

Geoffrey Hartman and Jane Nakano

# Southeast Asia in Global Energy Markets

*Trends, Challenges, and Policies*



A report in the CSIS-Pertamina  
Southeast Asia Energy Security Roundtable Series

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# About the roundtable

This report provides a summary of the discussion from a CSIS roundtable held on April 25, 2017, as part of the CSIS-Pertamina Energy Security Roundtable Series. The discussion brought together government, industry, financial, and policy experts to explore the state of global energy markets and Southeast Asia's shifting role within them. This was the first in a series of roundtables that will be convened over the next year to examine the most important energy issues affecting Southeast Asia and their broader strategic significance to regional and global energy security.







# Current Trends and Issues in Global Energy Markets

*Global oversupply of oil and gas is continuing to exert downward pressure on prices.*

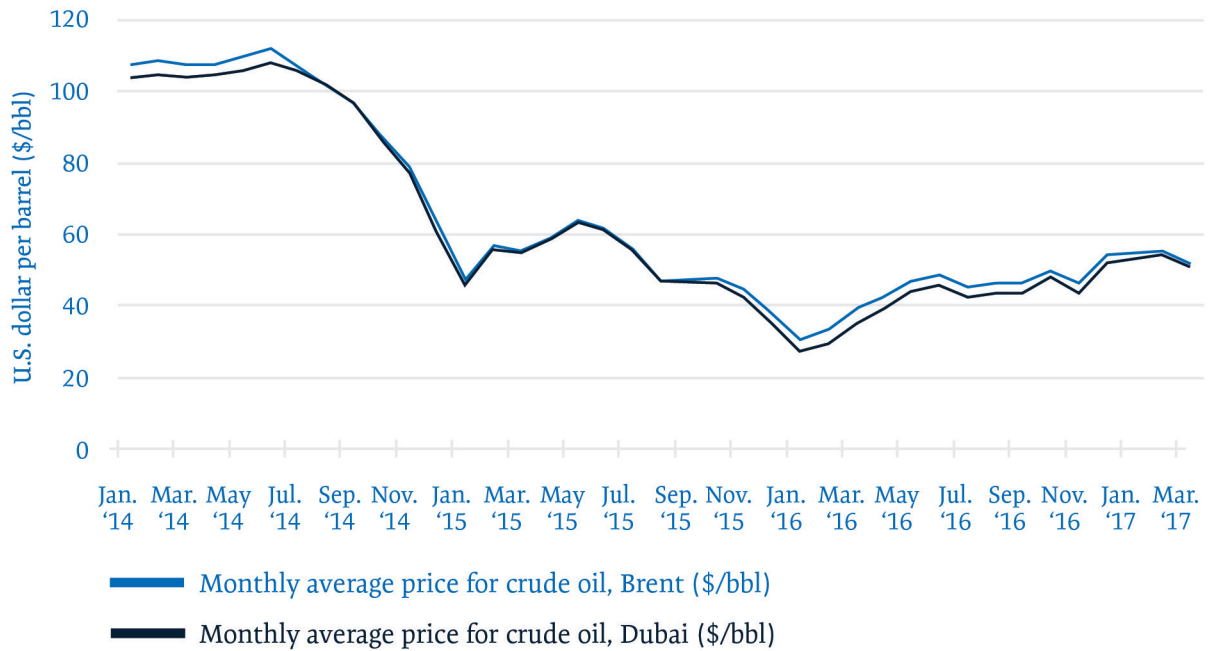
U.S. tight oil production has increased rapidly in recent years and has contributed to more than two years of low prices in the oil market, with prices for the benchmark Dubai crude falling from an average of \$104 per barrel in March 2014 to an average of \$51 per barrel in March 2017. The agreement between the Organization of Petroleum Exporting Countries (OPEC) and major non-OPEC producers to cut output in the first half of 2017 boosted prices temporarily but has yet to reduce the level of globally held oil stockpiles that, among other things, is creating downward pressure on prices. At this point an extension of the cuts at OPEC's May 25 meeting is widely viewed as necessary to keep oil prices above \$50 per barrel.

Natural gas prices are also at low levels, with prices for liquefied natural gas (LNG) in Japan falling from an average of \$16.55 per million British thermal units (Btu) in March 2014 to an average of \$7.60 per million Btu in March 2017. Gas prices are likely to remain low as global LNG supply surges by around 50 percent over the next few years on the back of increased production from Australia and the United States. Demand growth for LNG is also projected to remain weak as the slowdown in Asian gas demand continues.

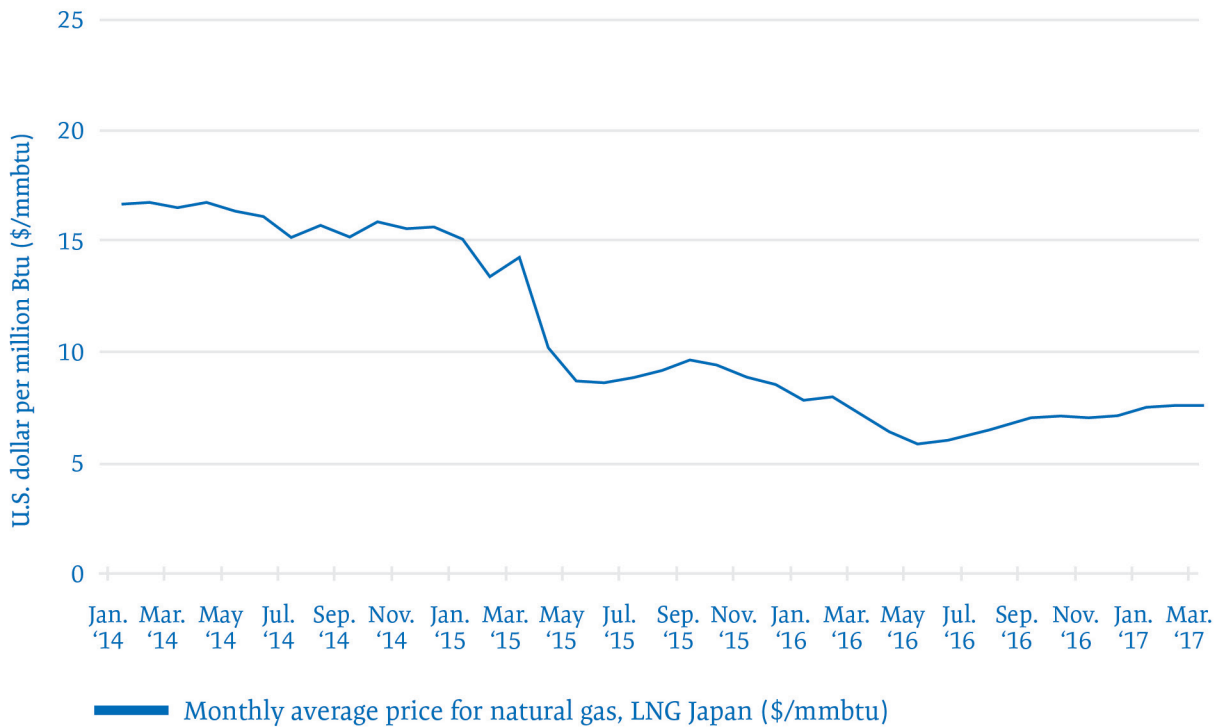
The robust production of unconventional oil and gas continues to shake up the global energy landscape, and U.S. producers of shale oil and gas have thus far been the most competitive assets for attracting new in-



## Oil Prices, 2014–2017 (Monthly)



## Gas Prices, 2014–2017 (Monthly)



Source: Adapted from World Bank data (May 2017)



vestment. The U.S. shale industry has proved unexpectedly resilient to lower prices, and shale production costs have fallen by 50 percent since 2014 thanks to technical advancement and productivity gains. This reduction in costs has made some of the U.S. shale production projects more competitive than many conventional oil and gas projects.

*Continued low prices have greatly reduced investment in new oil and gas projects.*

During the oil price downturn, oil and gas companies sought to reduce capital expenditures and create more value out of the volumes of production they could extract from existing assets. As a result, the industry has seen a significant reduction in investment in exploration and new production as low oil prices constrained their revenues. Global oil discoveries reached a record low in 2016, and the number of conventional oil projects sanctioned for development reached the lowest level since the 1940s, according to the International Energy Agency (IEA). Higher-cost offshore projects have seen a particularly large reduction in new investment.

The gas industry is also seeing a slowdown in new projects sanctioned, as low LNG prices and the looming increase in production capacity from projects currently under construction makes new LNG projects economically unviable. With the gas market already facing a major global oversupply, it could take several years for demand to catch up and raise the price level enough to justify new investments.

*Asia, including Southeast Asia, is becoming the world's only near-term net energy importing region.*

Discussion of Asian energy markets has traditionally focused on the role of Northeast Asian countries as consumers of energy, but Southeast Asia is becoming more important to global energy markets as it becomes an area of growing demand. Oil consumption in Southeast Asia increased from 3.6 million barrels per day (mmbbl/d) in 2000 to 6 mmbbl/d in 2015, and regional gas consumption increased from 2.7 trillion cubic feet (Tcf) in 2000 to 5.7 Tcf in 2014. This demand growth along with declining energy production is driving a shift from Southeast Asia's posture as an energy-exporting region to an energy-importing region. This will deepen Asia's net energy deficit at the same time as North America transitions to a net energy surplus, with long-term consequences for energy trade and investment flows in the coming decades.

# Southwest Asia's Role in Global Energy Markets

*Southwest Asian oil production is gradually declining, leading the region to steadily increase imports.*

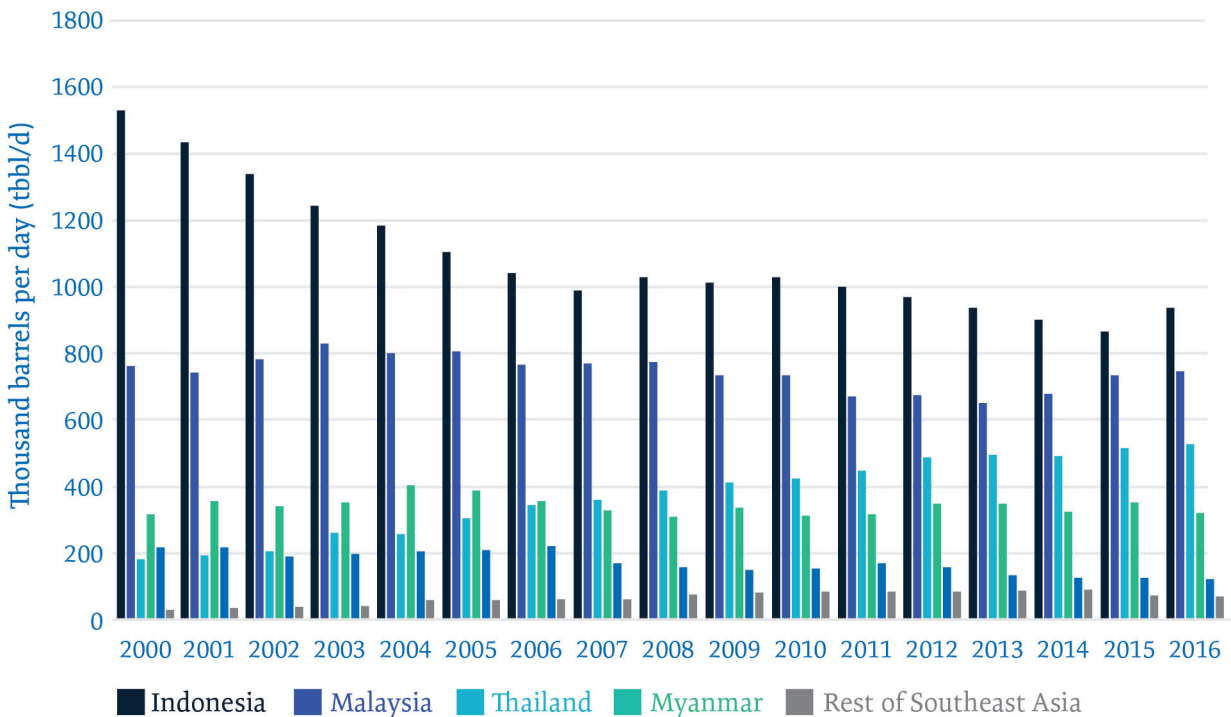
Indonesia, Malaysia, Vietnam, and Thailand are the largest Southwest Asian oil producers, and all face gradually declining output from mature oil fields. At the same time oil consumption is anticipated to increase, greatly outpacing growing domestic supply. All four countries are already net oil importers, as is the Southwest Asian region overall, and this reliance on imports will grow as regional demand for oil steadily rises.

Vietnam, Indonesia, and Malaysia lead the region in oil reserves, but Southwest Asian reserves are not significant on a global scale, representing less than 1 percent of global oil reserves. Exploitation of these reserves could help boost production and meet some of the increasing domestic demand for oil in these countries, but there has been a decline in the number of new discoveries in recent years, in part due to low oil prices but also due to the relative attractiveness of exploration options offered to companies.

The greatest potential for increased oil production in Southwest Asia exists in offshore basins, particularly in Indonesia and Vietnam, that have yet to be fully explored and are likely still rich in hydrocarbons. Deepwater projects are not economically viable at current prices, however, and regulatory barriers further contribute to a lack of new exploration and production in offshore areas.



## Southeast Asia Total Petroleum and Other Liquids Production, 2000–2016



Source: Adapted from U.S. Energy Information Administration data (May 2017)

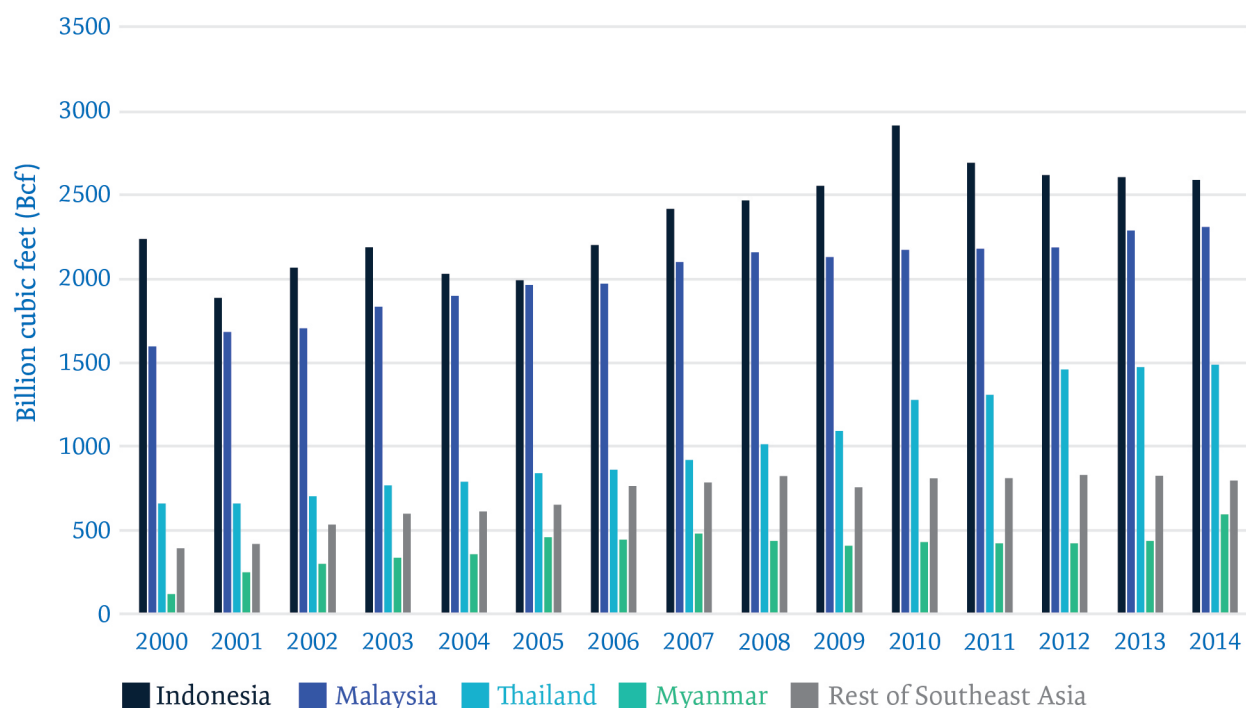
*Southeast Asian gas production is stable, but is not outpacing long-term regional demand.*

Indonesia and Malaysia are Southeast Asia’s largest gas producers, and both countries may continue to be net exporters of gas for years to come. Gas production across Southeast Asia is reaching a plateau, however, and growing local demand means that an increasing percentage of Southeast Asian gas will likely be consumed in the region, decreasing net exports over time. Persistent low gas prices could speed this shift by spurring demand for gas as an alternative to coal for power generation and oil in the industrial sector.

Southeast Asian LNG imports are expected to surge over the medium term due to increased demand from the power and industrial sectors and reduced supply from regional pipelines as Indonesia and Malaysia consume more of their own gas. Countries like Singapore and Thailand with a heavy reliance on regional pipeline gas imports for power generation are investing in LNG import infrastructure to prepare for this shift.

Southeast Asia has more extensive reserves of gas than for oil, primarily in Indonesia and Malaysia. Myanmar—which already exports gas to

## Southeast Asia Dry Natural Gas Production, 2000–2014



Source: Adapted from U.S. Energy Information Administration data (May 2017)

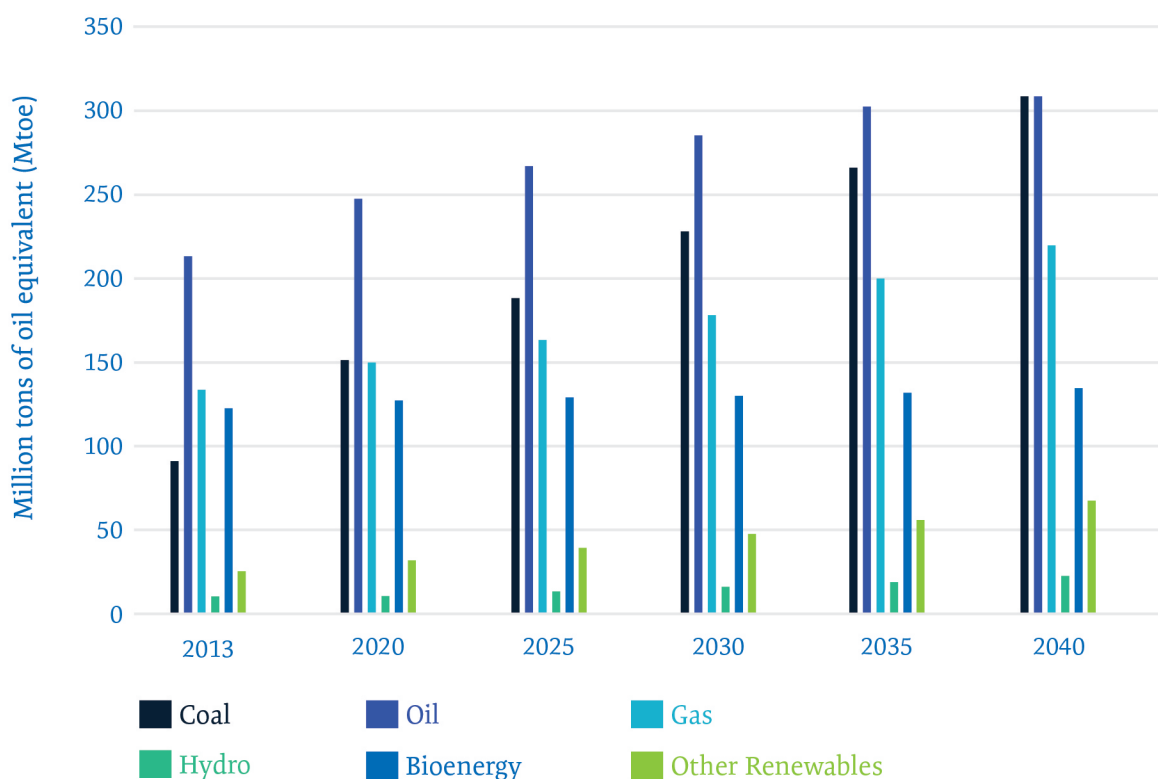
Thailand and China—has the potential to hold significant unexplored reserves of oil and gas, as demonstrated by recent discoveries such as the large Thalin gas discovery in 2016. Expanding gas production in Southeast Asia faces similar challenges to that of oil, however, with the most promising basins lying offshore in deep-water areas that are expensive to exploit.

*Southeast Asia will remain a major exporter and consumer of coal for years to come.*

Indonesia is the world’s largest exporter of the thermal coal and is likely to remain a major exporter for the foreseeable future as coal maintains its status as the most dominant fuel for power production in Asia. Indonesia’s coal industry has expanded greatly over the last decade on the back of exports to fuel power stations in China and India, but Southeast Asia is a growing market as local demand rises.

The domestic abundance, low cost, and easy storage and transportability of coal make it an appealing option for power generation in Southeast Asia. Many Southeast Asian countries are also concerned about being overly reliant on gas for power generation as regional reserves are deplet-

## Southeast Asia Projected Energy Demand (by fuel) to 2040



Source: Southeast Asia Energy Outlook 2015, International Energy Agency

ed, leading them to implement a large increase in coal-fired power generation projects that are already commissioned or still under construction. The coal boom in Southeast Asia is likely to continue, with almost 40 percent of new power generation capacity to 2040 projected to be coal-fired. Coal will likely become an increasingly important part of the energy mix in Southeast Asia, possibly even rivaling oil—the most prominent fuel in the region—within a few decades. Southeast Asia is one of the few regions to experience this trend toward coal use. Indonesia, with by far the largest coal reserves in Southeast Asia, will be key to meeting Southeast Asia’s demand for coal and also a major source of that demand. Many Indonesian coal projects are coming online in the next few years and the Indonesian government’s plan to add 30 gigawatts of power capacity by 2019 relies heavily on coal-fired power plants.

# Energy Security in Southeast Asia

## Key Policy Issues

*Southeast Asia faces regulatory and policy barriers to increasing oil and gas exploration and production.*

New production is needed to maintain Southeast Asia's output of oil and gas and meet at least some of the region's growing demand for energy. The low-price environment in both the oil and gas markets are working against efforts to increase production, however, especially the significant reserves of exploitable oil and gas in costly offshore areas.

While there are few near-term solutions to the economic dilemma facing Southeast Asian producers looking to expand production, technological advances over the next few years could reduce the cost of deep-water projects enough to make them competitive with shale oil projects, opening the door to increased production.

Southeast Asian countries are struggling to strike a balance between state ownership and control over resources, insulation of the domestic economy from high prices, and promotion of a competitive environment for upstream exploration and development. The removal of regulatory and policy barriers that deter increased foreign investment in energy exploration and production in Southeast Asia may be politically difficult in the face of societal pressure to assert control over natural resource developments, but would go a long way toward increasing the confidence of investors looking to expand exploration and production in Southeast Asia.

For example, Indonesia in January issued a regulation requiring future production sharing contracts (PSCs) in the oil and gas industry to adopt

a new “gross split” mechanism that eliminates the traditional allowance for contractors to recover their startup costs before they begin sharing production revenues with the government. The implications of this regulatory change are not yet clear, but they could be wide-ranging as 35 PSCs are expiring over the next decade. A gross split PSC could conceivably benefit contractors that can improve the efficiency of their production operations, especially if market prices rebound, but shifting the risk of operations fully onto contractors may reduce contractor interest in investing in badly needed exploration.

Legacy regulations, like price controls on gas in Malaysia and Indonesia intended to aid their domestic power sectors, also reduce incentives for exploration and expanded production. Southeast Asian governments are not unwilling to make needed regulatory changes, however, as demonstrated by the gradual price deregulation underway in local gas markets. On the other hand, Indonesia last September also revised a 2010 regulation to provide tax incentives during the exploration phase of oil and gas projects to boost Indonesia’s attractiveness in response to dwindling investment in exploration activities. These kinds of policy changes could play a valuable role in increasing the number of new oil and gas discoveries in Southeast Asia that can move to production when offshore projects become economically competitive.

*Investments in energy infrastructure and institutions are needed as regional energy consumption patterns shift.*

Southeast Asia’s ongoing transition from an energy-exporting to an energy-importing region will require regional countries to invest in changes to their existing energy infrastructure to adapt to changes in regional energy consumption patterns. The most obvious example of this is efforts by Singapore, Thailand, and others to build the LNG terminal infrastructure and regasification capacity needed to support a looming shift from pipeline-delivered gas imports from within the region to tanker-delivered LNG imports.

LNG infrastructure development is booming in Southeast Asia. Thailand this year will complete an expansion of its Map Ta Phut LNG import terminal to double its capacity to 10 million tons per year (Mtpa), and has an additional 1.5 Mtpa expansion planned for 2019. Vietnam is building its first LNG terminal at Thi Vai, scheduled to open in 2019, and is planning for a second. Malaysia is planning for two new LNG terminals in Sabah and Johor to join its existing terminal at Malacca. Indonesia has converted the Arun LNG production plant into a terminal, and is planning to build additional terminals, including several small-scale terminals to serve its smaller islands.

## Select Southeast Asian Oil and Gas Facilities



Singapore has perhaps the most ambitious LNG plans in the region, and is looking to seize the opportunity to position itself as a regional LNG trading hub. Singapore is expanding its Jurong Island LNG terminal capacity to 11 Mtpa this year, plans to increase it to 15 Mtpa in the future, and is considering a second terminal. In addition to physical infrastructure, Singapore is making institutional changes to position itself to serve as a regional LNG trading hub, such as creating the Singapore Exchange's LNG spot price index, developing a domestic secondary gas market, and is considering approval for third-party LNG imports.

Singapore faces stiff competition from Japan and China as it tries to become Asia's hub for LNG pricing and trading as the market moves away from long-term contracts toward more flexible spot purchases. While its small physical and LNG market size weigh against it, Singapore's political and market stability, geographic proximity to key LNG producers and consumers, and experience as an oil trading hub could win out if it gets the necessary infrastructure in place.



*Opportunities exist for greater cooperation with Middle Eastern partners.*

Producers in Gulf countries—Iran, Iraq, Kuwait, Saudi Arabia, and the United Arab Emirates—are looking to expand their market share in Asia over the next few years, offering an opportunity for Southeast Asian countries to court investment in their energy sectors through greater cooperation with Middle Eastern partners. Opportunities for joint ventures with Gulf producers are particularly good in the refining sector and in petrochemicals production. Many companies see petrochemicals as an attractive long-term market thanks to its steady growth, in contrast to the slowly dwindling market for petroleum-based fuels for transport, and are making investments needed to expand petrochemicals production.

Recent joint venture deals between Saudi Arabia and partners in Southeast Asia demonstrate the potential for greater cooperation in the refining and processing sector. Saudi Aramco signed an agreement with Indonesia's Pertamina in December to proceed on an upgrade of Pertamina's Cilacap refinery on Java that will allow the refinery to process Saudi crude oil to produce basic petrochemicals and fuels that meet European emission standards. Aramco signed a similar deal with Malaysia's Petronas in February to buy a stake in Petronas's Refinery & Petrochemical Integrated Development (RAPID) project in Johor. Involvement in these projects demonstrates Saudi interest in providing oil and refined products to growing markets in Southeast Asia, an interest that is sure to be shared by other Gulf producers who can invest in Southeast Asian refining and processing capacity.

*Regional governments have made progress in slowing energy demand, but more can be done.*

Growing energy demand in Southeast Asia will result in an increasing dependence on energy imports even if efforts are made to increase local energy production, and efforts to slow the growth in energy demand in Southeast Asia will be key over the long term in lessening the region's reliance on energy imports. Per capita energy demand in Southeast Asia has been growing steadily over the past two decades, and will likely continue to experience steady growth in line with other developing areas of Asia.

Energy intensity—a measure of the energy efficiency of an economy—has begun declining in Southeast Asia over the last decade, however, and may have peaked in key countries like Indonesia and Malaysia. This increase in energy efficiency is likely to continue as Southeast Asian countries continue to urbanize and shift from the use of traditional fuels like wood and other organic matter to modern energy sources. The reduction of fossil-fuel subsidies in Indonesia, Malaysia, and Thailand

have also slowed growth in the demand for oil and gas, and are a prime example of successful regional policies to lessen energy consumption.

While Southeast Asia is making progress on slowing energy demand, the regional focus remains on meeting rather than slowing growing demand and more can be done to increase energy efficiency. Policies mandating increased energy efficiency standards for buildings, equipment, appliances, and vehicles could be particularly effective in Southeast Asia, where many countries have not yet introduced such standards. More ambitious efforts like Singapore's proposed carbon tax, which is slated to begin in 2019, could provide an interesting test case for other Southeast Asian states to observe and potentially adapt for their own domestic carbon-pricing schemes.

*Governments seek to bolster energy security through diversification strategies that include promotion of modern renewable energy resources.*

Renewable energy sources already contribute significantly to the energy mix in much of Southeast Asia, but primarily in the form of traditional biofuels, like wood and other organic matter, and hydropower, which is the dominant source of power generation capacity in Laos, Myanmar, and Vietnam. Many countries in the region are promoting the use of modern renewables (wind, solar, geothermal), however, and have adopted targets for increasing their share of the overall energy mix. For example, the seven Southeast Asian countries that are APEC members have agreed to double their share of renewables in the energy mix by 2030, and countries like Indonesia have set even more ambitious targets.

Hydropower remains an important option for Laos and Myanmar, which both have large amounts of unexploited hydropower potential. Laos has taken advantage of its hydropower potential to become a successful electricity supplier, with two-thirds of its hydropower exported to neighboring Thailand and Vietnam. Myanmar's hydropower potential dwarfs that of Laos, but much work needs to be done to build out Myanmar's capacity and power grid before it can rival Laos as an electricity exporter.

Opposition to further hydropower expansion exists due to the potentially harmful impacts on the environment and local communities, especially in Myanmar where protests in 2011 pressured the government to stop China's construction of the Myitsone dam. Still, hydropower is readily available and existing financial incentives makes hydropower attractive for future investment.

Wind and solar power have the potential to play a significant role in Southeast Asia's energy mix, but both face challenges to their adoption in the short term. Solar and offshore wind power have wide potential

across Southeast Asia, but are not economically competitive with gas or even cheaper coal for power generation. Onshore wind power suffers from limited geographic availability in the region, with onshore wind potential concentrated in Vietnam and Laos. Vietnam is interested in developing its wind power sector, but high installation costs and power prices well below those in other Asian countries are a significant obstacle to the building of greater wind capacity.

Financing difficulties and bureaucratic hurdles in areas like licensing hold back the potential of solar and wind projects in much of Southeast Asia. Policies aimed at addressing these barriers would help increase the rate of adoption of renewables in the region, and cheaper financing in particular will help make solar and wind competitive alternatives to coal over the long term. Growing opposition to coal plants and their impact on air quality may drive an increase in renewables use even before they can match coal on price. Organized opposition to coal remains limited in the region for now, but countries like Thailand are already locating new coal-fired power plants in neighboring countries to avoid protests like those aimed at the proposed Krabi coal plant.

Geothermal power also has the potential to play a growing role in Southeast Asia's energy future, albeit one limited primarily to the Philippines and Indonesia. The Philippines and Indonesia are the second- and third-largest producers of geothermal power generation, and Indonesia in particular has significant geothermal potential that has yet to be exploited. Geothermal is a significant source of power generation in the Philippines, where the industry has benefited from financial and other incentives promoted by the 2008 Renewable Energy Act. The potential of geothermal is limited by the inherently few sites that can support geothermal plants, but it can provide a valuable source of non-variable renewable energy in areas that can support it.

## About the authors

Geoffrey Hartman is a fellow with the Southeast Asia Program at the Center for Strategic & International Studies (CSIS). Before joining CSIS, he served as a foreign affairs specialist in the Office of Asian and Pacific Security Affairs within the Office of the Secretary of Defense, where he provided policy advice and regional expertise to senior defense officials shaping U.S. defense policy in Southeast Asia. Prior to working in the Pentagon, Mr. Hartman was an analyst with the U.S. government, where he supported U.S. policymakers and military commanders with research, briefings, and written assessments on Asian security issues. He received an M.I.A. from Columbia University's School of International and Public Affairs and a B.A. from the University of Nebraska at Lincoln.

Jane Nakano is a senior fellow in the Energy and National Security Program at the Center for Strategic and International Studies (CSIS). Her areas of expertise include U.S. energy policy, global oil and gas markets, energy security issues in Asia, and global nuclear energy trends. She frequently writes and speaks on these issues at conferences and to the media. Also, she has testified before Congress on energy issues in Asia. Prior to joining CSIS in 2010, Ms. Nakano was with the US Department of Energy (DOE) and served as the lead staff on energy engagements with China and Japan. She was responsible for coordinating DOE engagement in the U.S.-China Strategic Economic Dialogue, U.S.-China Energy Policy Dialogue, and U.S.-Japan Energy Dialogue. She also worked on U.S. energy engagement with Indonesia, North Korea, and the Asia-Pacific Economic Cooperation forum. From 2001 to 2002, she served at the U.S. embassy in Tokyo as special assistant to the energy attaché. Ms. Nakano graduated from Georgetown University's School of Foreign Service and holds a master's degree from Columbia University's School of International and Public Affairs.



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