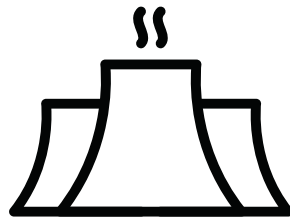
**SINGAPORE'S LNG DEMAND**  
(million mt)



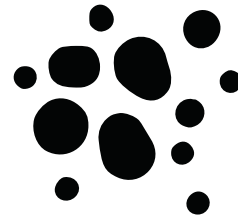
Sources: Platts, PIRA Energy, SEASI, DOE, Indonesian Ministry of Energy and Mineral Resources



# The Philippines



Coal-for-power generation demand to rise by **45%**

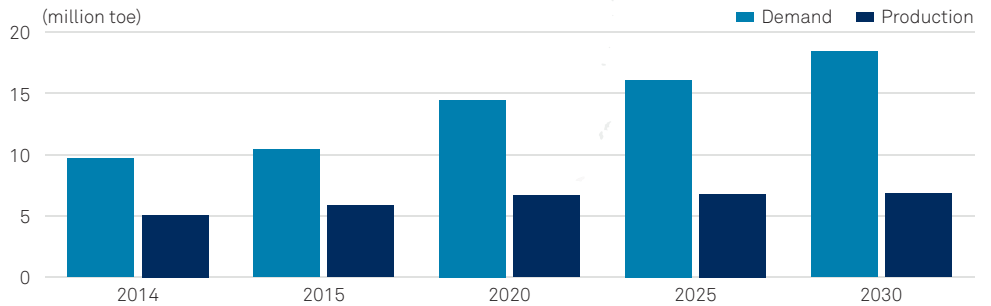


Thermal coal  
Demand **20** million mt  
Supply **9** million mt

Leaving imports to bridge the gap



## PHILIPPINES' COAL DEMAND AND PRODUCTION OUTLOOK



# Indonesia

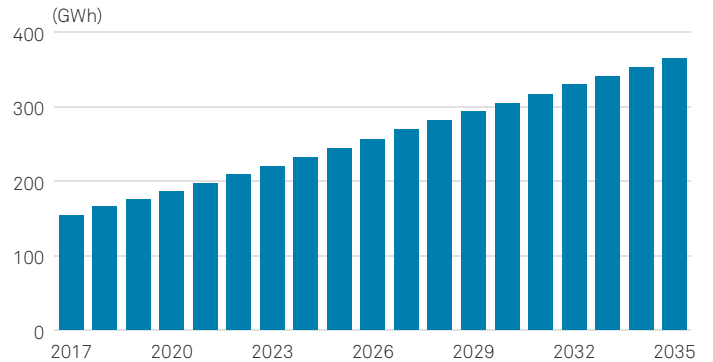


Coal demand to increase to **240** million mt in 2019

Coal production to decline to **400** million mt in 2019



## INDONESIA'S COAL POWERED ELECTRICITY DEMAND



# Malaysia



Oil production fell to **650,000** b/d since 2010



Most new deepwater projects brought online over the past

**10 years**

Estimated liquids reserves:

**3.6 billion** barrels



# ASEAN's inevitable rise

Taking advantage of lower labor costs, favorable demographics and a growing consumer base, Southeast Asia is next up in the 'flying geese' formation of Asian economies. But significant investment will be needed for the region to achieve its potential and diversifying sources of foreign capital will be a key objective.



**Paul Gruenwald**  
Chief Economist, Asia-Pacific  
S&P Global Ratings

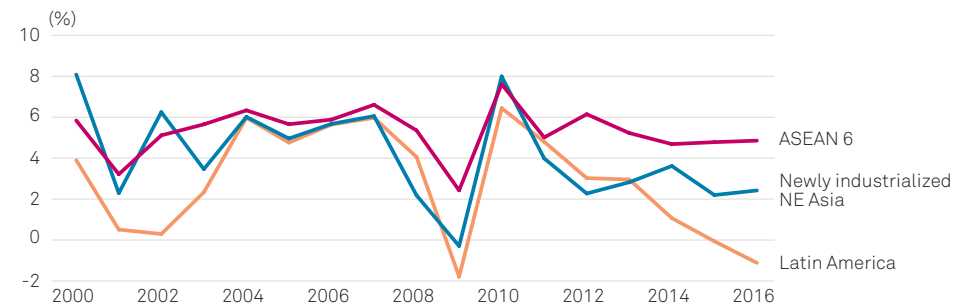
It has been nearly a decade since the Global Financial Crisis, and yet the world economy does not appear to have fully shaken off the lethargy that followed it. Despite the advanced countries showing some signs of improvement, US GDP growth has yet to break through the 2.5% range, and the Eurozone is only now beginning to show signs of life. Meanwhile, debt accumulation in China has necessitated a growth moderation there that further dampens global demand growth. Besides a spurt in 2010-2011, real growth of global trade in goods and services has fallen to an average of 3.3% since 2012, compared to 8.4% in the five years preceding the GFC.

The Southeast Asian economies have not been insulated from the impacts of

these developments. And yet these economies appear to have found a fairly smooth way forward. Besides lasting lessons in economic and financial policies from their own crisis in 1997, these economies are benefiting from longer term trends that are set to push the region forward as one of the main sources of global growth. Already, the six largest economies in ASEAN (Indonesia, Malaysia, Singapore, the Philippines, Vietnam and Thailand) have averaged 5% GDP growth over the past five years compared to around 1% growth for the top eight economies in Latin America.

The global economy will continue to have its booms and busts but demographics, geography, and investment momentum are all working under the radar for the

## SELECTED EMERGING MARKETS' GDP GROWTH



Source: Oxford Economics, S&P Global Ratings

region, and will continue to do so for the foreseeable future. This will have strong implications for demand, not only for consumer and capital goods, but also for commodities moving forward.

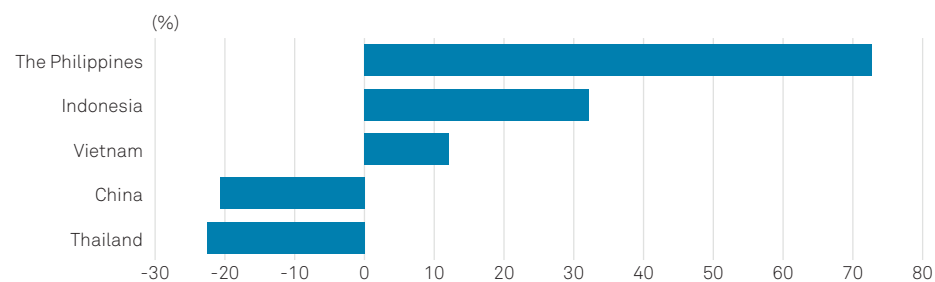
## ASEAN is up next in the flying geese formation

In the 1960s, Japanese economist Kaname Akamatsu suggested that the general pattern of development in East Asia resembled 'flying geese'. Japan industrialized first, beginning with lower-cost manufacturing before gradually moving up the value chain. As Japan's costs of production rose, the Tiger economies (Hong Kong, Singapore, South Korea and Taiwan) took over the mantle and began producing the lower end goods that Japan used to make. As the Tigers themselves developed, unit labor costs there increased, moving those countries up the value chain as China took over the lower end.

Now China's wages are rising as the economy advances to higher value-added products. Given the size and scope of China's manufacturing, its move up the value chain will benefit emerging markets globally. But the Southeast Asian region has some undeniable advantages, most notably its geographic proximity and existing connections to the supply chains of Japan, the Northeast Asian Tigers, and China. The strength of these ties is bolstered by the ASEAN+3 Cooperation (ASEAN, China, Japan and South Korea), which will help lower transport and trade costs within these supply chains.

But the region's cost advantages go beyond geography. Demographics in the ASEAN region are very favorable. While the World Bank projects the proportion of working age people in China will fall from three quarters

## WORKING AGE POPULATION GROWTH: 2010 - 2050



Source: World Bank, S&P Global Ratings

currently to less than 60% by 2050, the ASEAN 6 will only see a slight drop from 63% to 61% (Malaysia was excluded due to lack of projected data). This is due to young and growing populations, rather than slower aging relative to China. In fact, China's absolute number of working age people is projected to drop by 20% from 2010 to 2050, compared to 27% growth for the ASEAN 6 over the same period. The demographics are particularly favorable for Indonesia and the Philippines, where the working age populations are set to grow by 30% and 70% respectively over the next three decades. Vietnam's labor force is also projected to rise by 12% over the same period.

A large and rapidly growing working age population will allow Southeast Asia to maintain relatively low unit labor costs for decades to come, adding to the geographical advantage of being on China's doorstep.

Granted, not all ASEAN economies will see young and increasing populations. Singapore is already aging, and Thailand will follow suit after this decade. But these are economies that have had their growth spurts earlier and currently have higher per capita incomes than the aforementioned three. Their higher level of development allows them to push up higher on the value chain, and they have other natural advantages. Singapore is

the leader in finance and services, Malaysia is the only net energy exporter in the region, and Thailand has close economic ties with Japan. It is also closer to China geographically than Indonesia and the Philippines.

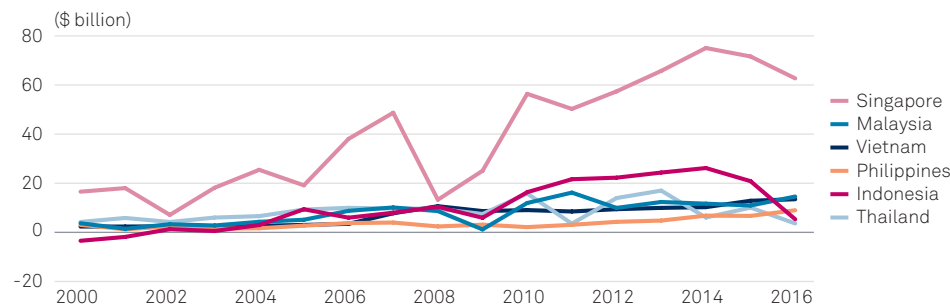
Youthful populations and rising incomes benefit an economy through relative unit labor costs. They also unleash the purchasing power of consumers, which becomes a crucial source of economic activity in times of sluggish global trade. Already the whole ASEAN region has been benefiting from this engine, which has allowed it to post enviable rates of growth over the past half decade.

## Unleashing the investment engine

ASEAN's beneficial demographics and location have not gone unnoticed in the global investor community. S&P Global Economics has previously highlighted significant investment from South Korean and Japanese companies into Vietnamese assembly plants for electronics, such as mobile phones. But this trend has not been limited to Vietnam, nor to the electronics industry. Inward foreign direct investment into the ASEAN 6 went from an average of \$39 billion per annum over 2000-2009 to an average of \$114 billion per annum since. Moreover, strong consumer demand across the region,



## INWARD FOREIGN DIRECT INVESTMENT



Source: Oxford Economics, S&P Global Ratings

boosted by the launch of the ASEAN Economic Community, will likely diversify the set of investors from traditional advanced economies (including Japan, South Korea and Singapore), to more intra-ASEAN capital flows.

FDI into new production, logistics and business processing facilities in the region is also being complemented by strong efforts to address infrastructure shortfalls. Indonesia, the Philippines, Vietnam and Malaysia have all rolled out infrastructure programs that increase connectivity, not only domestically but also across borders. China's One Belt, One Road initiative is also set to boost connectivity in the ASEAN 6, and in rapidly growing frontier markets, such as those in the Mekong region.

Further, FDI stimulates domestic investment and economic activity, resulting in new malls, residential areas, cell towers, offices and other businesses.

### The financing gap

Despite the bright long-term prospects, the challenge in the region has traditionally been financing, given that some economies (particularly at lower levels of development) run deficits or relatively small surpluses on their fiscal and current account balances. Savings

are typically not enough to cover the investment needs. This is why foreign investment has so far played a key role in filling the financing gap, and the region's policy makers have been very sensitive to changes in the strength and direction of capital flows.

In the absence of larger domestic savings to fully cover current consumption and investment needs, one key strategic objective is to diversify sources of foreign capital. Here, AEC negotiations and implementation are key, particularly regarding the opening up of domestic banking and financial markets to regional players. Though the specifics will take a while to develop and the road is fraught with obstacles, this is a long term positive for the ASEAN region, as surplus funds in one economy would more easily be able to find productive uses in deficit countries.

Notwithstanding the challenges ahead, the advantages of the ASEAN region have made it a non-negligible source of demand for consumption goods, machinery and equipment, commodities and construction materials, and high tech components for manufacturing. With a combined GDP (in purchasing power terms) that now nearly matches India's, and robust rates of growth, this demand is set to increase in importance for the global markets over the coming decades.







ASEAN's inevitable rise



# Electricity: striking the right power balance

To support its positive economic growth trajectory, ASEAN will need to make some important strategic decisions around its electricity generation future. Government policy must consider the most effective and sustainable market structure, power generation mix and funding sources.



**Jebsen Seo**

Senior Consultant, Platts Analytics  
S&P Global Platts

Watch Dr. Sanjayan Velautham of the ASEAN Centre for Energy discuss energy security in the region



Electricity is a matter of national interest to all countries, regardless of their stage of social and economic development. Governments need to achieve supply security before moving to secondary targets, such as lowering the cost of electricity, reducing energy intensity or minimizing carbon emissions – all of which are normally related to efficiencies and the social aspects of power generation.

Balancing power generation with consumption is therefore imperative, as either a shortage or an oversupply would cause problems.

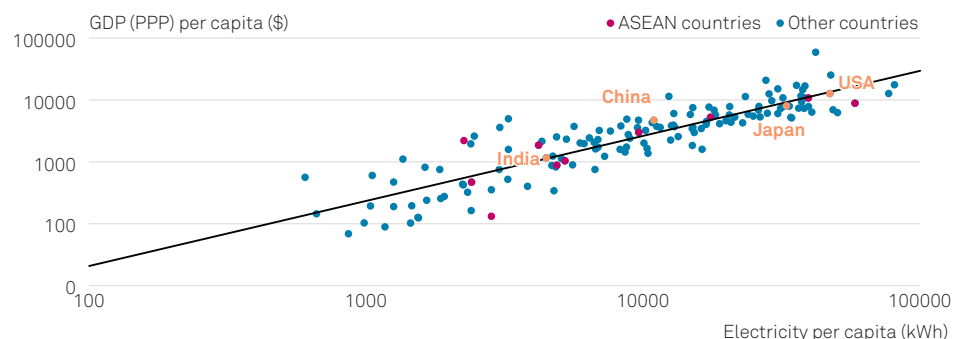
In many respects, given the ASEAN region’s positive economic and demographic growth trajectory,

achieving this generation-consumption balance will be a particularly tough challenge. Many countries will likely depend on foreign direct investment to help fund new electricity generation units. Investment over the longer-term will need to be sustainable to ensure power generation continues to support a country’s rate of development.

## Economic targets

Over the next five years, ASEAN GDP growth is forecast to stay at around 4.7%, while the region’s population growth will slow slightly from an annual rate of almost 1% over 2011-2016, according to S&P Global Market Intelligence.

## 2017 GDP vs ELECTRICITY GENERATION



Source: S&P Global Platts Analytics, S&P Global Market Intelligence



As population growth slows, GDP per capita is expected to rise, as will electricity generation per capita. ASEAN member states' ratio of electricity per capita versus GDP per capita is scattered widely (see chart on previous page). Most countries have plenty of scope to move up the curve, indicating the vast potential for more electricity generation.

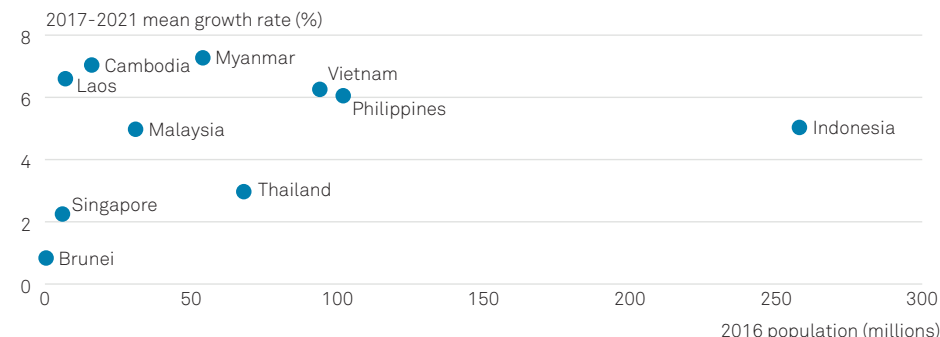
Other factors that will affect total electricity growth include the proportion of GDP growth coming from the industrial, services and agricultural sectors, along with changes to population density and migration to urban areas.

The targets for respective member states also vary widely. However, they can be broadly split into their economic and demographic growth rates (see chart above).

Less populated countries with relatively lower growth rates are more focused on the secondary goals of energy efficiency. They have limited potential to diversify their generation mix or to grow the share of renewables in the fuel generation mix.

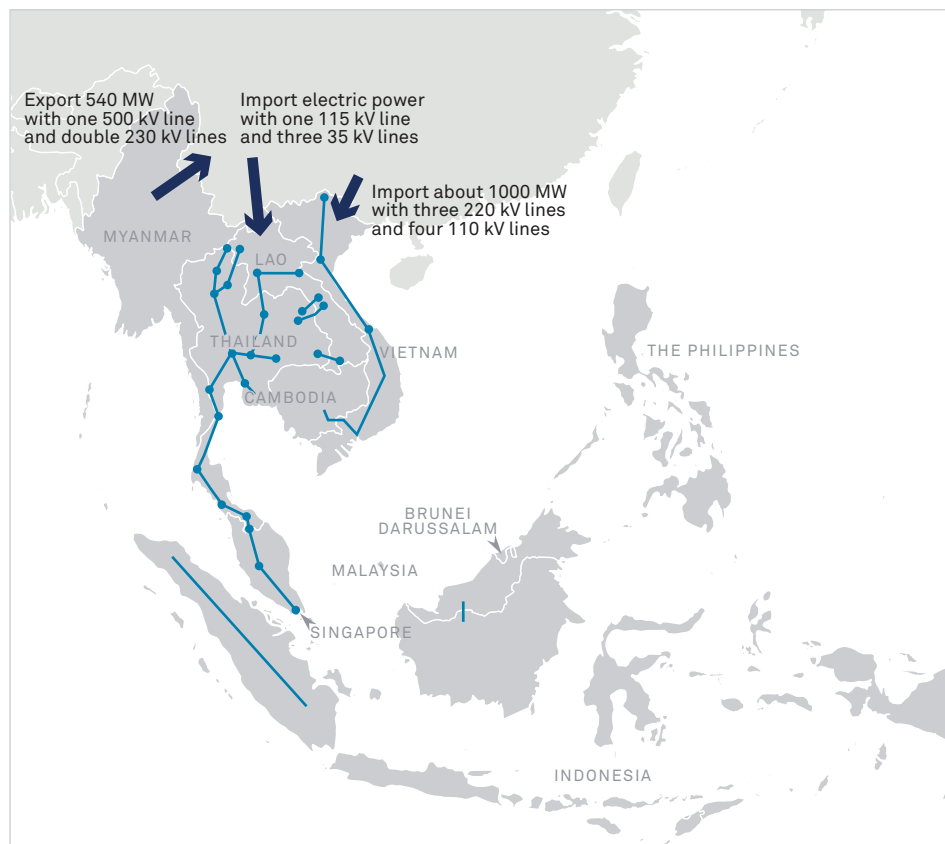
Conversely, countries with large populations and/or high growth rates, such as Vietnam, the Philippines and Indonesia, have a strong inclination towards increasing their electrification ratio. The ability to deliver electricity to the currently underserved population depends on being able to ensure adequate base load power supply to support sustained growth. Typically, these countries require significant and sustained investment to support ongoing requirements for power generation units and infrastructure development. Further, the bigger the country – both in terms of land mass and population – the bigger the challenge to source adequate levels of funding to achieve the ideal power generation mix.

### MEAN GDP GROWTH RATE vs POPULATION



Source: S&P Global Platts Analytics, S&P Global Market Intelligence

### CROSS BORDER ELECTRICITY TRANSMISSION INFRASTRUCTURE IN ASEAN



Source: ASEAN Power Cooperation Report, July 2017

### Market structure

In addition to the size of the country and its stage of development, the market structure of each nation is vital for

policy making. Apart from the electrical grid infrastructure, which is primarily publicly-funded, the development and operation of power generation assets can be delegated to the private sector.

## Electricity: striking the right power balance

According to the Economic Research Institute for ASEAN and East Asia (ERIA), both state-run and private sector-dominated markets would face challenges, though different in nature. In a state-run system, a lack of competition can cause lower rates of investment in new, efficient power units, resulting in decreasing competitiveness. But a fully liberalized market – where companies and investors are looking to secure profits – could lead to an imbalance in the power generating mix. Commercially-focused companies may prefer lower-cost generation, such as coal-fired plants. Moreover, deregulation could lead to an investor focus on the short-term and increased cost-cutting. This could potentially lead to the decommissioning of unprofitable plants and undermine long-term supply security.

In ASEAN, the level of liberalization and deregulation in energy markets, and the ratio of government to private investment, can vary greatly.

An overemphasis on changing the market structure to achieve the secondary targets we outlined earlier may not be ideal for most ASEAN members at this stage. Emulating Europe's (and some Australian states') push for renewables or gas generation could be a premature step for ASEAN countries as coal power generation remains important.

From a long-term supply security perspective, a government-run approach may be more successful for developing nations, provided there are enough funds. From a pure cost-efficiency perspective, a deregulated market could quickly adjust to meet these objectives, though this would be better suited to more developed nations.

### ASEAN's generation mix

In line with other parts of the world, ASEAN is trying to ramp up the proportion of natural gas in its electricity generation mix. However, unlike certain European countries, ASEAN will still depend on coal for a sizable portion of its generation for the foreseeable future. The main justification for the high usage of coal is the proximity to cheap and abundant supply. ASEAN will remain a major coal exporting region, with major producer Indonesia expected to export most of its annual production of around 430 million mt.

Due to adequate quantities of fuels and insufficient penalties on carbon emissions, there is little incentive for ASEAN to swing sharply away from coal to gas. This is a similar scenario to that of Japan, where there is a comparatively light government approach to carbon

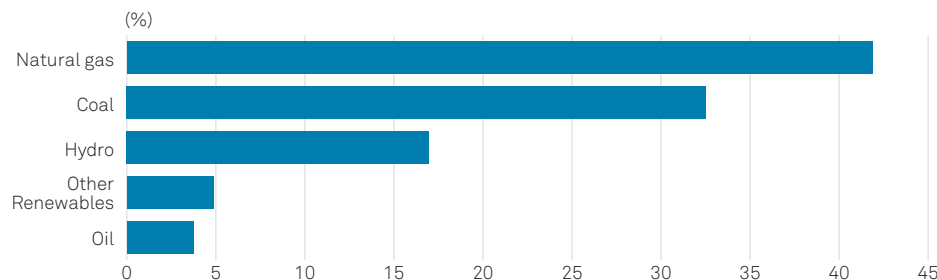
taxes, and coal is taxed only marginally more than gas. Electricity generation by coal is still the most cost-effective way of producing electricity in Japan.

In renewables, the Heads of ASEAN Power Utilities/Authorities (HAPUA) outlined a goal to increase the renewable component to 23% by 2025 for all primary energy consumption. This may be an ambitious target as S&P Global Platts Analytics estimates the 2016 mix currently stands at 17%, notwithstanding the proportion specifically for electricity generation is around 22% (see chart below). Power generation accounts for one-third of all primary energy consumption. All things being equal, the renewable mix in electrification would have to grow to 35% to meet HAPUA's targets.

Even though ASEAN will be challenged to reach its renewables target, it may choose to focus on its primary objective of supply security first.

ASEAN nuclear power generation plans are in their infancy and no investment decisions will be made until there is greater clarity, which could take several years. The fact that any nuclear energy initiative would require the cooperation of countries sharing borders could further delay any progress. ASEAN members will need to overcome political hurdles and align their electricity policies and markets before nuclear power generation becomes a reality.

### 2016 ESTIMATED ASEAN FUEL GENERATION MIX



Source: S&P Global Platts Analytics

### Foreign direct investments and market data

Building a 600 MW coal plant is estimated to cost \$3 billion, according to the US Energy Information Administration, though this figure could be lower for ASEAN. For ASEAN to meet its power needs – which the ASEAN



Centre for Energy estimates will grow by 5-6% each year to 2020 – will require investment of \$6 billion-8 billion/year, according to S&P Global Platts Analytics. This is equivalent to 15-20% of the total annual inward direct investment in ASEAN, excluding Brunei and Singapore.

In order to attract investment, ASEAN countries would need to ‘speak with one voice’ and market the region as one entity. Before committing, international investors will demand a stable political environment; one that is committed to meeting its economic growth and energy targets.

Inevitably, more transparency in the form of regular and detailed data is required to build confidence before potential investors would consider capital investment. Unfortunately, the dearth of such data is an impediment for most ASEAN nations in their goal to attract more inbound investment to develop a sustainable power infrastructure.

### In summary

ASEAN needs sustained investment to meet its electricity needs and to achieve its targets if the region is to continue its high economic growth rates. Member states must work to ensure the supply of generating fuels and align their policies while the integrated power grid is being completed. Though ASEAN may struggle to meet its renewables targets, this secondary target can be addressed more closely once the primary objective of ensuring enough power for its growing economies has been achieved.

To attract foreign investment on a sustained basis, ASEAN needs to effectively communicate its achievements and plans in the power arena to the international community to gain the trust of capital markets.





## Power Grid vision needs collaboration to light up region

ASEAN's economy is projected to grow at around 4–5% over the next five years, while its power demand is forecast to expand by 5–6%. The region's electricity demand will grow by almost 38% by 2025 to 1.42 million Gigawatt hours, according to PIRA Energy Group, a unit of S&P Global Platts. ASEAN's electricity supply will rise by 35% by 2025 to 4.86 million GWh.

The region's per capita electricity consumption is roughly half the world average and the electrification rate is only 78.7%. Millions of people continue to live without electricity and widening the coverage will require large-scale power generation capacity expansions. It will also require greater cooperation between ASEAN member states, a transparent regional pricing model, and significant investment.

It has been estimated that ASEAN will require annual investment of \$90 billion to pay for its energy requirements over the next 20–25 years. Clearly, there is much work to be done to attract this level of investment – a large proportion of which is likely to come from outside the ASEAN region.

Integration of the ASEAN network would significantly reduce investment requirements for new power projects and operating costs. This is another key incentive for better collaboration across ASEAN member states.

### Transmission underway

ASEAN set out its vision to ensure energy security in the region at a summit in Malaysian capital Kuala Lumpur in 1997. The vision was called the ASEAN Power Grid (APG). Looking ahead to 2020, the plan was to achieve energy supply security, optimize indigenous energy sources such as coal, gas and renewables, allow access to affordable energy, and facilitate multilateral trading across ASEAN.

Nine out of 16 cross-border transmission interconnections under the APG plan

have been built and are operational, while the rest are at various stages of planning and construction.

The 16 interconnection projects comprise 27 links. These include: Peninsular Malaysia–Singapore, Thailand–Peninsular Malaysia, Sarawak (East Malaysia)–Peninsular Malaysia, Peninsular Malaysia–Sumatra (Indonesia), Batam Island (Indonesia)–Singapore, Sarawak–West Kalimantan (Indonesia), Philippines–Sabah (East Malaysia), Sarawak–Sabah–Brunei, Thailand–Laos, Laos–Vietnam, Thailand–Myanmar, Laos–Cambodia, East Sabah–East Kalimantan, and Singapore–Sumatra.

The exchange of electrons via the first phase of the Laos–Thailand–Malaysia–Singapore Power Integration Project is poised to start by next January. This will see Laos sell up to 100 MW of electricity to Malaysia via Thailand's transmission system.

ASEAN Centre for Energy (ACE) has described the initiative as a “very good flagship” and “pathfinder” to encourage other cross-border trading arrangements within the region.

The multilateral dimension of the APG remains a work-in-progress despite much of the infrastructure having already been built, a report from an ASEAN Electricity Exchange (AEE) workshop in April concluded.

Multilateral trades are complicated by environmental challenges and the low level of trust between parties, the AEE report said. Constraints included technical problems relating to differing grid standards, the difficulties of synchronization, and the weak commercial viability of some of the planned interconnections.

Phillip Andrews-Speed, senior principal fellow at the National University of Singapore Energy Studies Institute, also highlighted the lack of mutual trust between member states. Many countries

have aspirations towards power self-sufficiency rather than collaborating with their neighbors, which could hamper the development of multilateral energy trading.

Further compounding progress is the perceived difficulty of setting up an effective trading system. Andrews-Speed said the disparities in supply-demand balance and fuel mix across ASEAN provided a real opportunity for electricity trading.

“The key is to start with a simple trading model that is voluntary in nature and which addresses trans-boundary trade. As parts of ASEAN have a surplus of power, such a market would support growing demand,” he said.

Citing the example of the European Union, he cautioned that economic integration and growth would not necessarily lead to a unified grid. It would require “special efforts” within the ASEAN power sector to bring the APG vision to fruition.

“There is a lack of economic incentives for the construction of grid connection, which arises from the nature of the electricity sector policies of most ASEAN member state governments,” he said.

### Pricing model imperative

To make trading work, a regional pricing model for cross-border trade needs to be agreed by participating member states. Such a model would be based on prevalent power surplus and deficit conditions traded on the market at a given time and the transparent allocation of transmission capacity. This would enhance price transparency and allow cross-border power trading on a more efficient and predictable basis, the AEE report found.

ASEAN's power supply is generated from a mix of coal, natural gas, hydro, oil, solar and renewables. Coal is relatively low-cost and abundant, and associated infrastructure is already established. Coal is expected to replace gas as the major fuel in the



industrial sector, while renewable energy will fill electricity demand in rural areas, according to the ASEAN Centre for Energy. In 2015, total electricity generation in the region was 930 Terawatt-hour, dominated by natural gas-based plants which supplied 385 TWh (42.4%), followed by coal-based plants with 321 TWh (35.4%), renewables with 197 TWh (21.2%) and oil supplying the balance. By 2025, coal could comprise 37% of the electricity fuel mix, gas 33% and

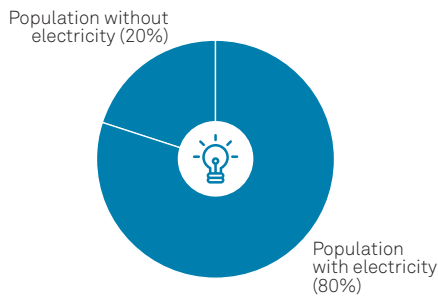
renewables 27%, according to Heads of ASEAN Power Utilities/Authorities. In addition to hydropower and geothermal, the region aims to install numerous solar power plants. Electricity generated by renewable energy is expected to grow by an average of 4.4% from 2013, when it was just 153 TWh, to reach 286 TWh in 2025 and 392 TWh by 2035. In line with their aim to reduce CO2 emissions, ASEAN members such as

Indonesia, Malaysia, the Philippines and Thailand are also considering the nuclear option in their energy mix. But these countries will need public support – and Japan's Fukushima nuclear disaster remains vivid in the memory – for the strategy to gain traction. An effective region-wide policy, road-map, and independent nuclear regulatory body, will also need to be established before progress is made on nuclear power.

## Powering ASEAN's growth and development into the future

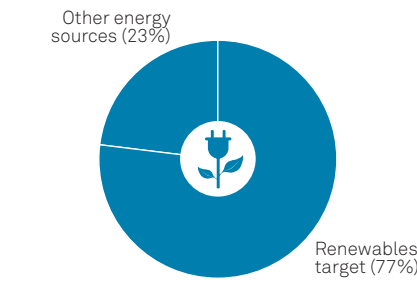
ASEAN needs better cooperation, more transparent markets to attract FDI

### TURNING THE LIGHTS ON ACROSS ASEAN



Source: S&P Global Platts Analytics

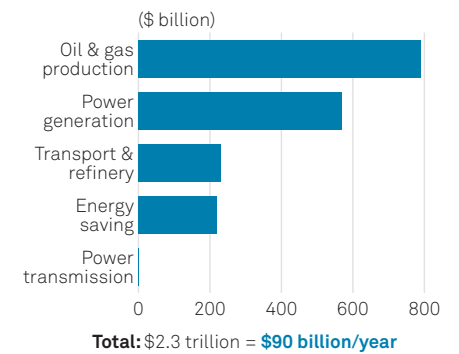
### ASEAN HAS SET AMBITIOUS RENEWABLES TARGETS BY 2025



Source: ASEAN

How will ASEAN fund its growing energy needs?

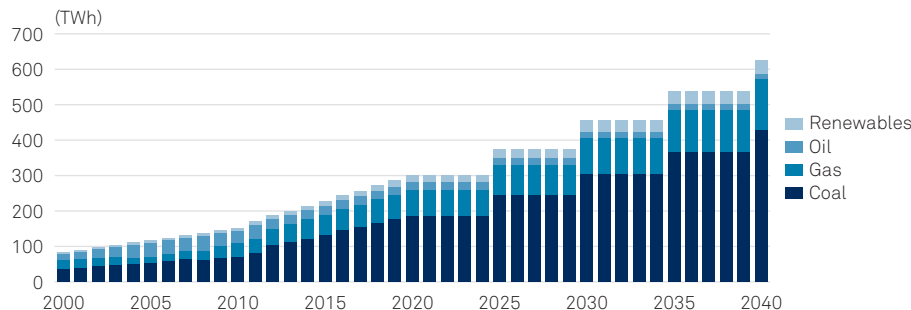
### ENERGY INVESTMENT REQUIRED TO POWER ASEAN BY 2040



Source: IEEJ

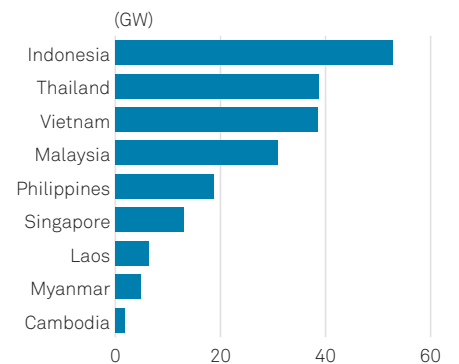
Despite the push into renewables, coal will account for more than a quarter of ASEAN's energy mix by 2020

### INDONESIA'S ELECTRICITY SOURCES



Source: S&P Global Platts Analytics

### ASEAN INSTALLED ELECTRICITY CAPACITY 2016



Source: HAPUA

# ASEAN confronts Trump TPP withdrawal

US President Donald Trump's rejection of the Trans-Pacific Partnership was seen as a blow to trade aspirations in the region, but walking away could impact steel more than LNG and crude.



**Chris Newkumet**

*Bureau Chief, Washington, DC  
S&P Global Platts*

Watch Ambassador Michael Michalak from the US-ASEAN Business Council discuss ASEAN's response to the TPP



Amid the non-stop swirl of competing policy pronouncements, failed or stalled legislative initiatives, distracting social media dust-ups, and saber-rattling on trade and other issues that have characterized the early months of Donald Trump's presidency, Asian commodities markets seem to be factoring in the new realities of the US as a trade partner.

Among other things, markets have been forced to adjust to impacts – real or imagined – caused by Trump's abandonment of the Trans-Pacific Partnership.

Shortly after taking office in January, Trump formally abandoned the TPP, the landmark deal of the Obama presidency aimed at fortifying trade rules between 12 nations amid China's growing economic influence.

The agreement was never ratified by the Republican-controlled Congress, and it's important to note that Trump's opponent in the election, Democrat Hillary Clinton, also was on record as opposing TPP.

The TPP was expected to allow the US to modernize a wide range of trade rules, but the deal largely excluded the

energy sector, other than LNG, and was expected to have little impact on crude. Various analysts contend that market fundamentals, and most importantly commodity prices, have had a far more substantial impact on the trajectory of US commodities exported to Asia and elsewhere, including metals, LNG and oil.

The TPP, in the eyes of US steelmakers who lobbied hard against it, weakened the "rules of origin" for the auto sector, which would adversely impact the steel industry – as well as other metals (aluminum) and commodities (petchems) used in cars.

As structured, the TPP gave an advantage to producers "whose primary supply chain is located outside the TPP region," according to US metals industry groups. Presumably, that advantage has now been negated.

As far as direct steel product trade, in recent years about 10 million tons of all steel imported by the US, roughly 25-30% of the total, came from the countries in the TPP, while 7 million-9 million tons of steel exported from the US went to these countries, and much of it was more value-added than the incoming products.



The flow of American steel to Southeast Asian countries is more of a trickle, but even that could be threatened more so now, given looming, more-intense US trade restrictions on imported steel, which could ignite retaliatory action by ASEAN countries that were part of TPP.

Most US-TPP trade in steel, however, was done with Mexico and Canada, which are still covered under the North American Free Trade Agreement, so the actual US impact of abandoning TPP is limited.

The TPP would have made US LNG export approvals to several Pacific Rim countries nearly automatic by classifying those markets as free trade agreement countries.

However, while the lag time for non-FTA approval to export is a risk, most developers of multi-billion-dollar US LNG projects were not counting on a deal like the TPP to make export authorizations quicker, analysts say.

Despite the US withdrawal from TPP, Trump recently has been banging the drum for the US LNG sector. In early May, he moved to liberalize LNG trade policy between the US and China. While the announcement was short on detail, US LNG project developers were largely supportive of the announcement.

Korea Gas, the largest natural gas buyer in South Korea, currently has a 20-year sales and purchase agreement for 3.5 million mt/year of LNG with Cheniere Energy out of Sabine Pass, Louisiana. The contract went into effect in June, and Kogas is said to be talking to Cheniere about the possibility of acquiring additional export capacity, which would help

*“Unlike the TPP, Trump’s plan to renegotiate NAFTA later this year could have a more significant impact on crude, gas and refined product flows... energy could be held hostage”*

Cheniere commercialize two liquefaction trains for which it has permits but has not yet made a final decision to build.

In February, the first full month of Trump’s presidency, the US exported nearly 9.58 million barrels of crude oil to China, roughly 1.32 million barrels more than it sent to China in all of 2016.

That same month, 509,000 barrels of US crude were sent to Hong Kong and 1.47 million barrels were sent to India, the largest American oil export amounts ever shipped to that market, according to US Energy Information Administration data.

“The United States is on track to export an average 1 million barrels of oil a day this year, double the pace of last year,” Trump’s White House press team boasted in a press release.

Export data suggests that the launch of the Trump presidency has sparked a new chapter in energy trade between the US and Asian and other trading allies, potentially signaling the launch of a new boom in US flows to Asian trading partners.

But the rise in crude exports likely had very little to do with Trump. Rather, the shift in export flows can be pegged to a change put in place by the Obama administration in December 2015, ending decades of restrictions on US crude oil exports.

In fact, many of the energy policy gains Trump has touted during his first six months in office took root in action or market moves made during the Obama years.

Much of the Trump administration energy trade policy focus has been on working to eliminate hurdles and untangle bureaucratic complexities put in place by the Obama administration.

Following a June 26 meeting with Indian Prime Minister Narendra Modi, Trump said the US will sign long-term agreements to send US LNG to India, claiming that the US was “trying to get the price up a little bit” before they were completed. But Indian companies had already reached multiple long-term agreements during the Obama administration to get LNG from terminals in Louisiana and Maryland.

Japan, China, Singapore and South Korea have emerged as the top Asian market destinations for US crude and petroleum products, according to government data.

## **US exports to Asia climb**

Total US exports of crude oil and petroleum products to China have climbed from nearly nothing in February 2008 to a recent peak of 645,000 b/d in February of this year. Similarly, exports of US crude and products to South Korea went from



zero in August 2013 to a peak in February of 174,000 b/d. Exports to Singapore peaked at 372,000 b/d in February and exports to Japan reached 379,000 b/d in December 2016.

These exports pale in comparison, however, to US petroleum trade with Canada, which peaked at 1.05 million b/d in May 2015, and Mexico, which reached 1.2 million b/d in December 2016.

US policies do not prevent crude and refined product flows to ASEAN nations, but free trade agreements and favorable tax treaties in ASEAN countries may give local suppliers an edge over US sellers.

Singapore was the biggest supplier of oil products to Vietnam in May, for instance, followed by Malaysia, South Korea, Thailand, and China. Oil products imports from the aforementioned nations carry low duties, as Vietnam has already had free trade agreements with them.

It should be noted that the shorter travel times also give local Asian sellers an edge. US refiners are keen to expand into Asian markets, but will need to sell at price discounts to make the long haul exports work.

US Gulf Coast ultra-low-sulfur diesel is regularly priced below Singapore diesel, but that discount does not appear to be wide enough to encourage regular flows to ASEAN nations, especially when so much local supply is available from Asian and Mideast refiners.

And Asia is gearing up for refining capacity additions, with one of the plants – a 200,000 b/d refinery – coming up in Vietnam, which will reduce its demand for imports.

US refiners are regular suppliers of “bottom of the barrel” refined products, such as fuel oil and petroleum coke, to ASEAN countries. But more valuable, lighter refined products rarely make that trip. US refiners occasionally export diesel to Malaysia, but for the most part focus on Latin American and European markets.

Trump will be attending three summits in Asia in late 2017, where he will meet with ASEAN nations on trade and security. It is unclear if the visit will focus at all on petroleum, and even if any individual free trade agreements with individual ASEAN nations would give US refiners and oil producers an edge.

Unlike the TPP, Trump’s plan to renegotiate NAFTA later this year could have a significant impact on crude, gas and refined product flows, analysts claim.

“Everybody feels like the dynamic on energy has changed in North America [and] that within the context of NAFTA renegotiation, energy could be held hostage,” said Sarah Ladislav, director of the Center for Strategic and International Studies’ energy and national security program. “If you don’t like what you’re getting back on lumber or autos or some other segment of the trade agreement then you could say ‘Well, maybe I’m going to treat my gas differently,’ or ‘Maybe we’ll treat our oil trade differently.’”

US Commerce Secretary Wilbur Ross has said the first goal of the NAFTA renegotiation was “to do no harm,” and specifically pointed to energy imports and exports as examples of trade relations the US was not seeking to alter.





# Oil

## Demand rising but so is refining capacity

As crude oil production declines and refining capacity rises, the ASEAN region is set to become a bigger net importer of crude oil. It is no surprise then that top crude oil suppliers such as Saudi Arabia, Russia and Kuwait are rushing to secure a foothold in the region.

According to estimates by PIRA Energy Group, a unit of S&P Global Platts, net crude oil imports by Southeast Asian countries, including

Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam, will rise to 3.53 million barrels/day in 2025 from 1.96 million b/d in 2015.

Indonesia, the region's top oil producer and formerly an OPEC member, has seen its crude production halve from a peak of 1.6 million b/d in 1995 to around 800,000 b/d currently. The country has not made a significant oil

discovery since ExxonMobil's Banyu Urip field in the onshore Cepu block in 2001. ExxonMobil this year increased oil output from Cepu to an average of 200,000 b/d, complying with a request from the Indonesian government to ramp up production.

PIRA pegs Indonesia's proven liquids reserves at 3.2 billion barrels. But significant progress will need to be made to ease the regulatory framework for investment to start flowing in. For example, contractors currently need to obtain more than 300 permits from various ministries before they can start work on a block.

In the 1970s the average time from exploration to production was around five years, but this blew out to 10 years in the 1990s and is now at least 15 years.

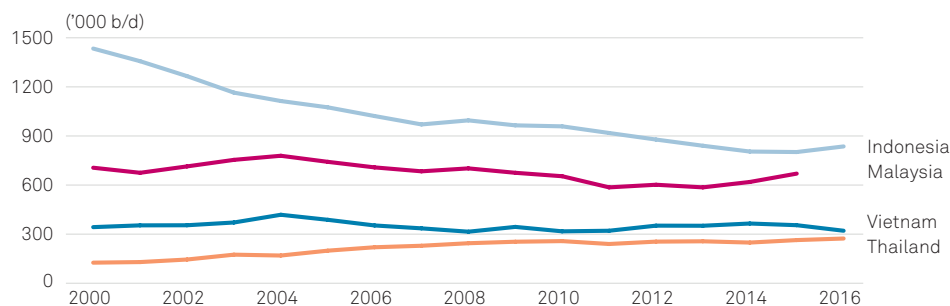
Vietnam's crude oil production has also declined from a peak of 400,000 b/d in 2004, as major oil fields have aged, while new marginal oil fields have been unable to make up the decline.

The country produced just above 300,000 b/d in 2016, according to the General Statistics Office data.

Vietnam's last major oil discovery was even longer ago than Indonesia's – the Bach Ho field off its southern coast in 1975. State-owned PetroVietnam has been planning oil projects but these

“The hydrocarbon potential of Southeast Asia is considerable and the investment climate is mostly favorable to international oil companies. It is likely that the new projects will materialize since the break evens in the area are reasonable at around \$45-50/barrel.  
— PIRA Energy Group”

### ASEAN CRUDE PRODUCTION



Source: US EIA (Malaysia), General Statistics Office (Vietnam), Energy Policy and Planning Office (Thailand), Ministry of Energy (Indonesia)

have failed to materialize owing to the prolonged period of low oil prices. The government has asked PetroVietnam to explore for oil in deep water areas of the South China Sea, but this requires both capital and technology, neither of which are PetroVietnam’s strengths.

Maritime tension with China in the area has also prevented foreign companies from investing in the region.

Malaysia’s oil production has seen the slowest decline in the region, having come off by around 50,000 b/d since the start of last decade to 650,000 b/d currently.

The country can also boast of bringing online the most number of new deep water projects – namely, Kikeh, Gumusut-Kakap and Malikai – over the past 10 years. PIRA estimates Malaysia’s liquids reserves at 3.6 billion barrels.

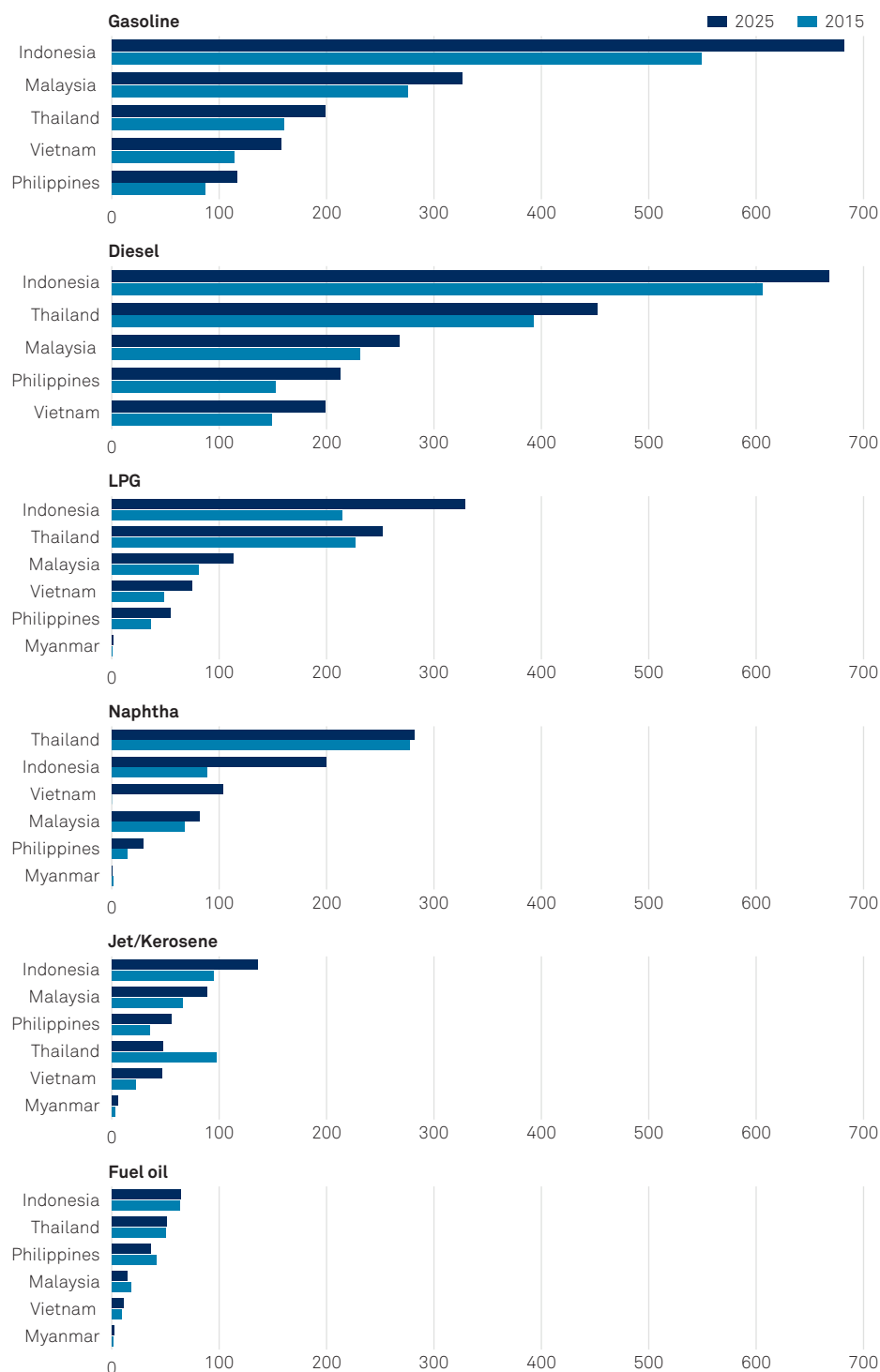
### Oil products demand

ASEAN oil demand is set to rise by approximately 1.2 million b/d in 2025 from 2015 levels with Vietnam and the Philippines leading the demand growth, according to PIRA.

The share of Vietnam in ASEAN’s total oil demand is expected to rise from 8% in 2015 to 11% in 2025, while the share of the Philippines is expected to rise from 8% to just below 9%, PIRA estimates.

Gasoline and diesel account for close to 60% of oil demand in ASEAN and limited refining capacity has left the region dependent on imports. The region is reliant on imports to meet 50% of its gasoline demand and around 10% of its diesel demand.

### INDIVIDUAL PRODUCT DEMAND ('000 b/d)



Source: S&P Global Platts Analytics

## Commodities Oil

The region's reliance on imports of refined products is expected to remain stable in the medium term despite rising demand, due to planned refining capacity expansions.

Several greenfield refineries and expansions at brownfield plants are planned in Indonesia, Vietnam and Malaysia.

PIRA estimates that net gasoline imports by ASEAN countries are expected to fall from 500,000 b/d in 2015 to 449,000 b/d in 2025. Net gasoil

imports are expected to rise slightly from 173,000 b/d to 190,000 b/d over the same period.

Given the growth demand potential of the region as an oil demand center, it is not surprising that the world's top crude oil suppliers have sought to grow their share of an attractive market by investing in refinery projects.

"The hydrocarbon potential of Southeast Asia is considerable and the investment climate is mostly favorable to international oil companies. It is likely

### NET PRODUCT IMPORTS ('000 b/d)

	2015	2025
<b>Gasoline</b>		
Indonesia	331	337
Malaysia	90	107
The Philippines	35	59
Thailand	-13	-18
Vietnam	57	-36
<b>Total</b>	<b>500</b>	<b>449</b>
<b>Diesel</b>		
Indonesia	133	164
Malaysia	-28	-21
The Philippines	77	120
Thailand	-98	-142
Vietnam	89	69
<b>Total</b>	<b>173</b>	<b>190</b>

Source: S&P Global Platts Analytics

that the new projects will materialize since the break evens in the area are reasonable at around \$45-50/barrel," according to PIRA.

Saudi Aramco, which earlier this year took a 50% stake in Malaysia's RAPID refinery, will be supplying 70% of the refinery's feedstock needs. Aramco is also involved in the expansion and upgrade of Indonesia's largest refinery, Cilacap, and will be meeting almost all of the refinery's crude demand.

Saudi energy minister, Khalid A. Al-Falih, said at the signing ceremony between Saudi Aramco and Petronas for the RAPID project that Malaysia had been identified as a strong market in itself, but also as a "platform from where we will be targeting the broader Southeast Asian region and Asia as a whole."

The Nghi Son refinery in Vietnam, in which Kuwait Petroleum International has a 35% stake, is designed to primarily run on Kuwaiti crudes.

Russia's Rosneft will be supplying 45% of the crude requirements of Indonesia's Tuban refinery in which it has taken a stake.

“ASEAN oil demand will reach approximately 1.2 million barrels/day by 2025 with Vietnam and the Philippines leading the demand growth”

### SOUTHEAST ASIA TOTAL DEMAND ('000 b/d)

Country	2015	2025	% Share in 2015	% Share in 2025
Indonesia	1,683.00	2,127.00	35.72	36.09
Thailand	1372.00	1492.00	29.12	25.32
Malaysia	790.00	949.00	16.77	16.10
Myanmar	96.52.00	154.31	2.05	2.62
The Philippines	377.66	518.51	8.02	8.80
Vietnam	392.14	652.48	8.32	11.07
<b>Total</b>	<b>4,711.00</b>	<b>5,893.00</b>		

Source: S&P Global Platts Analytics

### PLANNED REFINING PROJECTS

Country	Refinery	Capacity (b/d)	Start-up date	Partners	Type
Vietnam	Nghi Son Refinery and Petrochemical	200,000	Q1 2018	PetroVietnam (25.1%); Kuwait Petroleum International (35.1%); Idemitsu Kosan (35.1%); Mitsui Chemicals (4.7%)	Greenfield
Malaysia	RAPID	300,000	2019	Petronas (50%); Saudi Aramco (50%)	Greenfield
Indonesia	Tuban, East Java	300,000	2021	Pertamina, Rosneft	Greenfield
Indonesia	Bontang	300,000	N/A	Pertamina	Greenfield
Indonesia	Cilacap	52,000	2021	Pertamina (55%); Saudi Aramco (45%)	Expansion and upgrade
Indonesia	Balikpapan	100,000	2019	Pertamina	Expansion and upgrade
Vietnam	Dung Quat	40,000	2022	PetroVietnam	Expansion

Source: Platts



## Singapore to turn diesel net importer in light of IMO regulation

The share of gasoil in Singapore's marine fuel mix has been falling over the past few years and the country has remained self-sufficient in meeting requirements.

However, by 2020 a significant ramp-up in gasoil demand from the marine industry is expected to transform the country from a net exporter of diesel and gasoil into a net importer.

This change stems from the International Maritime Organization's decision in October 2016 to cut sulfur limits for bunker fuels worldwide from 3.5% to 0.5% from the start of 2020.

The IMO rule has important ramifications globally for all marine fuel industry participants, notably ship owners, producers and refiners. The shipping industry will not only have to act fast but also incur huge costs, which are estimated to be as high as \$60 billion worldwide.

Marine gasoil is likely to be a popular choice among the multiple options available – 0.5% sulfur bunker oil, high sulfur fuel oil with scrubbers, LNG, and even methanol – because it is a simpler solution.

PIRA expects Singapore's gasoil and diesel demand to rise six-fold from around 60,000 b/d in 2015 to around 360,000 b/d in 2025, with a majority of this attributed to rising demand for marine gasoil.

Singapore will also have to repurpose some infrastructure, including storage tanks to prepare for a shift from fuel oil to gasoil bunkering.

In addition, the IMO regulation could result in some shippers switching bunkering locations from Singapore to countries such as China, which has ample marine gasoil availability.

Singapore is the world's top bunkering port. The city-port's bunker fuel sales in 2016 rose 7.7% year on year to 48.6 million mt, surpassing the previous high of 45.2 million mt in 2015, according to the Maritime and Port Authority of Singapore.







# Liquefied natural gas

## Rising local demand will see ASEAN's net exports shrink

ASEAN LNG demand is expected to reach 30 million mt/year by 2022, marking a threefold increase from 2016 levels, according to S&P Global Platts Analytics. New regional regasification infrastructure will facilitate this growth, helping to meet rising demand in the face of constrained local gas production and limited cross-border piped gas flows.

ASEAN will remain a net LNG exporter and production will continue to rise, but an increase in LNG demand from existing and new ASEAN importers will far outstrip supply growth and lead to a sharp drop in net exports from the region.

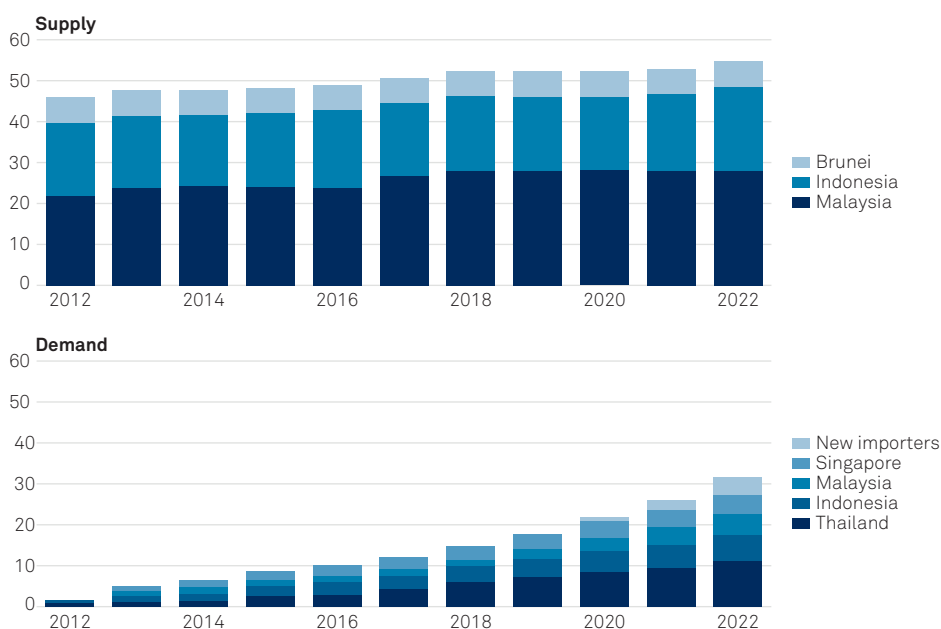
Demand from existing LNG consumers, Thailand, Indonesia, Singapore and Malaysia, is expected to top 25 million mt/year by 2022 from 10 million mt/year in 2016. In addition, Vietnam, Myanmar and Philippines are expected to start LNG imports later this decade, reaching nearly 5 million mt/year of combined demand by 2022.

ASEAN's LNG demand is expected to grow faster than the Asia-Pacific region as a whole and will account for 12% of Asia-Pacific's total LNG demand of 245 million mt by 2022, Platts Analytics estimates. ASEAN accounted for just 5% of Asia-Pacific's total LNG demand last year.

The region's top LNG user Thailand is expected to import more than 9 million mt/year by 2022, up from 3 million mt in 2016. The country's LNG imports will fill the widening gap between growing consumption and stagnant supply due to falling domestic production and uncertain pipeline gas imports.

Thai gas demand should rise robustly, driven by a growing population, an expanding economy, and increased utilization of gas in transport, as petrochemical feedstock, and also in the power generation sector where it accounts for more than 60% of fuel consumption.

### ASEAN LNG SUPPLY AND DEMAND (million mt/year)



Source: S&P Global Platts Analytics

Domestic Thai gas production, however, is set to decline due to dwindling upstream reserves. Further, pipeline gas imports remain uncertain as neighboring Myanmar diverts increasing volumes to its growing domestic market.

Thailand's PTT is on track to expand its 5 million mt/year regasification terminal at Map Ta Phut to 10 million mt/year by the end of this year, and to 11.5 million mt/year by 2019. There is also the potential for a second onshore Thai regasification terminal with capacity of 7.5 million mt/year to start early next decade.

Indonesia's LNG consumption has also shown strong growth and is expected to double from current levels to more than 6 million mt/year by 2022. Rising gas consumption will be driven by rapid



economic growth, and declining oil and gas output due to natural field decline and low exploration activity.

Indonesia is rich in natural gas and is a major LNG supplier, with the Bontang, Tangguh and Donggi Senoro LNG facilities producing 18.83 million mt of LNG in 2016. But it lacks the infrastructure to connect surplus gas areas to deficit rural areas across a sprawling archipelago of more than 18,000 islands.

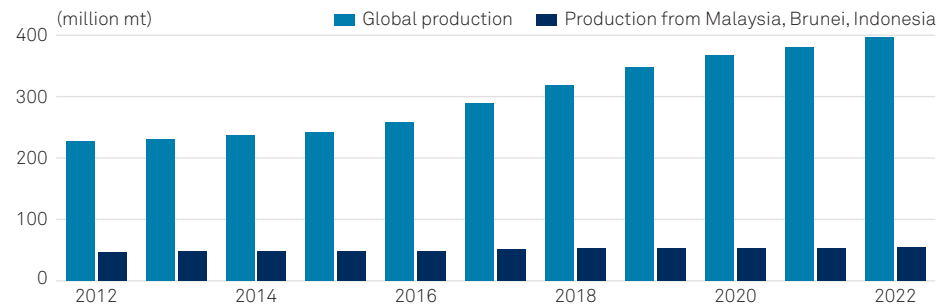
The country is set to start importing LNG from international markets in 2019. This will include 1.52 million mt/year from Houston-based Cheniere Energy, up to 1 million mt/year from Australia's Woodside Energy, and another 1 million mt/year from French energy giant Total from 2020. State-owned energy company Pertamina has inked a memorandum of understanding with US major ExxonMobil for 1 million mt/year of LNG over a 20-year period from 2025.

In Malaysia, Petronas plans to address declining gas production on the peninsular through its 3.8 million mt/year capacity Malacca regasification terminal. Peninsular Malaysia's LNG demand is expected to quadruple from 1.3 million mt in 2016 to 5.2 million mt/year by 2022, according to Platts Analytics.

An Integrated Petroleum Complex is being built in Malaysia's southern Johor state where the new Pengerang LNG terminal will provide gas for power generation to this complex, which is on track to start in 2019.

Singapore imported 2.4 million mt of LNG in 2016, with demand expected to grow to 4.6 million mt by 2022, as the country's pipeline gas contracts with Indonesia and Malaysia expire. Platts

## ASEAN OUTPUT AS A SHARE OF GLOBAL PRODUCTION



Source: S&P Global Platts Analytics

Analytics does not expect any of these contracts to be extended.

Singapore has been lifting capacity at its SLNG Jurong Island regasification terminal, which should reach 11 million mt/year by the end of 2017 from 6 million mt/year previously. In April this year, it launched the country's first LNG truck loading facility. Singapore already hosts most of Asia's LNG traders but has plans to position itself as an LNG trading hub by making terminal space available for physical trading.

In 2016, Maritime and Port Authority of Singapore issued LNG bunkering licenses to a Shell and Keppel joint venture and also to Pavilion Gas.

### Potential ASEAN LNG buyers

There is also potential for several other ASEAN countries to start importing LNG.

Vietnam has planned LNG imports for several years and in 2016 invited Tokyo Gas to partner with PetroVietnam Gas on feasibility studies with a view to building an LNG terminal with downstream pipelines.

The Philippines has 2.7 GW of installed gas-fired power generation currently supplied by the domestic Malampaya

gas field. However, Malampaya's production will likely end sometime in the next decade, which has sparked the interest of several companies in participating in a Philippine LNG import project.

In 2016, Myanmar launched an invitation for LNG imports and received a big response from suppliers, and outlined plans to put a 3 million -4 million mt/year capacity regas terminal out to tender. The project will be led by Myanmar's Ministry of Electricity and Energy.

Initial LNG demand from these three new potential ASEAN importers should materialize by the end of this decade and reach close to 5 million mt/year by 2022.

Brunei, Indonesia and Malaysia are ASEAN's three major LNG exporters, dominating LNG supply to the region before the emergence of Australia and the US as significant suppliers of the fuel. The three countries produced almost 50 million mt of LNG in 2016, and Platts expects production to reach around 55 million mt by 2022, with new trains offsetting a decline in output from legacy liquefaction trains, such as the 40-year old Bontang plant in East Kalimantan.

Recent capacity additions include Malaysia's Bintulu Train 9, Petronas

## Commodities Liquefied natural gas

Floating LNG 1 – the world’s first floating LNG production facility – and Indonesia’s Donggi Senoro LNG. Future expansions include Malaysia’s PFLNG2, with an additional capacity of 1.5 million mt/year, and Indonesia’s Tangguh Train 3, with 3.8 million mt/year. Both are expected to come online in 2020.

Despite recent export capacity additions in Indonesia and Malaysia, ASEAN’s share of global LNG production is expected to decline from almost 21% in 2013 to less than 14% by 2022.

### ASEAN’s LNG surplus shrinking

ASEAN’s tripling of current LNG demand levels by 2022 far outpaces the region’s modest LNG production growth.

This will result in ASEAN’s net LNG exports shrinking to 25 million mt in 2022 from almost 40 million mt in 2016, and regional LNG demand soaring to nearly 55% of regional supply in 2022 from 20% in 2016.

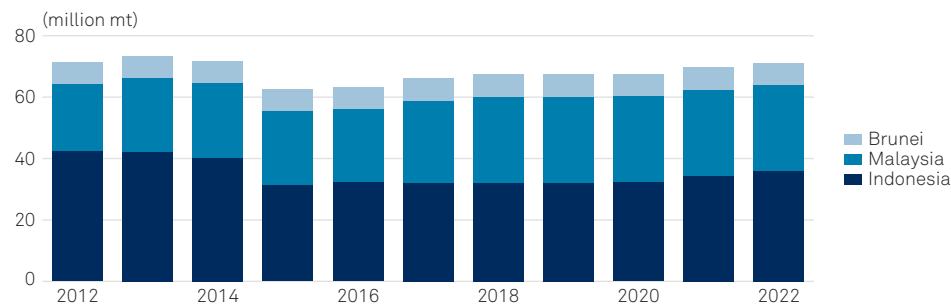
This presents growing opportunities for Brunei, Malaysia and Indonesia to supply nearby countries.

ASEAN LNG markets are also increasingly attractive to large and nearby existing LNG suppliers with available flexible volumes, especially Qatar and Australia. Frontier LNG supplier regions, including Mozambique, are also expected to target ASEAN markets for the signing of term LNG contracts to help underpin their proposed liquefaction project FIDs.

The Australian government’s recent demand that new LNG producers help fulfil the country’s gas shortfall rather than focus solely on exports could free up unexpected market share for both ASEAN and other suppliers.

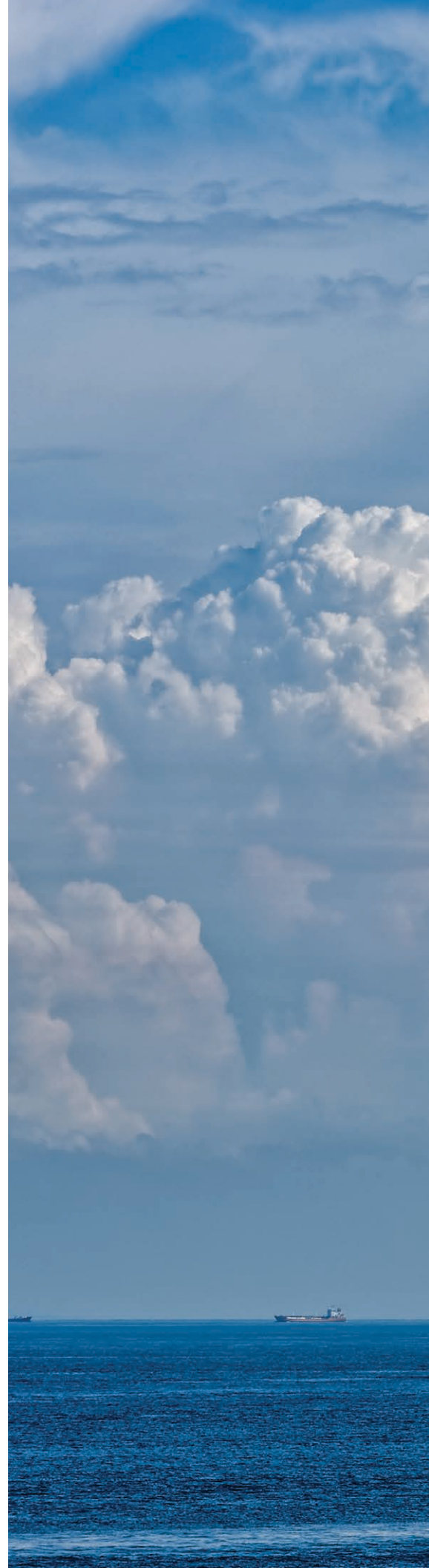
Global LNG trade patterns are evolving rapidly. Where cargoes once changed hands only via opaque bilateral deals, the market now exhibits open sell and buy tenders for multiple and single cargoes, brokered trades, cargoes sold in longer chains and speculative trading positions taken up by non-traditional players. These add to spot market liquidity. This trend is currently particularly prevalent in Asia, the region that accounts for around 70% of global LNG demand.

### TERMINAL CAPACITY IN BRUNEI, INDONESIA AND MALAYSIA



The drop in terminal capacity in 2015 is driven by the conversion of the 12.5 million mt/year Arun LNG export plant into a regasification terminal, partly offset by the start-up of the 2 million mt/year LNG export plant Donggi Senoro in Sulawesi.

Source: Platts









# Renewables

## ASEAN to target 23% of energy via renewables within a decade but progress slow so far

Renewable energy development remains slow in the ASEAN region, but energy demand growth, falling costs and limits on the region's own oil and gas production, put renewables at the nexus of climate change and energy security concerns. However, investment confidence remains a key problem as many of ASEAN's populous, high-growth markets demonstrate little policy consistency and transparency, while subsidization

retards market integration. However, solar and wind offer cost-effective options and smaller project sizes than the traditional reliance on large hydro schemes.

In October 2015, ASEAN set itself the target of meeting 23% of its Total Primary Energy Supply (TPES) from renewable energy sources by 2025, a target which was firmly characterized as "aspirational" rather than in any sense

prescriptive. The share of renewable energy in ASEAN's TPES was only 9.4% in 2014, while at the same time a substantial increase in the region's energy and especially electricity requirements is projected over the period to 2025 and beyond.

A joint study by the ASEAN Centre for Energy (ACE) and the International Renewable Energy Agency (Irena), published in late 2016, indicates the scale of the task needed to boost renewables to the 23% level.

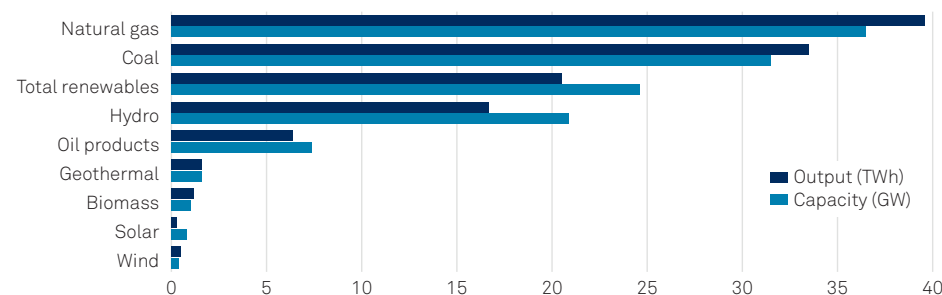
### ASEAN RENEWABLE ENERGY RESOURCES (GW or \*kWh/m<sup>2</sup>/day)

	Biomass	Geothermal	Hydro	Wind	Tidal	Solar*
Brunei Darussalam	-	-	0.07	-	-	9.60-12.00
Cambodia	-	-	10.00	-	-	5.00
Indonesia	32.60	28.90	75.00	-	49.00	4.80
Lao PDR	1.20	0.05	26.00	-	-	3.60-5.30
Malaysia	0.60	-	29.00	-	-	4.50
Myanmar	-	-	40.40	4.00	-	5.00
Philippines	0.24	4.00	10.50	76.00	170.00	5.00
Singapore	-	-	-	-	0.03-0.07	3.15
Thailand	2.50	-	15.00	-	-	5.00-5.60
Vietnam	0.56	0.34	35.00	7.00	0.10-0.20	4.50

Note: Excludes some non-power biomass

Source: ASEAN Power Cooperation Report, ACE and CREEI, July 2017

### ASEAN GENERATING CAPACITY AND OUTPUT BY ENERGY TYPE IN 2016



Source: ASEAN Power Cooperation Report, ACE and CREEI, July 2017

Renewable Energy Outlook for ASEAN: A REmap Analysis projects that ASEAN primary energy demand will increase by an average of 4% a year from 2014-2025. This will be driven by GDP growth averaging around 5%/year and a jump in the region's population from 615 million to 715 million, an increasing number of whom will live in cities.

Electricity demand is projected to grow at an even higher rate as a result of factors ranging from the aggressive pursuit of rural electrification to a substantial increase in electric vehicle use.

Power consumption is thus projected to almost double over the period from 856 TWh in 2014 to 1,656 TWh in 2025, while TPES is forecast to increase by about a half from 642 million tons of oil equivalent to 956 Million toe over the same period.

The REmap report adds that “the region has insufficient indigenous fossil fuel resources to meet its growing energy demand, and the share of imported fossil fuel will increase, which has important energy security implications.” International commitments and regional self-interest have thus converged to promote the aspirational target for renewables.

### Meeting aspirations

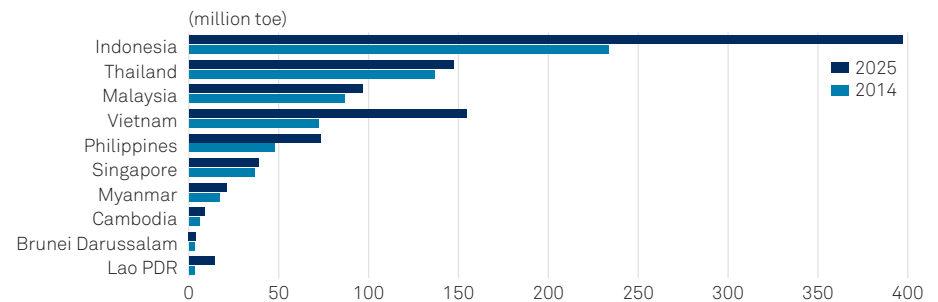
ASEAN’s primary renewables thrust is predicated primarily on the construction of huge amounts of new hydropower capacity; 79 GW by 2025 under the ACE/Irena reference case, which is based on the 4th ASEAN Energy Outlook and foresees 16.9% of total regional energy needs being met by renewables in 2025; 82 GW under the more ambitious REmap scenario, which charts a path towards meeting the 23% target.

A key difference in the REmap scenario is the opportunity for solar PV – 57 GW new solar, compared to the reference case, which assumes 14 GW. Current ASEAN solar capacity is just 1.6 GW.

Solar and onshore wind represent major opportunities because smaller projects sizes make capital funding easier, although projects will inevitably suffer interconnection constraints. Large hydro, by contrast, has much higher initial capital costs and longer gestation periods. Project can also run into local environmental impact problems and downstream concerns that in some cases have cross-border implications.

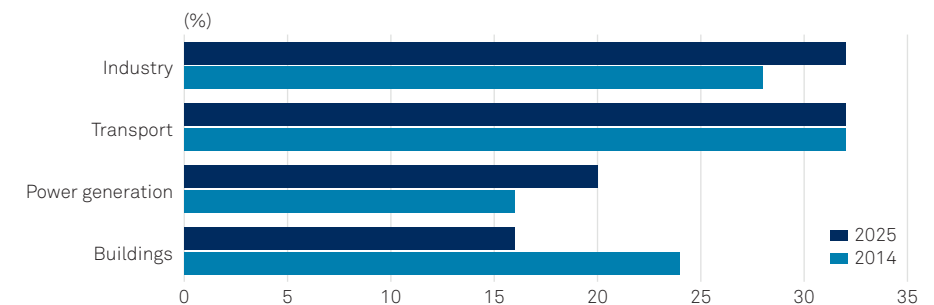
The REmap study argues that “across most of the ASEAN region, renewable power technologies will be able to

### TOTAL PRIMARY ENERGY SUPPLY BY COUNTRY



Note: 2025 is Reference case; growth rate is compound annual growth rate to 2025  
Source: ASEAN Power Cooperation Report, ACE and CREEI, July 2017

### ASEAN TOTAL FINAL ENERGY CONSUMPTION BY SECTOR



Note: 2025 is Reference case  
Source: Renewable Energy Outlook for ASEAN: A REmap Analysis, ACE-Irena (2016)

supply electricity at or below the cost of generation from non-renewable energy sources.” Specifically, the study says that in 2025 the levelized cost of solar PV and onshore wind generation could be as low as \$40/MWh and \$60/MWh, respectively.

### Slow progress

Progress to date has been very limited. The aggregate figures for the six ASEAN countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam), data for which is given individually in the 2017 BP Statistical Review of World Energy, show that renewable energy and hydroelectric supplies totaled 33.1 million toe in 2016.

This was little more than the 30.5 million toe shown for them in 2014, and at 5.6% represented exactly the same percentage of total primary energy supply as in that year.

One of the key problems in implementing the target is that ASEAN is far from a homogenous bloc. Even if the REmap scenario were to be successfully implemented, the share of renewables in national primary energy demand in 2025 would still show enormous variations, ranging from 4% in Brunei to 59% in Laos.

There are equally wide variations in the structure and regulation of national energy markets, with government involvement ranging from full state



## Commodities Renewables

control to a light-handed reliance on market signals. These differences have had and will continue to have a major impact on the adoption and penetration of renewable energy.

Thailand, for example, has clear regulatory and pricing arrangements, including guaranteed feed-in tariffs. The country also has a strong track record of honoring power purchase and other contractual agreements. These factors have facilitated investment in Thai renewable projects by both local and international players.

By end-2014, the country hosted 1,300 MW of solar PV and 2,800 MW of biofuel-based generating capacity. These facilities accounted for 81% and 44%,

respectively, of total ASEAN solar PV and biofuel capacity.

Vietnam is a very different story. It has significant potential for the installation of wind power and other renewable facilities, but the country's opaque legal and regulatory processes, together with its inconsistent and at times unclear energy pricing policies, have held back international investors and lenders from involvement in the implementation of projects.

As a result, apart from its traditional base of hydropower plant, the country had only 150 MW of renewable energy capacity in 2014.

The slow progress in developing renewable energy projects in Vietnam is

significant because almost half the additional renewable energy supplies needed to fill the gap between 16.9% in the ACE/Irena reference case and 23.2% in REmap is projected to come from just Vietnam and Indonesia, with the prospects for the latter being just as problematic as for the former.

As with Vietnam, Indonesia faces severe challenges securing investment capital because of issues relating to its legal and regulatory framework, past track record on honoring contracts, and provision of consistent and sustainable energy tariffs.

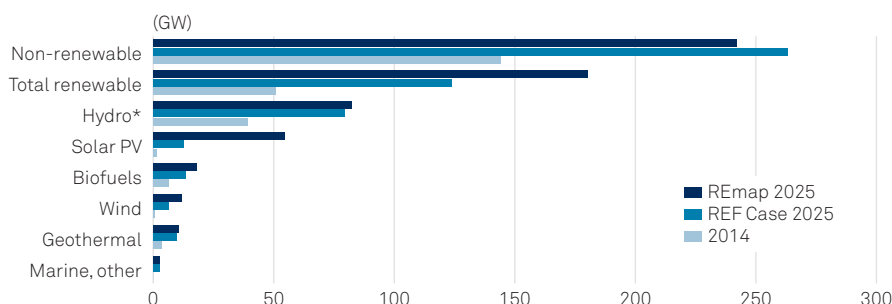
This suggests that not only might it fail to install the additional renewable capacity posited under REmap – including 3,200 MW/year of solar PV capacity – but also struggle to add the capacity planned under the ACE/Irena reference case.

In that case, Indonesia is slated to add 1,400 MW/year of hydropower capacity, which over the period would be eight times as much as it installed from 2006 to 2015, as well as adding 720 MW/year of geothermal capacity.

There may also be a question mark over the large amount of export-dedicated hydroelectric capacity – about 1,100 MW/year – planned in Laos in the reference case. Some of this could be delayed or scrapped if export sales contracts fail to emerge, as has happened on occasion in the past.

Meanwhile, Myanmar, another country with problematic regulatory and pricing structures, could face difficulties mobilizing the investment and expertise needed to build 5,500 MW of renewable capacity over the period – which is more than its entire stock of generating capacity in 2014.

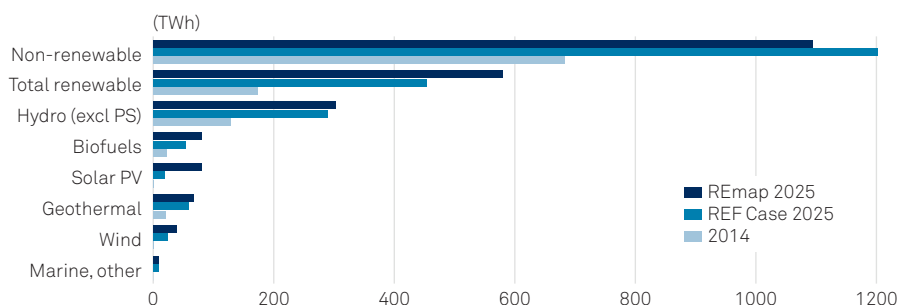
### ASEAN RENEWABLE GENERATING CAPACITY



\*Excludes pumped storage

Source: Renewable Energy Outlook for ASEAN: A REmap Analysis, ACE-Irena (2016)

### ASEAN GENERATING OUTPUT



Source: Renewable Energy Outlook for ASEAN: A REmap Analysis, ACE-Irena (2016)

## Investment requirement

The scale of the problems many ASEAN countries will face in meeting their share of the 23% target can be gauged from the overall level of the investment required. The REmap study estimates that to meet the renewable target ASEAN will need to invest \$27 billion/year, or \$290 billion in total up to 2025.

The power sector would account for 75% of the \$27 billion of average annual investment, including \$7.5 billion/year for solar PV and \$6.3 billion/year for hydropower plants. The study adds that Indonesia, Vietnam and Thailand will account for two-thirds of the total investment requirements, with Indonesia alone needing to find \$10.9 billion/year.

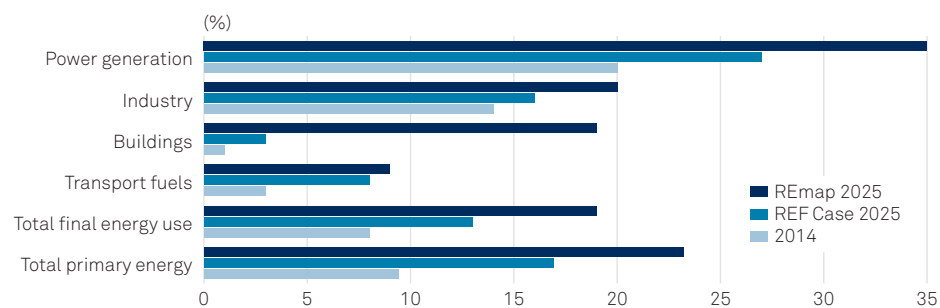
The differences already noted in national market structure and regulatory arrangements may also have an impact on member states' ability or willingness to implement the cross-border energy and electricity links which could help optimize and smooth out renewable energy supply at regional level.

More liberalized markets such as Singapore have been wary of opening their markets to unfair competition from subsidized energy production and enterprises in other ASEAN states.

“Across most of the ASEAN region, renewable power technologies will be able to supply electricity at or below the cost of generation from non-renewable energy sources.

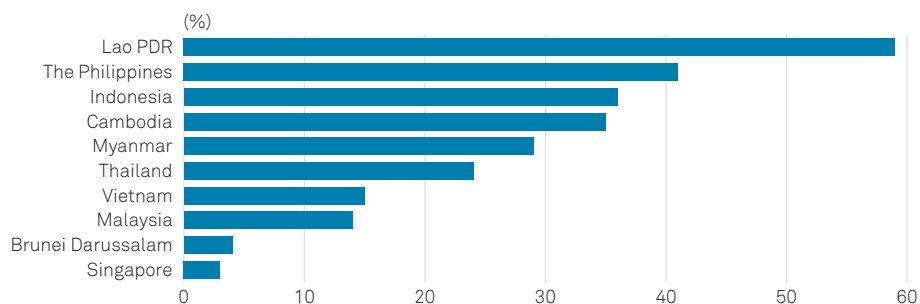
— REmap study ”

## RENEWABLE ENERGY SHARES



Source: Renewable Energy Outlook for ASEAN: A REmap Analysis, ACE-Irena (2016)

## RENEWABLES' SHARES BY COUNTRY IN 2025 REMAP



Source: Renewable Energy Outlook for ASEAN: A REmap Analysis, ACE-Irena (2016)

## Target achievement

Given these constraints, achieving the target of 23% in 2025 should definitely be regarded as aspirational, but not unattainable. Since a large proportion of the proposed investment would involve the installation of solar PV facilities with a short gestation period and relatively low and still falling unit capital cost, at least some of the national renewable programs could, with the right incentives,

take off in the same way as they have in countries such as China and India.

At the same time, it is unlikely that all of ASEAN's member states will achieve their individual targets, particularly given the high unit capital cost and long gestation periods of hydroelectric projects. But ASEAN's ability to achieve the 23% target cannot simply be written off.

Renewables' prospects in ASEAN rest primarily on political decisions across the ten member states. That ponderous and consensus driven decision-making process has sometimes worked to ASEAN's advantage in the past and may do so in the future, not least as a result of the continuing fall in international solar PV prices and as more of ASEAN's members look to at least partly liberalize their energy markets.

# Metals

## ASEAN steel growing in the shadow of China

Southeast Asia is widely recognized as the region offering the most steel consumption growth potential after India. The region boasts four countries – the Philippines, Malaysia, Vietnam and Indonesia – whose GDP grew at or above 5% in the January-March quarter of this year. A burgeoning middle class, hungry for new apartments, cars and white goods, is driving demand for steel, while Vietnam has emerged as a significant manufacturing hub.

The steel trade equilibrium is shifting towards Southeast Asia, away from

markets such as the US, and the region will become an increasingly important protagonist in setting global steel prices.

Steel consumption in ASEAN looks on track to almost double over the space of a decade – from 46 million mt in 2008 to beyond 90 million mt by 2018-2019, S&P Global Platts estimates. ASEAN’s steel consumption grew 14% year on year to reach 78 million mt in 2016, while its steel production rose by 11.5% to almost 32 million mt, according to data from the South East Asia Iron & Steel Institute.

The region’s own steel output has not kept pace with demand, forcing it to rely heavily on imported steel. Total steel imports reached close to 70 million mt in 2016, more than double the 33 million mt imported in 2009, SEASI data showed. If steel consumption slows to around 5-6% in coming years, imports could rise to around 75 million mt/year until new domestic capacity is developed.

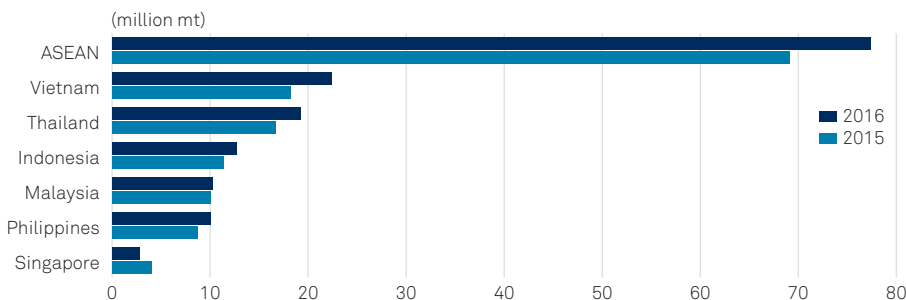
ASEAN countries naturally want to become more self-sufficient in steel. New production facilities are being brought online, while others remain at the planning stage. But the region will need to continue importing for the foreseeable future to support new housing and infrastructure.

The challenge for many steelmakers is how to survive and thrive in the shadow of giant neighbor, China – the country that produces half the world’s steel. The fear is that ASEAN steelmakers will miss out on demand growth opportunities if they are unable to compete with Chinese imports.

In the first quarter of this year, ASEAN accounted for 41% of China’s steel exports, up from 37% in 2016, and double the volume of six years earlier. Vietnam is China’s second-largest customer for steel after South Korea. Total net steel imports into Vietnam, Thailand and Indonesia in 2016 were double those of the US.

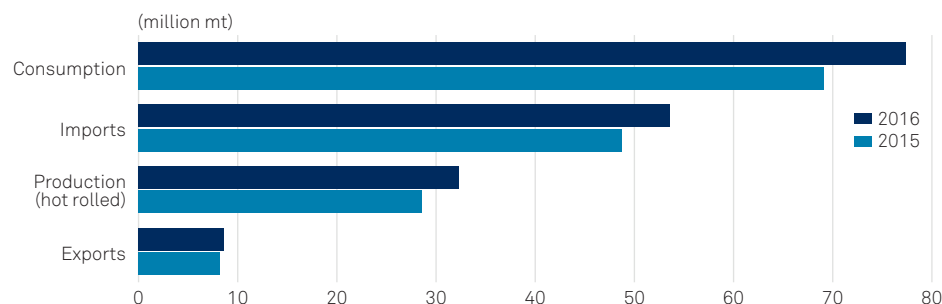
SEASI, which represents the interests of the region’s steelmakers, has held many

### APPARENT STEEL CONSUMPTION IN ASEAN



Source: SEASI

### ASEAN STEEL DEMAND SERVED BY IMPORTS



Source: SEASI



discussions with counterpart, China Iron & Steel Association, about the adverse impact of Chinese imports on the region's steel sector. But the talks have to date achieved little, and Southeast Asian countries have resorted to anti-dumping measures on imports from China, and also from South Korea.

## Vietnam the rising star

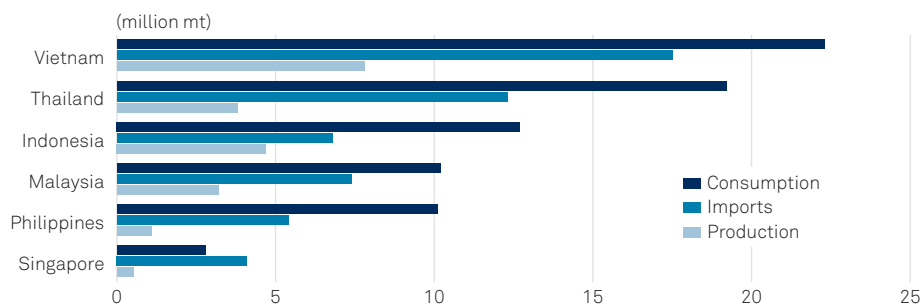
Vietnam is the rising star in the region, both economically and in terms of steel demand growth. It overtook Thailand in 2015 to become the largest steel consumer. On some estimates, Vietnam's steel consumption could double to around 36 million mt by 2025. It also has the most ambitious plans regarding the expansion of its steel production capacity.

Formosa Group's Ha Tinh steelworks in northern Vietnam fired up its first blast furnace in June and could eventually produce more than 20 million mt/year of crude steel. In the words of one steel industry veteran, the facility "could change the face of Southeast Asia's steel industry." This is because the steel it produces will compete with Chinese steel, both in Vietnam and elsewhere in the region.

Other Vietnamese steel companies, Hoa Phat and Hoa Sen, have ambitions to build new steelmaking capacity, which together with Ha Tinh could potentially add 30 million-40 million mt/year.

Compared with its more economically developed neighbors, Thailand and Malaysia, Vietnam is building from a lower base. A low-wage environment is fueling a manufacturing boom, successfully attracting international companies to establish facilities in Vietnam.

## ASEAN STEEL SCENARIO



Source: SEASI

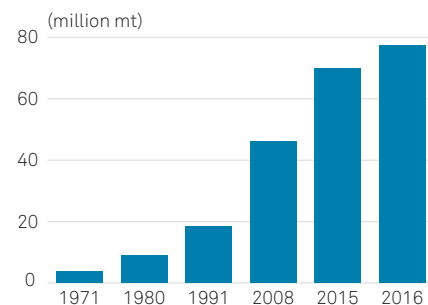
Chinese manufacturers have even relocated some operations to Vietnam, where average salaries are roughly half those in China. Vietnam's government loosened restrictions on foreign ownership of real estate in mid-2015 to help stimulate the property sector, which is a major consumer of steel.

Political uncertainty undermined Thailand's economy in 2014 and 2015, but the country recovered last year, reporting 15.1% steel consumption growth. This was second only to Vietnam and just pipping the Philippines' 15% increase.

Through joint ventures, Thailand is an integral part of Japanese and South Korean auto and white goods manufacturing supply chains. But the ongoing success of these facilities depends upon the ability to export goods to neighboring countries in the region. Thailand produced 3.8 million mt of crude steel in 2016, up 3% on the year before, as domestic producers benefited from stronger global steel prices. Its output in coming years is not expected to grow much beyond 4 million mt.

As it is already largely developed with decent infrastructure, Thailand's steel consumption per capita is forecast by SEASI to grow steadily to 292 kg by 2019 compared to 278 kg this year. Vietnam

## ASEAN STEEL CONSUMPTION GROWTH



Source: SEASI

has a more rapid trajectory with steel consumption per capita expected to hit 314 kg by 2019 from 267 kg this year.

Due to its diverse geography and large population, Indonesia has by far the lowest steel consumption per capita in the region at just 52 kg and may only reach 59 kg by 2019. Indonesia's steel consumption also rebounded in 2016 to 12.7 million mt after several slow years.

Malaysia has its ongoing political challenges, which are hampering steel growth in a market dominated by flat steel producer Megasteel. Malaysia was the only Southeast Asian country to report a drop in steel production last year, falling 15.4% to 3.2 million mt. Its consumption grew 2.3% on the year before while imports rose by almost 3%.

### Nonferrous production needs investment

Mineral-rich ASEAN plays a significant role in the nonferrous metals industry, providing key metal ores for global markets, and generating vital jobs and income in many local economies. But producers and investors in the region have had to negotiate changeable and sometimes confusing production and export policies. Governments have juggled environmental and social considerations around mining, against the income they earn from exports. They have also tried to climb the quality curve and encourage value-addition by banning exports of unprocessed minerals.

The Philippines and Indonesia are cases in point. The Philippines contains some of the world's largest reserves of nickel, copper and gold; while Indonesia is a

major producer and exporter of tin, copper, nickel, and bauxite ores.

In 2016, Philippines and Indonesia accounted for almost 30% of global mined nickel output, with 668,500 mt produced in total – the former making up 22% and Indonesia a 7.4% share – a United States Geological Survey report showed.

Indonesia comprised 18.7% of the world's output of bauxite in 2013 before the country banned mineral ore exports in 2014. The ban resulted in more than a 90% plunge in domestic bauxite output in the following years, and brought exports to a standstill. Production and exports of copper and nickel ores were also hit, and the value of the country's minerals exports fell to \$9.4 billion in 2014 from \$15 billion in 2013, according to the UN Conference on Trade and Development.

### Export ban impact

Indonesia's export ban was in part aimed at encouraging in-bound investment to develop domestic refining and processing, and the move has been generally effective. One example is the 1 million mt/year PT Well Harvest Winning Alumina Refinery – a joint venture in which China's Shandong Hongqiao Group holds a 56% stake – that began operating in May 2016. This project marked the debut of alumina production in Indonesia.

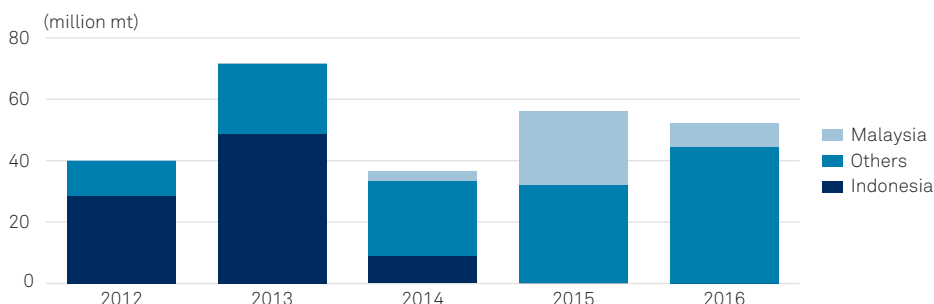
With the completion of some investment projects last year, overall exports of processed minerals have increased. On some estimates, Indonesia's mineral export value could reach \$22 billion this year.

Somewhat surprisingly, Indonesia eased the ban on mineral exports in 2017 (subject to varying conditions), allowing the export of low-grade nickel ores, bauxite with an aluminum content of 42% minimum, and a temporary grant to export copper concentrate. At the end of May, Indonesia's Antam obtained approval to export 850,000 wet mt of bauxite, ending a ban imposed on it by the government in January 2014.

There is no consensus on why Jakarta changed its policy on exports. Some market participants believed the country wanted to regain lost market share and revenues from lost nickel and bauxite exports, after they were overtaken by the Philippines and Malaysia during the ban period.

Regardless, Indonesia's easing of the export ban has upset some investors and reduced foreign investment. Several Chinese investors, including Virtue Dragon Nickel Industry, have warned of legal action against Jakarta,

### CHINA BAUXITE IMPORTS



Source: China Customs

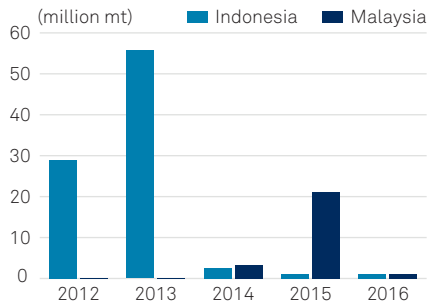
### LME NICKEL PRICES



Source: LME

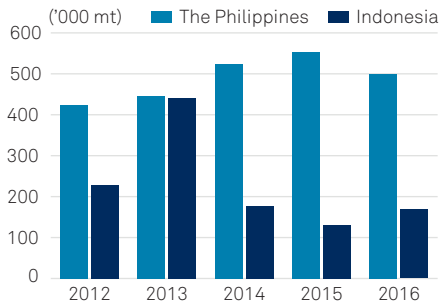


## BAUXITE OUTPUT



Source: United States Geological Survey

## NICKEL OUTPUT



Source: United States Geological Survey

and threatened to halt further expansion plans in the country.

Further, reversing the ban is expected to put downwards pressure on metals prices if more exports are seen in the near-term.

Given this scenario, will investors continue to be attracted to the ASEAN region? Most likely – as it remains a major mineral resource base with comparatively low production costs, particularly in emerging markets such as Indonesia and the Philippines. However, more caution will be exercised in light of the various unexpected changes in government policies, especially if the mood in certain countries is interpreted as being increasingly protectionist. Political instability in the region will also be closely monitored by the investment community.

## Mining rules

**Indonesia** introduced more protectionist mining rules this year, requiring copper mining giant, Freeport Indonesia, to convert its original contracts of work into a special contract, as well as pay new scheme of taxes, and divest a 51% stake in the company.

Freeport, a subsidiary of US Freeport McMoRan, and operator of the world's second-biggest copper mine, Grasberg in Indonesia, responded with a threat of arbitration and massive layoffs. As a result, the company has been banned from exporting copper concentrates for more than three months. In late August Freeport decided to give up its majority stake in Grasberg.

**The Philippines** displaced Indonesia as the world's top nickel producer and exporter after the latter's export ban in 2014, but also imposed production and export restrictions over the past year due to environmental concerns. In 2016, the country saw a halt in mining expansions and shutdown of more than half of its mines, citing sub-par environmental standards. As a result, the value of its minerals exports slumped by 18% from the year before in 2016 to \$2.3 billion, and by a massive 42.5% compared with 2014, Philippines Mines and Geosciences Bureau data showed.

However, former Environment Secretary Regina Lopez, who was instrumental in the mining ban, was ousted in May. This has led to expectations of a resumption of mining and a subsequent increase in nickel supply this year, which has resulted in softer nickel prices after last year's bull run.

**Malaysia** took advantage of export bans in neighboring countries to lift its bauxite production in 2015 to 2 million-3 million mt, accounting for around 8% of global output from just 1% the year before. Despite this, the country imposed a temporary three-month ban on production and exports at the start of 2016 due to pollution in the state of Pahang stemming from the spike in mining operations in the region.





# Biofuels

## Regional governments aim for biofuels self-sufficiency

Southeast Asia's biofuels policy has largely been premised on governments in the region mandating that all biofuels be made from indigenous feedstocks.

Thailand relies on sugar cane and cassava for ethanol production, while Indonesia and Malaysia use crude palm oil (CPO) for biodiesel.

Among ASEAN countries, Thailand has been most successful in implementing its biofuels policy.

A combination of subsidies, fiscal policies and effective awareness campaigns has made this possible.

Thailand also has one of the most aggressive renewable fuel targets with the 2015 Alternative Energy Development Plan (AEDP) targeting

for renewables to account for 30% of total energy consumption by 2036. Ethanol and biodiesel will play a significant role in meeting that target.

Thailand's biodiesel blending mandate stands at an upper limit of B7 (7% biodiesel blending into diesel). Blending ratios are adjusted to reflect the CPO supply situation.

In July 2016, the government lowered the blend level to B5 after CPO supply was hit by El Nino. This mandate was further lowered to B3 in August to ensure food supply security.

Thailand does not have an ethanol blending mandate, but retail outlets sell a range of ethanol-blended gasoline, locally known as gasohol, from E20 (20% ethanol-blended gasoline) to E85.

Supportive policies have led to ethanol-blended gasoline accounting for almost 95% of total gasoline sales in the country.

The retail fuel price of ethanol-blended gasoline is maintained 20% to 40% below regular gasoline with the aid of subsidies.

The government also supports the manufacturing of vehicles that are compatible with E20 and E85 gasohol with the excise tax rate for such cars set at 17% compared with 30% for E10 vehicles.

Going forward, the government's AEDP will add further impetus to the country's biofuels demand.

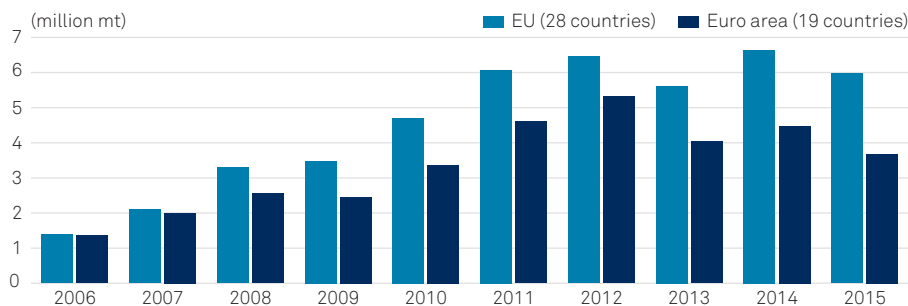
Thailand strictly controls palm oil imports and only domestic palm oil is allowed to be used for biodiesel production.

As part of the AEDP, Thailand plans to increase the palm crop area to 1.2 million hectares by 2036 from 0.5 million hectares today with the aim of easing supply tightness.

The country currently produces 6.5 million liters/year of biodiesel and the AEDP envisages production at 14 million liters/year by 2036.

Thailand is completely self-sufficient in ethanol with production

### IMPORTS OF BIODIESEL



Source: Eurostat

currently at 4.44 million liters/day. The AEDP is targeting for production volumes to reach 11.3 million liters/day by 2036.

## Philippines – the only importer

While Thailand prohibits ethanol imports, the Philippines is emerging as a major destination for ethanol suppliers.

The Philippines initiated a 10% ethanol blending mandate in 2011 to support its domestic sugarcane farmers and plans are in place to raise this to 20% by 2020 and to 85% by 2025.

The country does not prohibit imports, but oil companies are obliged to buy the more expensive domestic ethanol, irrespective of price, and can supplement any shortfall with imports.

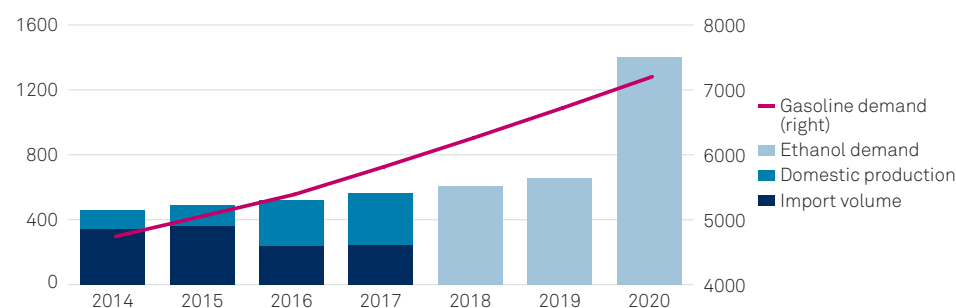
Oil companies in the Philippines are allocated a purchase quota proportionate to their market share in the retail gasoline market, and are required to fulfill the quota before turning to imports.

The country consumed 520.38 million liters of ethanol for blending in 2016, of which 281.81 million liters came from domestic production and 238.57 million liters from imports.

The US has been one of the big suppliers of ethanol to the Philippines.

In 2017, a new 40 million liter/year distillery is expected to begin operating, taking the total to 11 plants

## PHILIPPINES GASOLINE AND ETHANOL DYNAMICS (million liters)



Source: DOE, Platts

with combined capacity of 322 million liters/year.

Demand for ethanol is expected to more than double to 1.4 billion liters by 2020, according to forecasts by S&P Global Platts, leaving plenty of space for imports.

*“What was a boon for the PME industry has turned into a curse as growth in palm oil plantations has led to massive deforestation, especially in Indonesia.”*

## Vietnam – an emerging user

Vietnam is an emerging ethanol user in ASEAN but its plan faces fierce headwinds as high production costs and unstable supply continue to hamper availability of the biofuel.

In January 2016, the government made a second attempt at mandating 10%

blending in all gasoline sold in selected provinces and cities.

But it was forced to defer the plan after high costs and unstable domestic production did little to incentivize retailers and customers to switch from 92 RON gasoline to E5.

Unlike Thailand, Vietnam has not been able to price E5 more attractively and convince consumers of the benefits of switching to the environmentally-friendly fuel.

The price of E5 tends to be only around 1.5% below regular gasoline.

The absence of a significant cost incentive to buy E5 is making it difficult for the government to change consumer behavior. Retail prices are also not attractive enough to encourage suppliers to invest in new pump stations to sell E5, especially given the high cost of feedstock for producing ethanol.

Not long after Vietnam began construction of a number of major ethanol projects in 2009 and 2010, the price of cassava, the main feedstock for ethanol production, went up unexpectedly – from an average Dong 2,000/kg over 2009 and 2010 to Dong



## Commodities **Biofuels**

3,500-5,000/kg between 2011 and mid-2016.

Only two ethanol plants are currently in operation in Vietnam, with a combined capacity of 150,000 cubic meters/year. The remaining plants have suspended production owing to high costs.

Weak domestic demand has driven ethanol producers to increase their dependence on exports, with only 20% of the country's ethanol

output consumed domestically at present. The balance is exported, mainly to Japan, South Korea and the Philippines.

But Hanoi has not given up. In June 2017 it set a new mandate to switch all 92 RON sold in the country to E5 by January 1, 2018.

But with no plan in place to tackle the issues that led to failure in the past, chances of success appear unlikely this time.

## **Biodiesel faces headwinds**

There are several headwinds facing the Indonesian and Malaysian biodiesel industry due to policy uncertainty in their biggest export markets, Europe and the US.

Indonesia and Malaysia are the world's largest producers of crude palm oil and palm oil-derived biodiesel (Palm Methyl Ester).

As the world began to tackle global warming with the adoption of the Kyoto protocol in the late 1990s, blocs like the EU created biodiesel blending mandates.

To fulfill these mandates, demand for biodiesel increased and this was met by domestically produced biodiesel and imports, with the most competitive biodiesel coming from Argentina and Indonesia.

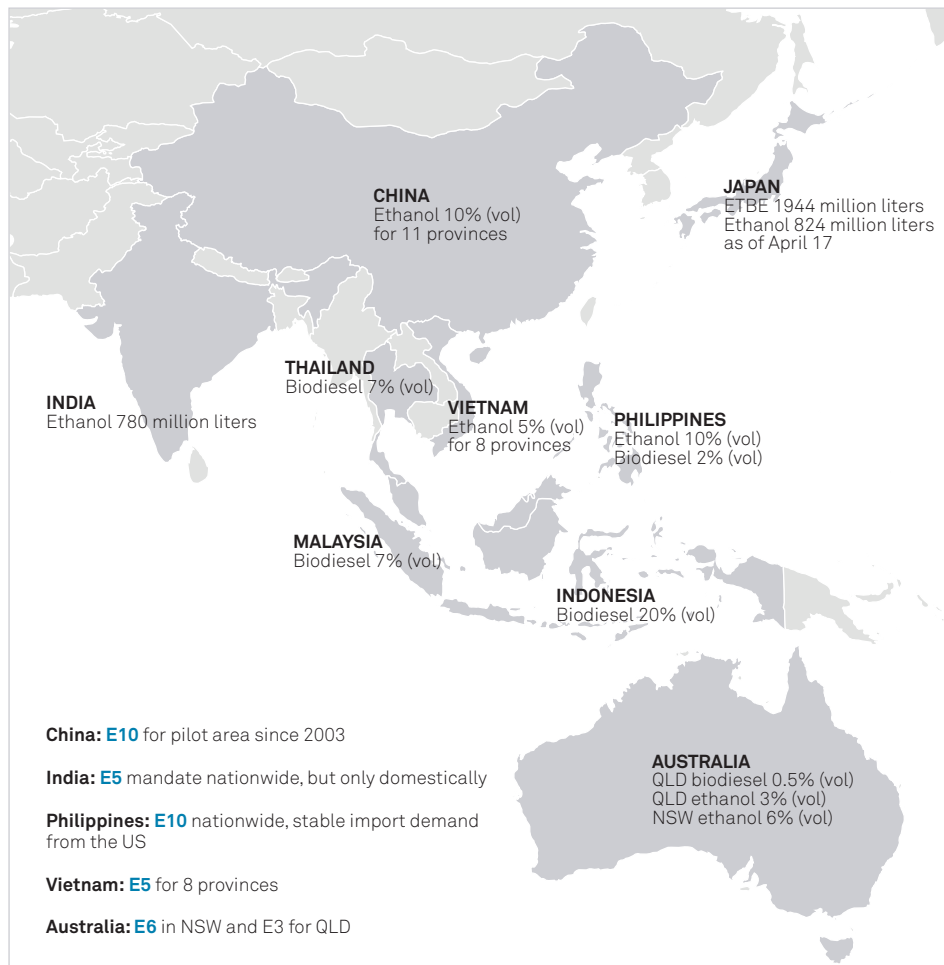
This increased demand for cheap PME drove massive investment in Indonesia and Malaysia and expanded the area under palm oil cultivation.

But what was a boon for the industry then has recently turned into a curse as growth in palm oil plantations has led to massive deforestation, especially in Indonesia.

PME is now under increasingly harsh scrutiny from the US and EU and is no longer considered "sustainable" since it leads to Indonesia burning its rain forests, emitting 11.3 million mt of carbon per day, and causing a region-wide haze at certain times of the year.

The European Parliament is setting the stage for an eventual ban on PME as a blend stock for gasoil in the EU,

## **FUEL ETHANOL MANDATES IN ASIA**



Source: Platts

sparking an Indonesian and Malaysian outcry. Norway has already banned the use of PME in its public procurement.

The US, meanwhile, under President Donald Trump has lowered its overall blending targets, raising a big question mark around biodiesel demand from the country.

Cheap Indonesian biodiesel supply, which in some cases replaced domestic biodiesel produced in the US and EU, is also being targeted by their respective domestic biodiesel industries and has been subjected to anti-dumping tariffs.

Another uncertainty facing the biodiesel industry is the prolonged downturn in oil prices, which lowers the incentive for blending, further reducing PME demand.

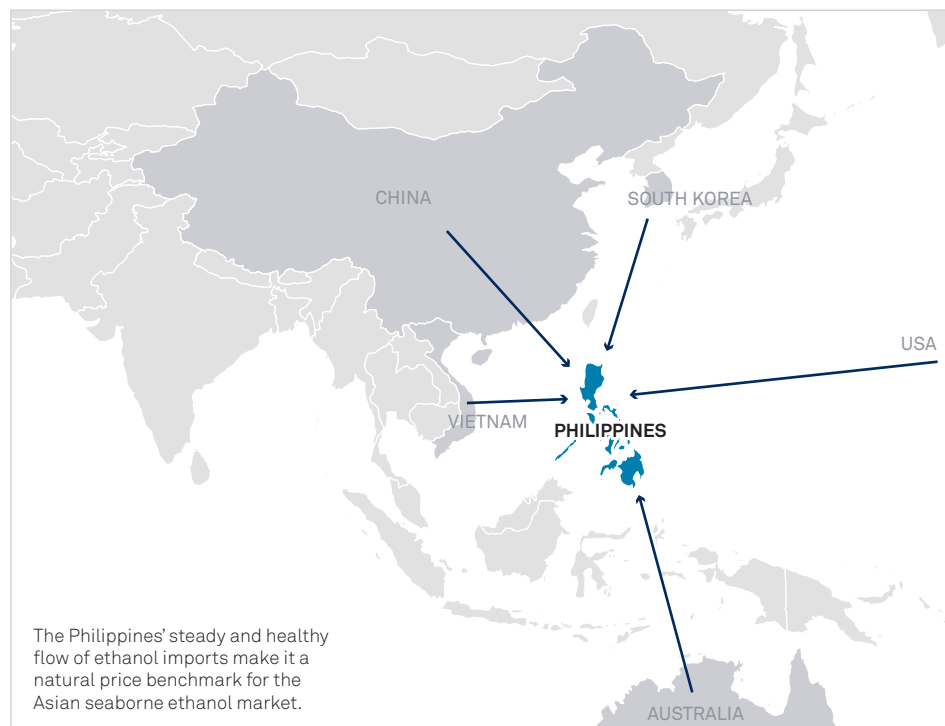
When oil prices were nearly \$100/barrel, countries around the world began blending biodiesels into their gasoil to lower the price of their fuel.

However, as oil prices began falling in mid-2014, demand for biodiesel for voluntary blending slowed and eventually disappeared.

Currently, biodiesel demand is only driven by mandatory blending laws which aim to reduce carbon dioxide emissions.

*“ASEAN’s biofuels policy has largely been premised on making biofuels from indigenous feedstocks”*

## THE PHILIPPINES IMPORT PRICES CAN ACT AS ASIAN BENCHMARK



Source: Platts

To protect its domestic PME industry from the vagaries of external factors, Indonesia raised its own biodiesel blending mandate to B20 in 2015. Malaysia raised it to B10 officially, but this has not yet been implemented.

The Indonesian mandate is financed by a \$50/mt levy on crude palm oil exports.

The money collected is used by the government to finance the purchase of PME from domestic producers for blending into gasoil and selling within the country.

This has been an important prop in increasing demand for palm oil and keeping palm oil prices firm.

Indonesia and Malaysia have responded to the EU threat of

palm oil bans and anti-dumping duties by promising retaliatory measures such as dropping arms purchases.

But their main response has been to increase the domestic mandates within their own countries.

Indonesia's domestic mandate is especially important in this regard because the government promises to raise the blend percentage to B30 for the transport sector by 2020.

Increasing biodiesel demand will keep Indonesian PME capacity occupied, but more importantly, it provides valuable demand which keeps palm oil prices propped up.



# Shipping

## Huge dry bulk and tanker growth but investment needed

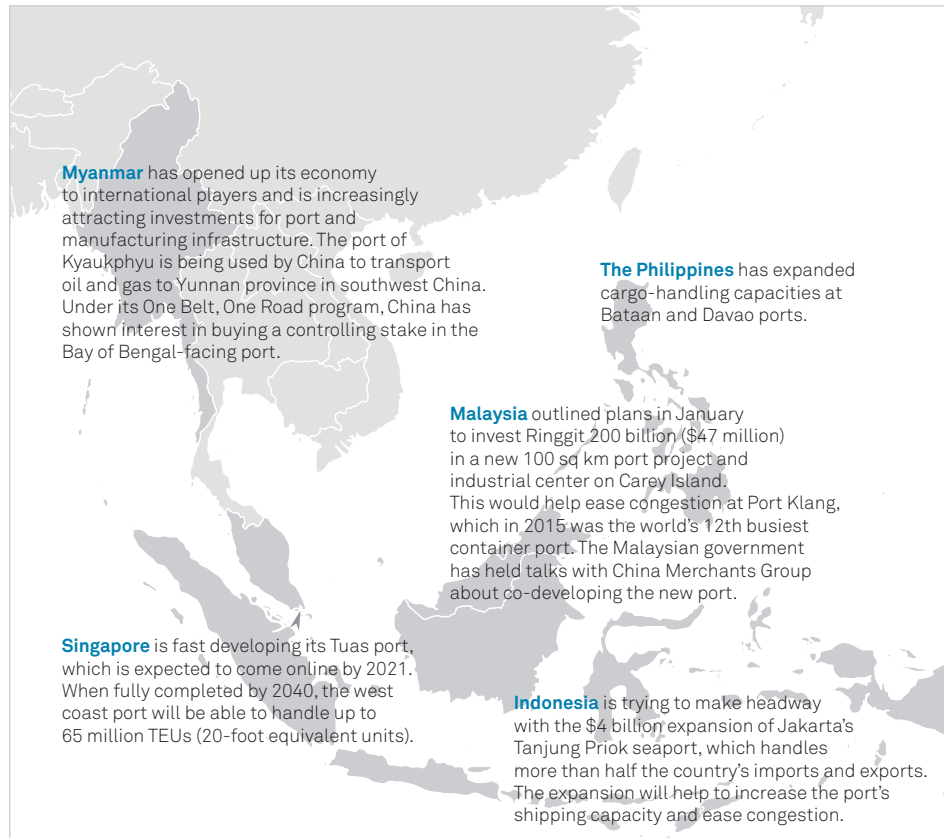
ASEAN's thriving commodity import and export markets are set to intensify demand for dry bulk vessels and tankers and underscore the urgency for ASEAN countries such as Indonesia, Malaysia and the Philippines to upgrade their ports.

With total trade of around \$1.5 trillion, the region is both a net exporter and importer of crucial commodities and this creates a sizable dry bulk and tanker market.

Regional coal trade, led by Indonesia, the world's largest thermal coal

exporter, is one of the bulwarks of the Panamax (76,000 dead weight tons), Kamsarmax (81,000 dwt) and Supramax/Ultramax (57,000-63,000 dwt) dry bulk segments. The minor bulk trade from Indonesia, the Philippines, Thailand and Vietnam has been lending support to the Handymax (40,000-50,000 dwt) and Handysize (up to 50,000 dwt) class dry bulkers.

### ASEAN'S PORT INFRASTRUCTURE PLANS



Source: Platts

Indonesia's coal exports rose 0.6% year on year to 369 million mt in 2016, the country's customs data shows.

From a shipping perspective, this would equate to 4,920 Panamax-class vessel shipments, or 7,380 Supramax-class shipments to send cargoes to their destinations. Panamax vessels can hold about 75,000 mt of coal, while Supramax ships can hold 50,000 mt.

Indonesia is forecast to export around 375 million mt of coal in 2017, which would equate to around 7,502 Supramax shipments, or 5,001 Panamax shipments.

In 2018, exports are set to ease slightly to 371.3 million mt, equal to some 7,426 Supramax-sized cargoes or 4,950 Panamax-sized cargoes, according to PIRA Energy Group, a unit of S&P Global.

Indonesian thermal coal exports are mainly driven by Indian and Chinese demand, supported by solid demand from Malaysia, Thailand and the Philippines.





### Singapore at a glance

One of the world's busiest trans-shipment hubs, Singapore has about 1,000 vessels positioned at its port at any given time. It is the world's top bunkering port with more than 48 million mt of bunkers supplied to ships calling at its port.

With over 5,000 maritime firms operating in Singapore, it is a huge magnet for shipping talent and a base for market expertise. The Singapore Registry of Ships is among the top 10 registries in the world, with more than 4,500 vessels registered, according to the Maritime Singapore publication. Though China is the major customer for bulk commodities, such as iron ore and coal, the regional sales and marketing functions of major mining companies, such as Vale, BHP Billiton and Rio Tinto, are based in Singapore.

Malaysia is expected to import 23.9 million mt of coal this year and 26 million mt in 2018. To ship these volumes to Malaysia would require 478 Supramax or 318 Panamax vessels this year, and 580 Supramax or 366 Panamax vessels in 2018, PIRA estimates.

### New ports needed

But while demand for coal has been growing, the development of coal ports and terminals has been lagging, hurting Indonesia's finances.

Overcrowded ports and poor connectivity between Indonesia's islands have led to logistics costs equal to around 24% of GDP, compared with

16% in Thailand. If Indonesia could reduce its costs to 16%, it could save about \$70 billion to \$80 billion a year, it has been estimated.

Indonesia is also losing much-needed revenue by coal loading being mostly done at anchorages where charges are lower, rather than at underutilized coal terminals. This is discouraging the development of new terminals.

Charges at anchorages are generally around \$10,000, while loading at a terminal can cost up to \$25,000.

The downside of loading at anchorages is that shipments could be delayed by inclement weather, and floating cranes tend to be less efficient.

Indonesian coal is shipped out in four ways:

- via existing ports, most of which are unable to accept large vessels;
- via towed barges that sail directly to international destinations;
- via trans-shipment, whereby coal is transferred from barges onto large bulk carriers by floating cranes;
- and on floating vessels which stockpile coal brought in on barges before being loaded onto larger vessels.

To mitigate draft limitations at Indonesian ports, trans-shipments and floating vessels are used at coal ports that are



## Commodities Shipping

unable to accommodate Handymax, Panamax and Capesize vessels.

In 2014, Indonesia announced ambitious plans to build 14 dedicated coal terminals on the islands of Kalimantan and Sumatra in a bid to improve its infrastructure and to curb illegal coal exports estimated to be around 50 million-60 million mt/year.

But to date, the terminals remain at the planning stage, and it is unclear how they will be funded.

### Crude oil imports set to rise

Net crude oil imports by Southeast Asian countries will increase to 3.53 million barrels/day in 2025 from 1.96 million b/d in 2015, according to PIRA, reflecting the region's declining energy self-sufficiency.

If all the crude under the current capacity is ferried on Very Large Crude Carriers (VLCCs), it would require almost 908 vessels. At a capacity of 5 million b/d, refined products moved regionally

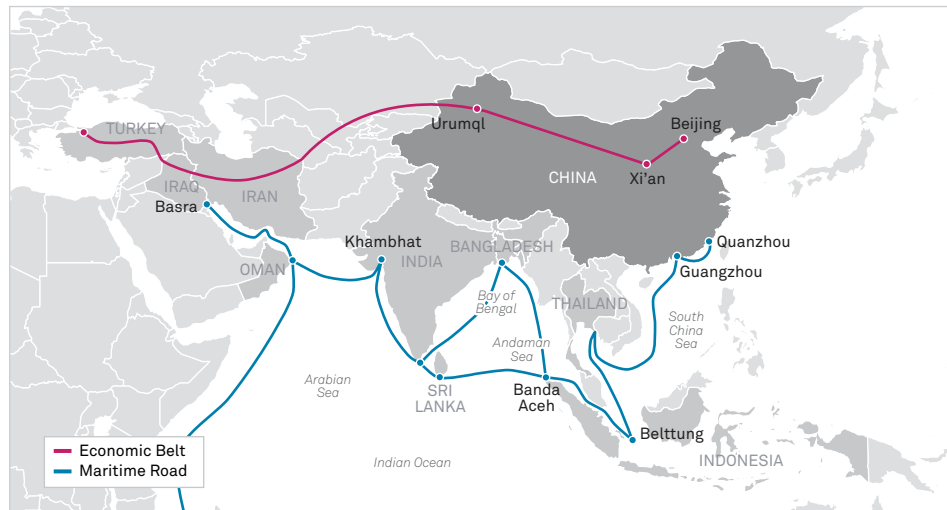
on Medium Range (MR) class tankers would require about 6,260 shipments. A VLCC can load 2 million barrels of crude, or 280,000 mt, while an MR can hold 40,000 mt of oil products.

The regional crude trade had given rise to what the tanker industry called the "Indo market", covering mainly oil ports and terminals in Indonesia, Malaysia and Brunei. ASEAN is one of the largest markets for the Aframax and Medium Range class tankers in Asia.

Rapid economic development of the ASEAN region is also driving demand for steel, which is boosting the Supramax vessel segment of the dry bulk market. Vietnam's infrastructure boom pushed up steel imports by almost 20% to a record of 18.4 million mt last year, according to ship brokers. This required some 460 Handymax vessels, each of which can hold 40,000 mt parcels, or 368 Supramax vessels.

Grain shipments from Europe and Australia to ASEAN are also lending support to the Panamax and Kamsarmax segments.

## ONE BELT, ONE ROAD



Source: China US Focus





### **China's One Belt, One Road strategy will benefit ASEAN**

Sometimes a foe, sometimes a friend, China is set to wield even greater influence in the ASEAN region through its One Belt, One Road strategy. Notwithstanding ongoing tensions in the South China Sea, many of the ASEAN nations will need Chinese help to develop new infrastructure, including ports.

Two-way investment between China and ASEAN over the past quarter of a century is estimated to have exceeded \$160 billion. This could grow significantly if China's OBOR initiative directs funds into developing new ASEAN ports to facilitate the movement of goods and promote economic ties.

Beijing's OBOR policy is largely about extending its 'soft power' across much of the globe and facilitating China's economic interests. But new ports and infrastructure will greatly benefit ASEAN countries. China could potentially invest in Vietnam's key Hai Phong Port, which requires a major upgrade.

In Malaysia, China is leading the development of the Melaka Gateway, costing \$7.3 billion, and the near \$13 billion East Coast rail line. The Philippines is also set to benefit from Beijing's deep pockets after China agreed last year to loan the Southeast Asian country some \$9 billion.

The trade-off is that China will expect new infrastructure projects to be built by Chinese engineering companies, using Chinese materials like steel, and in many cases Chinese workers. This can be politically sensitive and can cause tensions. In 2014, locals attacked Chinese contractors building the Ha Tinh steelworks in northern Vietnam during a dispute between the two countries in the South China Sea.

China's major rival in the region, Japan, will not want to cede too much influence to Beijing, particularly as Southeast Asia is a key plank in Japan's auto and white goods manufacturing supply chain. In a presentation in March, Japan's ambassador to ASEAN, Kazuo Sunaga, highlighted the country's cooperation with the region. This included investment in a number of ports in ASEAN, such as Da Nang and Hai Phong ports in Vietnam, Map Ta Phut and Laem Chabang ports in Thailand, and Sihanoukville port in Cambodia. Japan has also issued loans for some seven ports in Indonesia.





# Thermal coal

## New era beckons for thermal coal as Southeast Asia emerges as growing demand center

Southeast Asia is set to be the next demand growth region for thermal coal, following on from the rise of China and India as gigantic import markets for the seaborne-traded generation fuel.

Cambodia, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam are all building a new generation of super-efficient coal-fired power plants to increase their electricity generation from thermal coal.

Indonesia has been a dominant supplier to these countries but expansion plans for thermal coal generation herald a new era for the Asian thermal coal market that could see new trade routes emerge for export shipments from Australia, Colombia, Russia and the United States.

China and India, meanwhile, have both matured in terms of their import demand and both are looking to overhaul their own domestic coal industries to decrease their dependence on imports.

Thermal coal is becoming the fuel of choice for fast-growing Southeast Asian countries as it is relatively cheap compared with imported LNG, and has fewer of the safety issues surrounding nuclear power.

Thermal coal-based electricity capacity in ASEAN is projected to increase from about 47 GW in 2013 to 152 GW in 2025, and then to 261 GW in 2035, an average growth rate of 8.1%, according to ASEAN's Center for Energy.

This is despite a push towards renewable energy in the region,

as part of Southeast Asian countries' commitment to the COP21 Paris Agreement on reducing climate change.

With all this forecast growth, it is not surprising to discover that thermal coal is projected to overtake oil as the main fossil fuel to power ASEAN's growing economies by 2035.

According to estimates by the ASEAN Centre for Energy, coal is expected to account for 26.3% of the region's total energy mix by 2020 and 33% by 2035 compared with 20% in 2013.

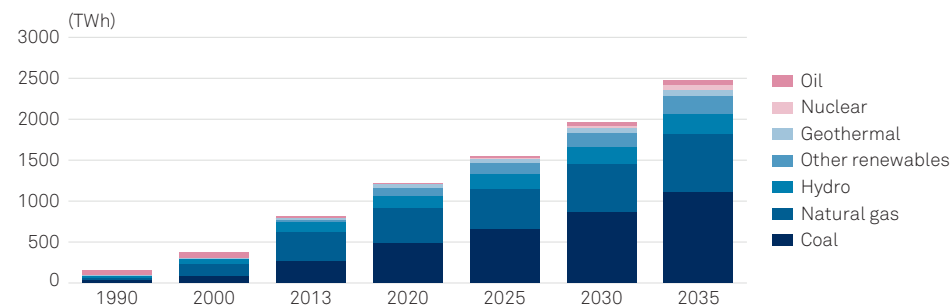
### Indonesia's changing supply-demand dynamics

The traditional coal exporting nation of Indonesia represents an interesting case study in the Asian market's development.

The vast archipelago nation that spans 17,000 islands is building 20 GW of new power plants to run on 80 million mt of thermal coal from its domestic mines.

Jakarta's Domestic Market Obligation requires domestic producers to quarantine an ever-growing supply for Indonesian power plants.

### ELECTRICITY GENERATION



Source: The 4th ASEAN Energy Outlook 2013-2035, ASEAN Centre for Energy

Indonesia's coal demand is projected to increase from 65 million mt in 2010 to 240 million mt in 2019, driven by new coal-fired power generation.

Indonesian coal production hit a peak of 474 million mt in 2013 and is forecast to decline to 400 million mt in 2019, according to the Ministry of Energy and Mineral Resources.

Indonesia's thermal coal exports are expected to decline to 361 million mt by 2035 from 366 million mt in 2015 as the country diverts more coal for domestic use, data from S&P Global Platts Analytics showed.

As Indonesia's own demand for thermal coal continues to increase, Southeast Asian countries will need to draw supply from other sources, for example from Colombia and the US.

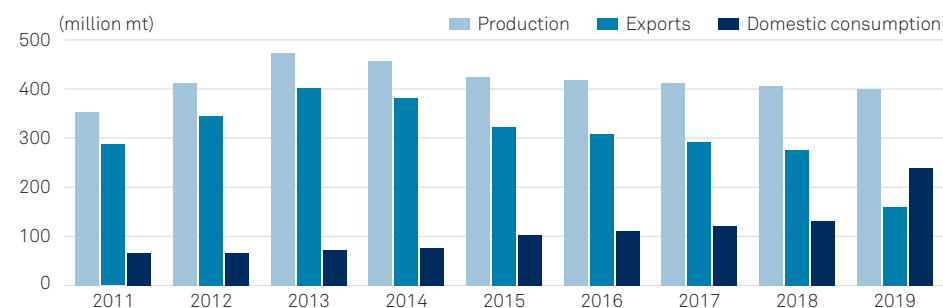
The US plays a swing supply role to the Asian market, as evidenced by the two coal terminals near San Francisco in California that ship to Asian customers when Australian 6,000 kcal/kg NAR prices rise above \$70/mt FOB.

Colombian coal producers have benefited from a widening and deepening of the Panama Canal through Central America that has enabled larger ships to navigate from the Atlantic to Pacific markets.

Policy changes in China have caused volatility in Indonesia's thermal coal exports to its largest buyer.

For example, in June 2017 up to 10 Chinese ports imposed restrictions on accepting imported cargoes as Beijing

### INDONESIAN COAL PRODUCTION, CONSUMPTION AND EXPORTS 2011-2019



Source: Indonesian Ministry of Energy and Mineral Resources

### INDONESIA'S COAL EXPORTS BY REGION (million mt)

	2014	2015	2016
Asia	293.14	278.71	279.32
Middle East	0.52	0.09	0.20
Europe	4.47	5.48	5.78
Australia, NZ & Pacific	0.09	0.27	0.15
Americas	0.66	0.23	0.46
Africa	0.09	0.05	0.00

Source: Platts, BTS

### KALIMANTAN AND SUMATRA COAL PORTS



Source: Platts



### Vietnam's thermal coal imports tipped to surge

Vietnam's thermal coal imports are predicted to soar in coming years to serve rising energy demand, particularly in the power sector. State-owned Vietnam Electricity (EVN) predicts that Vietnam's electricity demand will rise by around 10% annually over the next five years.

Coal-fired power plants account for around 30% of Vietnam's total power capacity of 42,000 MW. The country's coal demand for power generation is expected to increase from around 35 million mt in 2017 to 60 million mt/year by 2020, before rising to 100 million mt/year by 2025 and to 140 million mt/year by 2030.

Coal demand from the cement industry is forecast at 6.5 million mt in 2017, more than 8 million mt/year by 2020, and around 9 million mt/year from 2025.

EVN's coal-fired power plants mainly used domestic coal, or high-quality anthracite coal, before 2016. But the company imported 680,000 mt of coal for the first plant, the 1,245-MW Duyen Hai 3 in the Mekong Delta province of Tra Vinh, last year. EVN's coal imports will rise to 4.7 million mt this year, 11 million mt/year by 2020 and 19 million mt/year by 2025, Hai said.

GENCO 1, a wholly-owned subsidiary of EVN and operator of Duyen Hai 3, will import around 3 million mt of coal this year and is currently the country's biggest importer of bituminous and sub-bituminous coal.

In 2016, Vietnam produced 38.4 million mt of coal, down 7.5% from 41.52 million mt in 2015.

In June Vietnam's government directed Vietnam National Coal-Mineral Industries Holding Corp. Ltd., or Vinacomin, to consider reducing its selling prices to lower stockpiles and better compete with imports.

At the time, Vietnam's average domestic coal price was about Dong 2 million/mt (\$88/mt), considerably higher than prices of imported coal at around Dong 1.5 million-1.6 million/mt.

Vinacomin's coal stockpile was around 9 million mt, down from 12 million mt at the end of last year. In January-May, Vietnam imported 5.57 million mt of coal, down 4.7% on the year before, which mostly came from Indonesia, Australia and Russia.



took steps to defend its domestic coal industry from competition.

Further, a rise in India's domestic coal production has led to a sharp drop in its imports of Indonesian coal.

Indonesia has sought to diversify its customer base to lessen its dependence on China and India.

Southeast Asia has seen a steady rise in imports of Indonesian coal to 42.9 million mt in 2016, from 32.8 million mt in 2014, said the ministry.

## Rising demand in the Philippines and Thailand

Coal-fired power generation plays a significant role in most ASEAN countries' power development plans.

The Philippines Department of Energy expects its demand for coal for power generation to rise by 45% from 7.44 million mt of oil equivalent in 2014 to 10.82 million mt of oil equivalent in 2030.

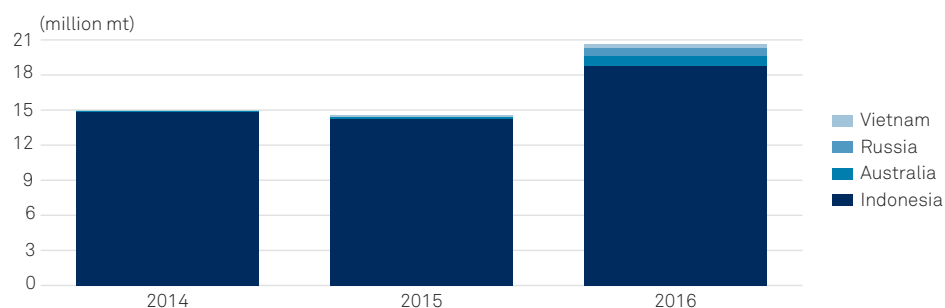
The Philippines' thermal coal market had a sizeable deficit in 2014 with demand at 20 million mt to domestic supply at 9 million mt that year, leaving imports to bridge the gap.

With domestic coal production not expected to keep pace with demand growth, imports will play a bigger role in meeting demand in the years ahead.

Platts Analytics expects the Philippines' coal imports to rise from 11 million mt in 2017 to 18 million mt in 2035.

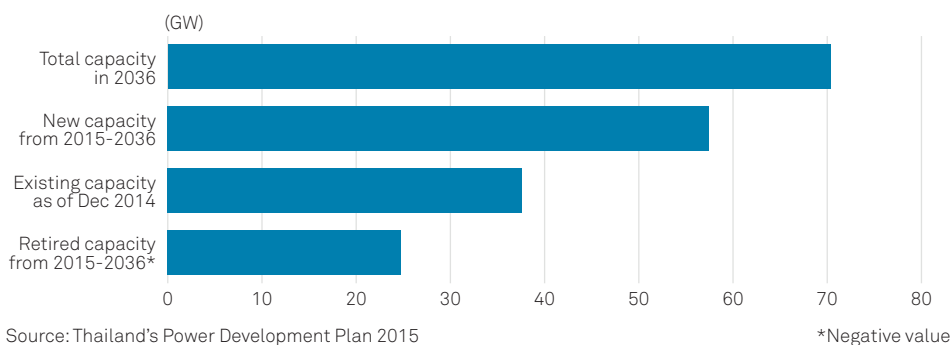
Indonesia has been a dominant supplier to the Philippines, accounting for almost all of its imports in 2014, though

## THE PHILIPPINES' COAL IMPORTS BY ORIGIN 2014-2016



Source: The Philippines' Bureau of Customs

## THAILAND'S POWER GENERATING CAPACITY 2015-2036



Source: Thailand's Power Development Plan 2015

\*Negative value

other origins including Australia are gaining ground.

Thailand, meanwhile, has been heavily dependent on domestic and imported natural gas for electricity generation, but most of its gas needs are met by Myanmar, which is starting to divert more gas to meet its domestic needs.

Based on Thailand's Power Development Plan 2015, the country aims to add 57,459 MW of new generation capacity.

Coal will fuel 75% of Thailand's thermal power generation in 2026, but the share will fall to 61% by 2036, as Thailand aims to cut its carbon emissions by 20%-25% under the COP21 Paris climate agreement.

Thailand's thermal coal imports are expected to rise from 8.5 million mt in 2016 to 11.6 million mt by 2030, according to Platts Analytics.

Most of Thailand's coal comes from Indonesia. But similar to the Philippines, Thailand has opened up more to coal imports from other origins, such as Russia and Australia.

A number of Southeast Asian countries are choosing thermal coal imports to fuel their expanding electricity generation systems. This includes countries such as Indonesia and the Philippines that each have sizeable domestic coal industries, but which do not supply enough to meet their growing energy needs.



# Petrochemicals

## Demand booming but the region could become a net exporter

Southeast Asia's robust petrochemical sector has contributed to the region's strong economic growth. With living standards rising, the region has witnessed polymer demand growth levels consistently above GDP growth over the past five years. ASEAN's polyolefin demand is projected to increase by around 6.5% over the next decade, surpassing the 5% GDP growth projected over this period.

ASEAN is the world's third-largest consumer of polyolefin at more than 11.5 million mt/year, behind the United States and China and marginally above India. Combined polyethylene and polypropylene demand in ASEAN is set to rise to 17.5 million mt by 2027, according to S&P Global Platts Analytics.

Indonesia, Vietnam and Malaysia are expected to break into the top 15 polyolefin demand centers globally by 2027. Regional polyolefin powerhouse Thailand is currently number 11 in the global polymer demand list but is set to

move to number six by 2027 – behind China, the US, India, Japan and Germany.

The availability of petrochemical feedstocks due to significant investment in integrated refining projects, and the geographical advantage of established trade routes, have combined to bring supply and demand into balance.

New investment in polyolefin aims to meet regional demand growth, especially for polyethylene, and the integrated nature of these projects will help maximize margins due to feedstock flexibility.

Some projects involve enormous levels of investment, such as Petronas' Refinery and Petrochemical Integrated Development (RAPID) project, which is estimated to cost around \$27 billion. State-owned Saudi Aramco has pledged to invest \$7 billion into the project in Malaysia's southern state of Johor. RAPID consists of a 300,000 barrel/day oil refinery and a petrochemical facility with 7.7 million mt/year capacity.

Vietnam's \$9 billion Nghi Son Refinery, 200 km from capital Hanoi, is being developed by a consortium consisting of Petrovietnam (25.1%), Idemitsu Kosan, Kuwait Petroleum International (35.1% each) and Mitsui Chemicals (4.7%). The facility will produce 400,000 mt/year of polypropylene and 240,000 mt/year of benzene.

Even if all the projects planned for the region come onstream as planned, Southeast Asia will continue to be short of polyethylene. ASEAN's polyethylene surplus, which peaked at 1.15 million mt in 2014, is expected to turn into a deficit by 2019.

But for propylene there could be a surplus of 1.2 million mt/year by 2027 as new refinery projects generally include propylene production units, and polypropylene is considered the best option for downstream propylene consumption.

Recent delays to some new refinery-based petrochemical complexes due to prolonged negotiations for feedstock security suggest the need for a more flexible policy approach. Some market participants have suggested tax cuts to Middle Eastern feedstock providers and cheaper access to land.

### Could the region become a net exporter?

Imports from East Asia and the Middle East mainly meet ASEAN's supply gap in the olefins and aromatics chain.

### NEW PETROCHEMICAL PROJECTS ('000 mt/year)

Country	Company	Product	Capacity	Location	Start-up
Thailand	PTT	PE	400	Map Ta Phut	2018-19
Thailand	Thailand Integrated Refinery Petrochemicals (IRPC)	PP	300	Map Ta Phut	2017
Malaysia	RAPID	PE/PP	850/900	Pengerang (southern Johor state)	2019
Vietnam	Nghi Son Refinery	PP/BZ/PX	400/240/700	Tinh Gia District, Province Thanh Hoa	2018
Vietnam	Long Son petrochemical complex	BZ/PX/PE/PP	240/700/900/400	Long Son Island, Vung Tau	2022
Indonesia	PT Chandra Asri	PE	400	Merak, Cilegon	2020
Indonesia	Lotte Chemical Indonesia	PE/PP	900/450	Cilegon, Banten	2022

Source: Platts



Upcoming projects will drive the region temporarily towards self-sufficiency across various petrochemical products.

Further, ASEAN has the potential to transform itself into a petrochemical exporter by utilizing its abundant natural resources such as coal and natural gas, which can be used as alternative feedstocks.

The enormous Chinese and Indian polymer-deficit markets will be ideal destinations for potential ASEAN surpluses, helped by geographical proximity vis-à-vis competing American exports. But ASEAN products will continue to compete with East Asian and Middle Eastern producers.

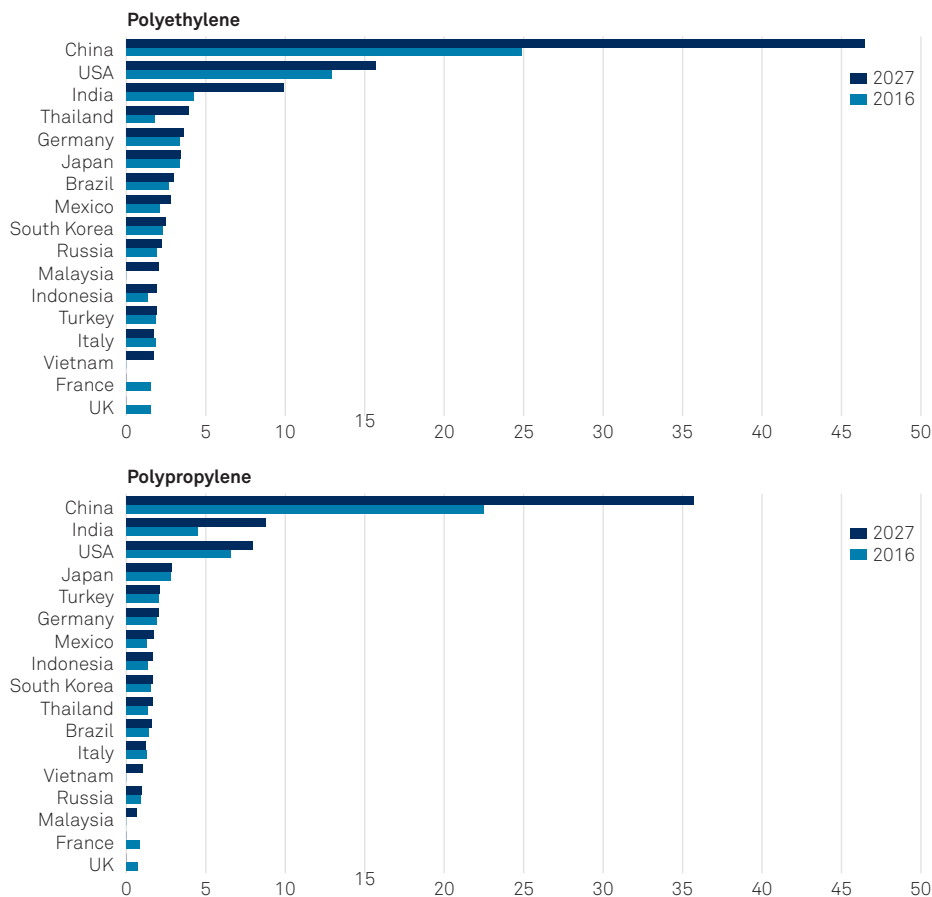
China is expected to remain in deficit over the longer-term despite the development of propane dehydrogenation in recent years. The Indian market could return to a balance if two or three new projects are unveiled over the next five years.

The rising number of petrochemical projects in ASEAN could see individual countries competing against each other. This could potentially see the ASEAN Economic Community (AEC), established in 2015, step in to settle any disputes among its member states, while pushing ahead with the removal of trade barriers.

### Feedstock diversity

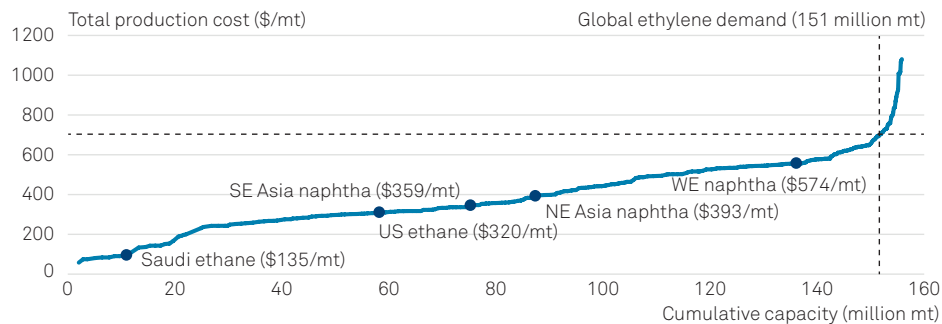
In the current low oil price environment, petrochemical makers in ASEAN are enjoying competitive margins versus non-traditional gas-based crackers, which do not enjoy the same advantage. But the heavy dependence on naphtha as a primary feedstock could also be a hurdle on the way to ASEAN realizing its potential to become a net exporter.

### TOP 15 POLYMER DEMAND CENTERS (million mt)



Source: S&P Global Platts Analytics

### ETHYLENE COST CURVE



Source: S&P Global Platts Analytics

Healthy demand in western markets has pushed naphtha prices above Asian levels, regularly closing the arbitrage to Asia and limiting

monthly flows to 500,000 mt over the past year, compared with up to 1.5 million mt/month when the economics are viable.

## Commodities Petrochemicals

A lack of flexibility and integration among existing crackers deprives them of cheaper feedstocks that can help improve cracking margins, such as LPG and condensates, especially in the face of increased supply from the US due to the shale boom.

In contrast, North Asian petrochemical makers are improving their feedstock flexibility, allowing them to switch to alternatives for a significant portion of their feedstock slate whenever naphtha becomes tight and expensive. Chinese and South Korean petrochemical makers have also invested in propane dehydrogenation plants to capitalize on abundant and cheaper LPG feedstock.

One exception is ExxonMobil's 'one-of-a-kind' crude oil-fed, world-scale steam cracker in Singapore and the recently acquired Jurong Aromatics complex (JAC), which consumes condensate to produce petrochemical products, including 800,000 mt/year of

paraxylene, 400,000 mt/year of benzene and 200,000 mt/year of orthoxylene.

JAC's 100,000 b/d condensate splitter can also produce 783,000 mt/year of jet fuel, 647,000 mt/year of light naphtha, 662,000 mt/year of gasoil, 283,000 mt/year of LPG, 35,000 mt/year of fuel oil, 46,000 mt/year of hydrogen and 18,000 mt/year of heavy aromatics. These two facilities are among the few petrochemical plants that are not completely dependent on a refinery to procure feedstock.

Thailand's steam crackers also mainly use ethane, which is in abundance in the US, instead of naphtha. Of the seven steam crackers in Thailand, only three use naphtha, namely PTT's I4-I, IRPC and Rayong Olefins Co Ltd.

Other abundantly available natural resources provide opportunities to diversify the feedstock slate. The advent of coal-to-olefins via methanol technology

opens possibilities to use Indonesia's coal to set up a new olefin industry. Indonesia also has the option to use natural gas – the traditional feedstock to produce methanol – for the same technology.

### Growing intra-ASEAN trade poses pricing challenge

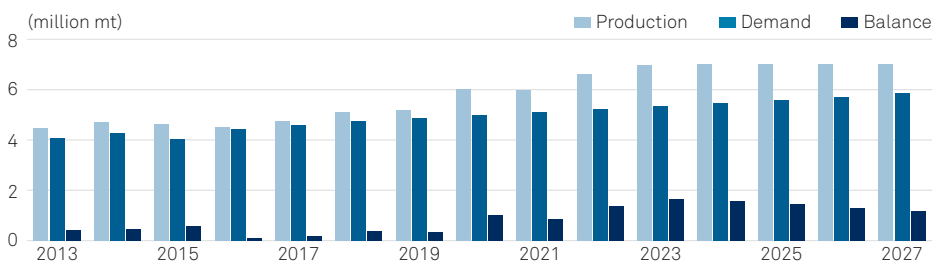
ASEAN's improving cost competitiveness versus the Middle East – the biggest supplier of petrochemical products to the region – supported by the ASEAN Free Trade Area, have helped regional petrochemical producers to garner good margins.

Due to the predominant use of naphtha as a key feedstock in ASEAN, it was only 2.6 times more expensive in March 2017 to produce ethylene in the region versus the lowest-cost ethane-based producer Saudi Arabia. In contrast, it was six times more costly before June 2014. The cost of producing ethylene in a naphtha cracker in Southeast Asia in March this year was \$359/mt, compared with \$135/mt in an ethane cracker in Saudi Arabia.

Both these factors have boosted intra-regional trade in ASEAN, especially for polymers. These trades are duty-exempt and must be normalized to the price of imported cargoes, mainly from the Middle East, before they can be factored into the Platts CFR SE Asia assessments.

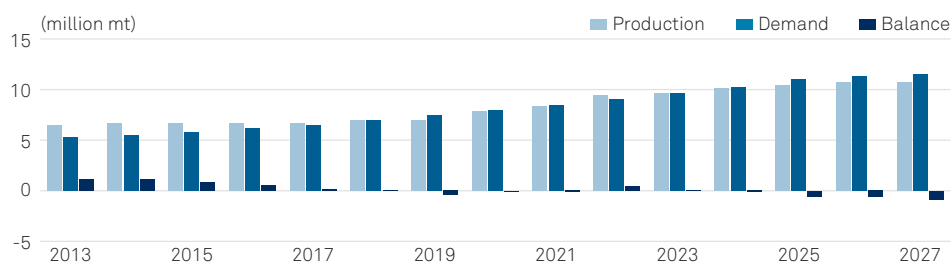
Another challenge is that spot activity for most petrochemicals is thin in ASEAN, except for Vietnam. As a result, most Southeast Asia assessments are linked to the more liquid FOB Korea or CFR China assessment by using the freight differential as well as other market fundamentals. Even in markets such as methanol, where the CFR Southeast Asia assessment moves independently, the CFR China assessment remains the dominant benchmark.

### ASEAN POLYPROPYLENE BALANCE



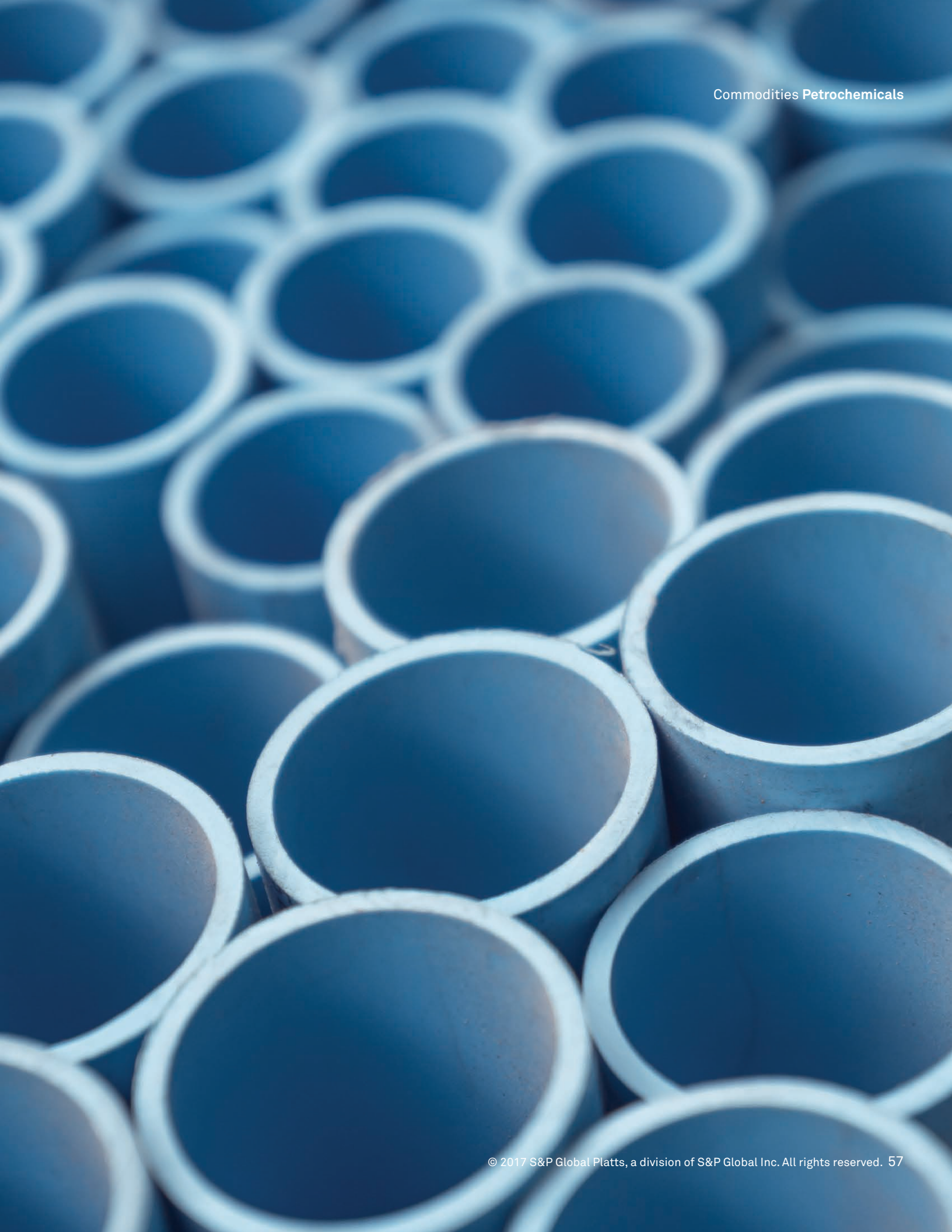
Source: S&P Global Platts Analytics

### ASEAN POLYETHYLENE BALANCE



Source: S&P Global Platts Analytics







## Glossary

<b>AEDP:</b>	Alternative Energy Development Plan
<b>ASEAN:</b>	Association of Southeast Asian Nations
<b>ACE:</b>	ASEAN Centre for Energy
<b>AEC:</b>	ASEAN Economic Community
<b>AEE:</b>	ASEAN Electricity Exchange
<b>APG:</b>	ASEAN Power Grid
<b>B/D:</b>	Barrels/day
<b>CPO:</b>	Crude palm oil
<b>DWT:</b>	Dead weight tons
<b>ERIA:</b>	Economic Research Institute for ASEAN and East Asia
<b>EVN:</b>	Vietnam Electricity
<b>FDI:</b>	Foreign direct investment
<b>GW:</b>	Gigawatt
<b>HAPUA:</b>	Heads of ASEAN Power Utilities/Authorities
<b>JAC:</b>	Jurong Aromatics Complex
<b>KCAL/KG:</b>	Kilocalorie/kilogram
<b>LNG:</b>	Liquefied natural gas
<b>MT:</b>	Metric ton
<b>MW:</b>	Megawatt
<b>NAFTA:</b>	North American Free Trade Agreement
<b>OBOR:</b>	One Belt One Road
<b>PME:</b>	Palm methyl ester
<b>RAPID:</b>	Refinery and Petrochemical Integrated Development
<b>RCEP:</b>	Regional Comprehensive Economic Partnership
<b>SEASI:</b>	South East Asia Iron & Steel Institute
<b>TPES:</b>	Total primary energy supply
<b>TPP:</b>	Trans-Pacific Partnership
<b>VLCC:</b>	Very large crude carriers







For more information, please contact the Platts office nearest you:

#### **NORTH AMERICA**

##### **New York**

2 Penn Plaza, 25th Floor  
New York, NY 10121-2298, USA  
P: +1-800-PLATTS8 (toll-free)  
P: +1-212-904-3070 (direct)

##### **Boston**

225 Franklin Street, 14th Floor  
Boston, MA 02110, USA  
P: +1-800-752-8878  
P: +1-617-530-8300

##### **Denver**

1800 Larimer Street, Suite 2000  
Denver, CO 80202, USA  
P: +1-720-264-6600

##### **Hightstown**

148 Princeton-Hightstown Road  
Hightstown, NJ 80021, USA  
P: +1-800-PLATTS8 (toll-free)

##### **Houston**

Heritage Plaza  
1111 Bagby Street, Suite 2200  
Houston, TX 77002, USA  
P: +1-800-PLATTS8 (toll-free)

##### **Pittsburgh**

424 South 27th Street, Suite 306  
Pittsburgh, PA 15203, USA  
P: +1-412-431-4370

##### **Washington, D.C.**

1200 G Street NW, Suite 1000  
Washington, DC 20005, USA  
P: +1-212-904-3070

#### **LATIN AMERICA**

##### **Buenos Aires**

Tte. Gral. Juan D. Perón 346,  
6th Floor  
(C1038AAH) Buenos Aires, Argentina  
P: +54-11-4121-4810

##### **São Paulo**

Av Brigadeiro Faria Lima  
201 21st Floor  
São Paulo – SP Brasil – 05626-100  
– Brazil  
P: +55-11-3818-4100

#### **EUROPE, MIDDLE EAST AND AFRICA**

##### **London**

20 Canada Square  
9th Floor, Canary Wharf  
London E14 5LH, UK  
P: +44-20-7176-6111

##### **Dubai**

DIFC, The Gate Precinct  
Building 1, Level 05  
P.O. Box 506650  
Dubai, UAE  
P: +971-4-372-7100

##### **Moscow**

Business Center  
Mokhovaya  
4/7 Vozdvizhenka Street  
Building 2, 7th Floor, 125009  
Moscow, Russia  
P: +7-495-783-4141

##### **Stavanger**

Øvre Holmegate 1  
4006 Stavanger  
Norway  
P: +47-51-89-06-66

#### **ASIA-PACIFIC**

##### **Singapore**

12 Marina Boulevard  
#23-01 Marina Bay  
Financial Centre Tower 3  
Singapore 018982  
P: +65-6532-2800

##### **Beijing**

Suite 1601, 16/F Tower D  
Beijing CITC  
A6 Jianguo Menwai Avenue  
Chaoyang District  
Beijing 100022, China  
P: +86-10-6569-2929

##### **Hong Kong**

Unit 6901, Level 69  
International Commerce Centre  
1 Austin Road West  
Kowloon, Hong Kong  
P: +852-2841-1035

##### **Shanghai**

33/F Shanghai Plaza  
138 Huaihai Road (M)  
Shanghai 200021, China  
P: +86-21-5110-5488

##### **Tokyo**

Marunouchi Kitaguchi  
Building, 28th Floor  
1-6-5 Marunouchi  
Tokyo 100-0005, Japan  
P: +81-3-4550-8300

##### **Melbourne**

Level 45, 120 Collins Street  
Melbourne  
VIC 3000, Australia  
P: +61-3-9631-2000