

The U.S. Push for LNG in the Philippines Is Based on Dubious Assumptions

Introduction

The United States continues to play an active role in the development of the Philippines' natural gas industry by promoting imports of liquefied natural gas (LNG) to offset declining domestic gas production. American companies are involved in LNG regasification projects in the Philippines, while officials from various U.S. agencies have advised policymakers on legal reforms to govern the country's emerging natural gas industry.

A recent white paper sponsored by the U.S. Agency for International Development (USAID) lays out the sales pitch for U.S. LNG.^{1,2} Although the report claims only to provide "a summary of observations within the LNG market and its impact in the Philippines," it presents an overly optimistic case for LNG prices, long-term domestic demand, and market viability of U.S. exports to price-sensitive emerging markets in Asia.

Many of the assumptions underlying the report's findings are ill-timed and seemingly ignore current dynamics in the global LNG market and recent developments in the Philippines' energy industry, as well as findings from the international scientific community regarding the incompatibility of greenhouse gas-intensive fossil fuels like natural gas with global climate goals.

These overly optimistic assumptions distort the financial, economic, and environmental case for LNG imports. While small amounts of LNG will likely be necessary in the Philippines to compensate for declining production from the Malampaya offshore development, the country's only large producing indigenous field,³ the situation should not justify a wholesale expansion of the Philippines' LNG-

¹ USAID. [LNG Pricing and Market Opportunities in the Philippines](#). July 2021. Note: The white paper was released publicly on September 9, 2021.

² In 2019, USAID launched the U.S.-Asia Gas Partnership (AGP) in collaboration with the U.S. Energy Association (USEA) and the National Association of Regulatory Utility Commissioners (NARUC), with the aim of developing domestic gas markets in Asia. U.S. Energy Association. [Philippines: Tapping into the World's LNG Market](#). 2020.

The white paper was prepared by NARUC and USEA, an association of public and private organizations involved in energy policy. The USEA shares best practices, coordinates research, and support project developments. The report was sponsored by USAID.

³ The government estimates that Malampaya could be completely depleted by 2027. As a result of depleting reserves, international oil companies involved in Malampaya have sold off assets. In 2020 and 2021, both Chevron and Shell sold their respective 45% stakes to the domestic conglomerate Udenna Corporation. The remaining 10% share is owned the Philippines National Oil Corporation (PNOC). Business World. [Malampaya depletion expected by 1st quarter of 2027](#). May 19, 2021.

to-power fleet.⁴ Doing so would risk locking in dependence on a foreign imported fuel known for its extreme volatility, to the detriment of cleaner, cheaper domestic energy sources.

Assumption 1: U.S. LNG Delivered to PH Will be Cheap

The white paper argues that LNG offers economic benefits relative to coal due to “LNG’s growing supply and falling prices.” The report continues, “The delivered LNG price from the U.S. to the Philippines could range as low as \$5.75 to \$7.25 per MMBtu (million British thermal units) based on suppliers and contractual terms ... *the DES U.S. LNG cost to the Philippines, based on a modelled large-scale LNG export terminal is estimated at \$5.93 per MMBtu*” (emphasis added).

The delivered price of U.S. LNG consists of several components, including the cost of gas feedstock; transportation fees for delivering gas from distribution hubs to the liquefaction terminal; fees for liquefaction; and shipping charges to destination markets. The largest U.S. LNG company, Cheniere Energy, charges its customers the Henry Hub price for gas feedstock plus a 15% markup to cover the cost of delivering gas to the terminal. Cheniere also charges customers a fixed liquefaction fee set by contracts, ranging as high as \$3.50/MMBtu. Other U.S. LNG facilities may use a tolling structure, in which an LNG buyer arranges to purchase the feedstock and have it delivered to the LNG terminal; the LNG projects only receive a fixed liquefaction fee. In practice, the two pricing structures arrive at roughly the same place: LNG buyers pay for gas feedstock, gas pipeline transportation, liquefaction, and shipping to destination markets. Lastly, end-users of gas in the Philippines must consider the added costs of regasification terminals, gas pipelines, and other related infrastructure.

The US\$5.93 figure cited relies on several questionable cost estimates. First, it assumes a feedgas price for U.S. liquefaction facilities of US\$2.57/MMBtu. As of September 15, 2021, Henry Hub gas prices stood at US\$5.434/MMBtu—more than twice the figure cited.⁵ This does not include a 15% gas delivery and conversion surcharge. Moreover, Henry Hub futures on the New York Mercantile Exchange (NYMEX) anticipate prices rising in winter 2021, only falling back down to below US\$3/MMBtu in May 2023. The U.S. Energy Information Administration forecasts Henry Hub averaging US\$3.47/MMBtu in 2022.⁶ The current high-price

⁴ There are five existing gas-fired power plants in the Philippines with a combined capacity of 3,457 megawatts (MW). The Philippines Department of Energy has estimated that 3 million to 5 million tons per annum (MTPA) of LNG import capacity will be necessary to keep the plants operating. Other [sources](#) estimate only 1-2 MTPA will be necessary, given that the supply contracts with Malampaya include must-run terms for the power plants, which inflate the volume of gas required for power production. IEEFA. [No Guaranteed Future for Imported Gas in the Philippines](#). May 2021.

⁵ Natural Gas Intel. [‘All Fear in the Market’ as Natural Gas Futures Rally Early](#). September 15, 2021.

⁶ U.S. Energy Information Administration. [Short-term Energy Outlook](#). September 2021, p. 3.

environment demonstrates the extreme volatility of natural gas and LNG prices (discussed further in the next section).⁷

The white paper's model also assumes a liquefaction fee of US\$2/MMBtu. U.S. liquefaction facilities have historically charged a tolling fee ranging from US\$2.25-\$3.50. For example, the first five liquefaction trains from the Sabine Pass LNG facility in Louisiana were sanctioned under long-term contracts with an average fee of US\$2.78/MMBtu, while contracts with the Corpus Christi LNG facility involved liquefaction fees of US\$3.50.⁸ Sempra Energy initially targeted a liquefaction price of US\$3.30/MMBtu for its Cameron LNG facility.⁹

Lastly, the US\$5.93 figure includes a shipping price from the U.S. Gulf Coast to the Philippines of US\$1.20/MMBtu. In 2021, however, shipping prices to Tokyo have averaged more than US\$1.90, up from US\$1.45/MMBtu in 2020.¹⁰ The white paper suggests shipping costs could fall over time as LNG shipping capacity grows, but spot charter rates have tended to rise year-on-year since 2017.¹¹ Some experts expect shipping prices to continue to tighten in the near term.¹² During the winter months of the past few years, shipping rates from the U.S. Gulf Coast to Japan have tended to exceed US\$2.50/MMBtu. The white paper does not consider regasification costs or the costs of associated infrastructure.

⁷ The Fuse. [Natural Gas Prices Soar Worldwide In A Mark Of Extreme Volatility](#). September 10, 2021.

⁸ S&P Global Platts. [Cheniere offering more competitively priced LNG for some US marketing volumes](#). November 6, 2020.

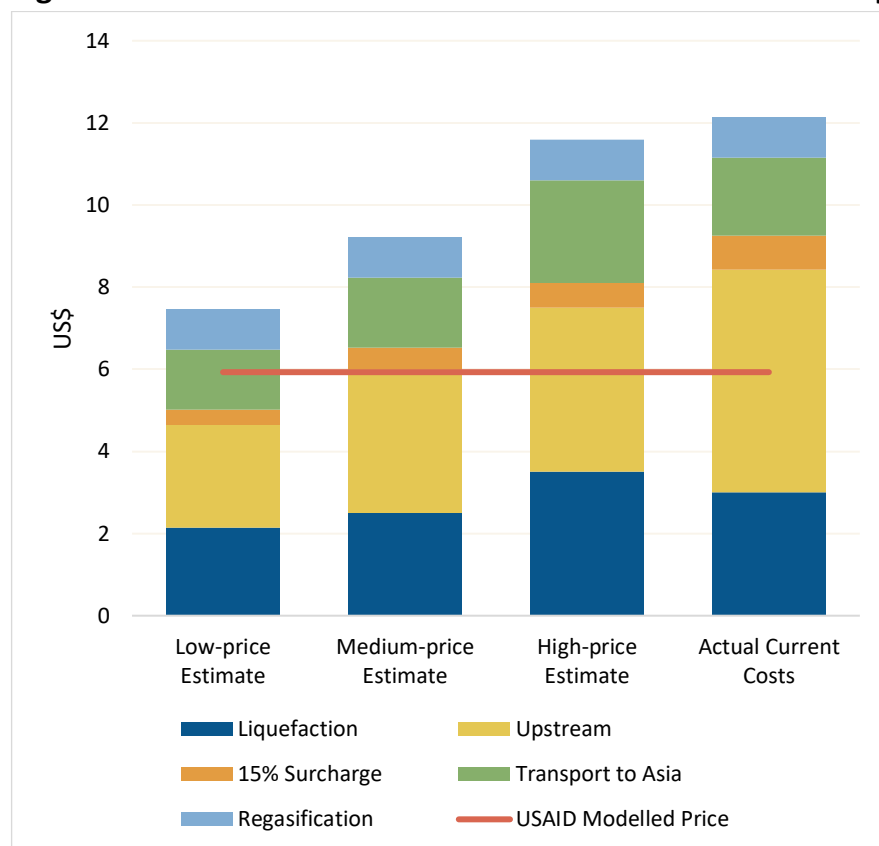
⁹ Independent Commodity Intelligence Services (ICIS). [Sempra sees \\$3.30/MMBtu fee for Cameron LNG export scheme](#). March 30, 2012.

¹⁰ Rystad Energy. [Supplying Asia with LNG got much costlier for the US, but strong demand brings export records](#). June 23, 2021.

¹¹ Maritime Logistics Professional. [LNG Shipping Costs: A Roller Coaster in Early 2021](#). March 26, 2021.

¹² ICIS. [LNG shipping outlook bullish as oversupply risk drops](#). July 8, 2021.

Figure 1: Estimated Delivered Prices for U.S. LNG to the Philippines



Source: IEEFA estimates based on various public sources.

Even considering lower costs for newer brownfield liquefaction facilities, the delivered price of U.S. LNG to the Philippines is unlikely to come in under US\$7/MMBtu.^{13,14,15} According to IEEFA estimates (Figure 1), the white paper underestimated the delivered price of U.S. LNG in the Philippines by 105% under current market conditions and 26% under the most conservative cost estimates. Reuters also compiled several breakeven estimates for North American LNG projects from various sources. The lowest estimated breakeven for new U.S. facilities was US\$7.50 (Figure 2). U.S. liquefaction companies in the Gulf Coast are therefore likely to be among the most expensive LNG suppliers to Asia (Figure 3).

¹³ French Institute of International Relations (IFRI). [The Next Wave of LNG Investment is Coming](#). October 16, 2018, p. 2.

¹⁴ Timera Energy. [Where will the next wave of LNG supply come from?](#) October 30, 2017.

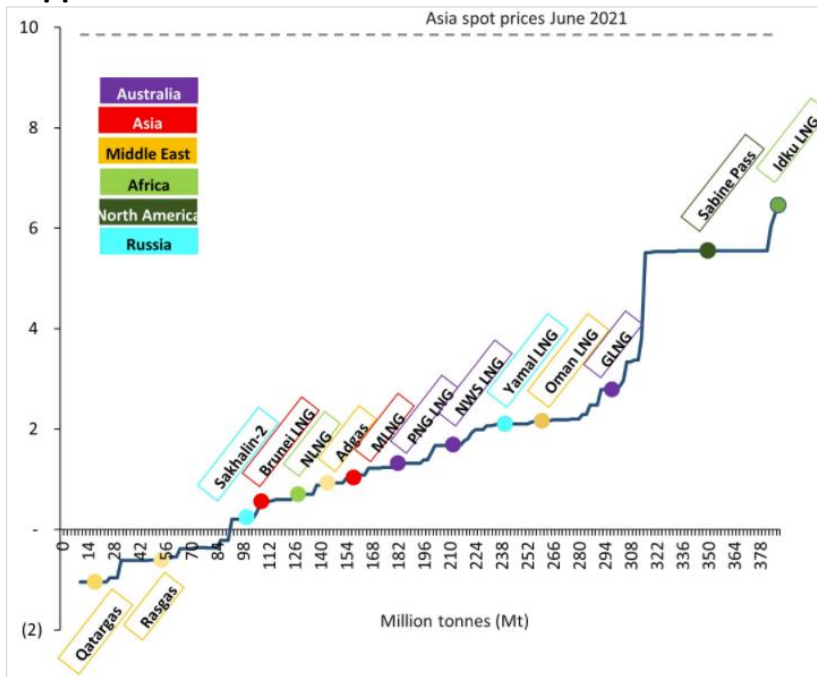
¹⁵ IEEFA. [China unlikely to come to rescue of overbuilt U.S. LNG industry](#). July 29, 2020.

Figure 2: Breakeven Prices Required for North American LNG Projects



Source: Reuters.

Figure 3: The U.S. Is Likely to Be One of the Most Expensive LNG Suppliers to Asia



Source: Rystad Energy (2021).

Note: The figure only includes short-run marginal costs of liquefaction plants and does not include fees for long-term capital cost recovery.

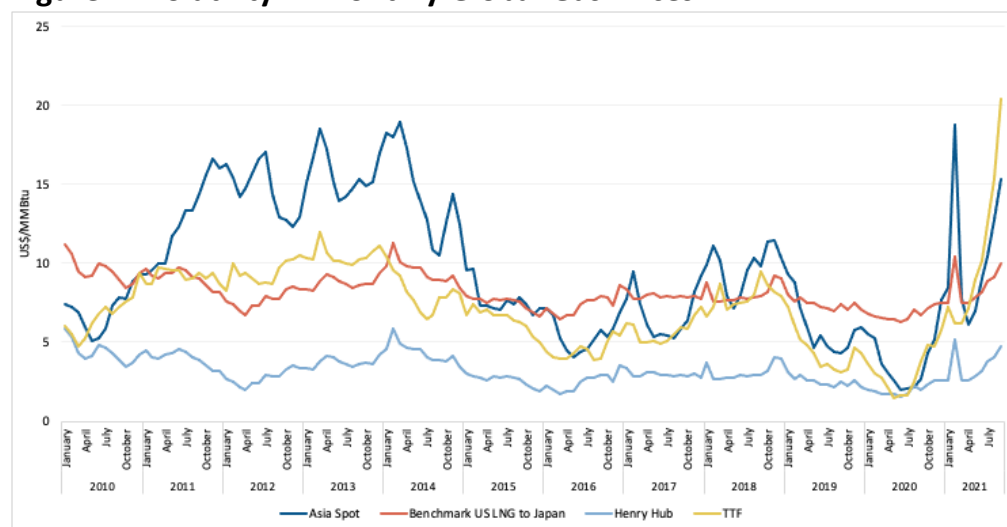
Assumption 2: The Spot Market Is a Dependable Source for Cheap Gas

The white paper states clearly that it is “not intended to prescribe a specific approach on developing LNG infrastructure or contracting for LNG,” but it notes that spot trading opportunities could drive Philippines LNG demand. Reliance on the LNG spot market, however, could subject the Philippines to even greater price volatility.

The S&P Global Platts Japan-Korea Marker—the benchmark spot price for LNG in Asia—has soared past \$20/MMBtu for October delivery, and was assessed at

\$20.038/MMBtu on Sept. 8.¹⁶ This follows a tumultuous 2020 in which LNG prices in Asia fell to their lowest point ever—under US\$2/MMBtu during the height of the pandemic—only to rise to US\$32.50/MMBtu in late 2020 due to strong winter demand in North Asia (Figure 4). NYMEX futures anticipate LNG sold in North Asian spot markets to remain around US\$11-\$12/MMBtu during the early 2020s.

Figure 4: Volatility in Monthly Global Gas Prices



Source: IHS Markit.

Recent volatility in LNG prices in Asia has been caused by a confluence of factors, including outages at liquefaction facilities, high summer temperatures, and limited storage inventories in Europe causing buyers to compete for cargoes to Asia. The effect of volatility has been to paralyze decision-making and gas market developments in emerging Asian economies. For example, Bangladesh abandoned long-term contract negotiations in 2020 to take advantage of low spot market rates, only to have prices skyrocket in 2021. The country is now reconsidering long-term contracts.

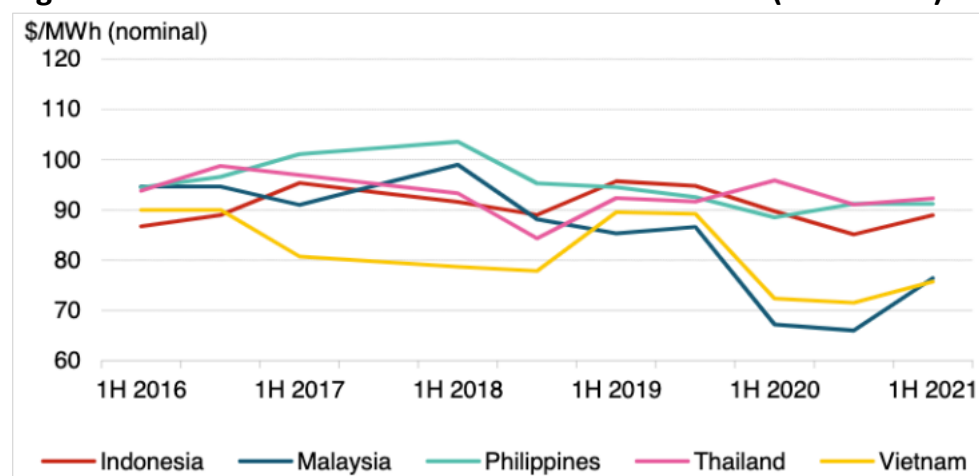
The inherent volatility of LNG makes it difficult for policymakers and power sector planners to determine final prices of gas and power to domestic end-users. The white paper states, “the levelized cost of electricity (LCOE) from a gas-based power plant ranges from \$54 to \$99 per MWh (megawatt-hour). In comparison, that of a coal-based power plant is estimated at \$101 to \$242 per MWh, including carbon capture and storage costs.” These figures assume a gas feedstock cost of US\$6.40/MMBtu, and the respective efficiencies of the modelled gas and coal plants are not provided.

However, these LCOE estimates are well below the LCOE for existing gas plants in the Philippines. According to figures from Bloomberg New Energy Finance, the LCOE of existing gas plants has ranged from US\$90-\$105/MWh over the last five years (Figure 5). Moreover, as already shown, gas feedstock costs to power plants in

¹⁶ CME Group. [LNG Japan/Korea Marker \(Platts\)](#). September 13, 2021.

the Philippines are likely to be significantly higher due to higher costs associated with LNG imports, raising power prices. The comparison is also flawed given that coal costs assume carbon capture and storage, whereas power prices from gas plants do not. A more realistic comparison of levelized costs for coal and gas plants eliminates the alleged economic advantages of imported LNG to coal. Recent renewable energy tenders, by contrast, have yielded prices below US\$60/MWh, suggesting that the addition of LNG facilities to the Philippines' grid could put upward pressure on consumer prices compared to renewable technologies.¹⁷

Figure 5: Historical LCOE for CCGTs in Southeast Asia (2016-2021)



Source: Bloomberg New Energy Finance. *Uncertain Role for Gas in Southeast Asia Power Transition*. July 29, 2021.

Assumption 3: LNG Is a Reliable Bridge Fuel for Power Generation

The white paper states, “LNG-fired generation provides a reliable and cleaner bridge fuel to complement and supplement variable renewable energy as it increases in prevalence.” But recent events in the Philippines and the global market demonstrate that fossil fuels are less reliable than industry advocates claim. The idea of LNG as a flexible bridge fuel, meanwhile, is based on technical and contractual circumstances that are not present in the Philippines market.

The reliability of LNG and natural gas has been called into question recently, as volatile prices and barriers to global trade have resulted in higher prices and, in some cases, gas shortages for emerging markets in Asia. For example, following record high LNG prices in winter 2020, Pakistan and Bangladesh were forced to cancel spot market tenders due to the unaffordability of gas,¹⁸ resulting in gas shortages for residential and industrial end-users.¹⁹ According to Bangladeshi government daily generation statistics, between 25% and 36% of gas-fired power

¹⁷ PV Magazine. [Solar Philippines bids \\$0.058/kWh in Meralco price challenge](#). February 2, 2018.

¹⁸ IEEFA. [Gas and LNG Price Volatility to Increase in 2021](#). January 2021, p. 4.

¹⁹ New Age Bangladesh. [Gas crisis hits Bangladesh consumers](#). January 22, 2021.

capacity was stranded in the early months of 2021 due specifically to fuel supply shortages.²⁰

Even countries with long-term LNG supply contracts have experienced difficulties procuring gas during times when spot market prices are high, since large spot price increases create an incentive for LNG suppliers to cancel term cargoes. During the high-priced winter months of 2020, for example, suppliers sent “failure to deliver” notices to long-term customers in South Asia to take advantage of more profitable opportunities in the spot market.²¹ Most recently, in August, Italian oil major Eni defaulted on a term cargo delivery to Pakistan.²² While the exact reasons for the cancellation are unclear, there was speculation it was because spot prices at the time were surpassing US\$18/MMBtu, while the price of the cargo under the term contract was estimated to be US\$9/MMBtu.

In the Philippines, recent brownouts in Luzon were caused by unplanned outages at four coal plants and the de-rating of capacity at the Ilijan natural gas facility due to gas shortages from Malampaya. In addition, the Philippines Joint Congressional Energy Commission (JCEC) recently found that 12 power plants—mostly natural gas and coal-fired facilities—have far exceeded limits for allowable planned and unplanned outages, resulting in energy shortages and at least 1,900 megawatts (MW) of power cut from the grid.²³ Fuels that have been traditionally labelled as “reliable” are in fact highly vulnerable to disruptions in global trade and other market events in both LNG importing and exporting countries.

The idea of natural gas as a bridge fuel has also been scrutinized. The idea stems from the purported operational flexibility of natural gas turbines, allowing gas-fired power plants to ramp up and down quickly to accommodate renewable energy sources like wind and solar. However, this operational flexibility is more common in smaller gas turbines, known as open-cycle gas turbines (OCGTs). Combined cycle gas turbines (CCGTs), on the other hand, take significantly longer to ramp up to full capacity,^{24,25} and using them to balance renewables would increase marginal electricity costs. All the proposed gas plants in the Philippines are CCGTs.

Along with operational characteristics of gas-fired power plants, flexibility also depends on the rigidity of contractual arrangements between suppliers and consumers of both gas and power. Financing new gas-fired power plants often requires guaranteed offtake levels, known as take-or-pay commitments, to ensure project sponsors can service debt. Take-or-pay commitments essentially require end-users to pay for capacity even if the gas and electricity are no longer being used due, for example, to the introduction of lower-cost renewables. As a result, long-

²⁰ Bangladesh Power Development Board (BPDB). [Daily Generation Archive](#). See, for example, the daily report from January 5, 2021.

²¹ S&P Global. [LNG market upheavals push Asian buyers to see more legal protection in contracts](#). May 5, 2021.

²² The News Pakistan. [Backing out of LNG term cargo: PLL not keen to penalise ENI](#). August 26, 2021.

²³ Business Mirror. [The Power ‘Blame Game.’](#) May 1, 2021.

²⁴ International Renewable Energy Agency (IRENA). [Flexibility in Conventional Power Plants](#). 2019, p. 7.

²⁵ Oil Change International. [Burning the Gas “Bridge Fuel” Myth](#). May 2019, p. 14.

term take-or-pay arrangements can lock in gas-fired capacity and inhibit the growth of domestic renewables, contrary to LNG industry narratives.

Assumption 4: LNG Is Beneficial for the Climate

The white paper sponsored by USAID champions the “environmental benefits of LNG.” However, recent reports from the International Energy Agency (IEA) and the United Nations’ Intergovernmental Panel on Climate Change (IPCC) point to the incompatibility of natural gas and LNG with global climate targets.

In its latest five-year report, the IPCC notes that the world is on track to surpass 1.5 degrees Celsius of global warming by the early to mid-2030s. The IPCC calls for “strong, rapid, and sustained reductions in greenhouse gases,” particularly methane.²⁶ The primary component of natural gas, methane has a global warming potency more than 80 times the heat-trapping potential of carbon dioxide (CO₂) over a 20-year period. The transportation and burning of natural gas leaks significant volumes of methane, which is now responsible for roughly a quarter of global temperature increases.²⁷ The shipment of LNG adds to leakages, increasing the life-cycle emissions of natural gas by 8% to 21% over a 20-year period.²⁸ While the white paper considers the emissions impact of natural gas consumed in the U.S., it does not account for the additional greenhouse gas emissions resulting from gas liquefaction and regasification.

An earlier IEA report from May 2021 also highlights the incompatibility of global net-zero targets with continued reliance on oil, natural gas, and coal. The report found that limiting global warming to 1.5 degrees Celsius would require an immediate cessation of new drilling for oil and gas fields, and that under a net-zero pathway to 2050, LNG trade would decline by 60%. The IEA’s net-zero roadmap also involves a 75% reduction in methane emissions by 2030. Under a climate-friendly pathway, investors in new LNG and natural gas assets risk considerable exposure to stranded assets.²⁹

²⁶ According to Rick Duke, U.S. senior director and White House liaison for the Special Presidential Envoy for Climate Change, “Methane is the next crucial, fast, climate stabilization prize. There’s simply nothing that comes close for securing our near-term climate future ...” Mother Jones. [To Put the Brakes on Global Warming, Slash Methane Emissions First](#). August 16, 2021.

²⁷ IOP Science. [Acting rapidly to deploy readily available methane mitigation measures by sector can immediately slow global warming](#). 2021.

²⁸ Natural Resources Defense Council. [Sailing to Nowhere: Liquefied Natural Gas Is Not an Effective Climate Strategy](#). December 8, 2020.

²⁹ IEEFA. [IEA’s net zero emissions by 2050 maps the huge increase in global ambition](#). May 18, 2021.

Assumption 5: There Is Sustainable Demand for LNG in the Philippines

As mentioned, there is a small role for LNG in the Philippines to cover declines in Malampaya production over the medium term. However, the country's long-term demand for LNG in both power and non-power sectors remains to be seen. Currently, natural gas is used almost entirely in the Philippines power sector—and only on the Luzon grid—with very little long-term demand expected to come from residential, industrial, or commercial sectors.³⁰ There are no existing gas transmission lines that might supply other regions or sectors, providing a physical limitation on medium-term demand growth.

In the power sector, power supply procurement plans (PSPPs) submitted by the Philippines' largest utilities indicate only a limited role for large-scale, baseload thermal power plants. According to Meralco's latest PSPP, for example, the company expects to contract an additional 1,070 MW of baseload and 600 MW of mid-merit capacity beginning this decade, as well as an additional 1,200 MW of baseload capacity beginning in 2030.³¹ These requirements are far less than the current LNG-to-power pipeline of 10.9 gigawatts (GW).³² The other largest utilities in the Philippines—namely Visayan Electric Company, Davao Light and Power Company, and the Cagayan Electric Power and Light Company—do not intend to procure significant volumes of thermal baseload power by 2030.

Several projects have historically been cancelled due to the lack of contractual offtake opportunities. Most recently, the 1,100 MW LNG-to-power project led by a partnership of Batangas Clean Energy and the U.S.-based private equity firm Blackstone was cancelled due to an inability to secure financing without a guaranteed offtake commitment.³³

Demand for LNG-to-power capacity could decline even further with the introduction a higher share of renewable energy share mandated by the Philippines' Renewable Portfolio Standard. The current RPS requires large offtakers to procure an additional 1% per year of renewable power, but a recently drafted update to the RPS would raise the requirement to 2.52%.³⁴ Under the higher standard, renewables generation would account for 37.3% of the country's generation by 2030 and 55.8% by 2040, further limiting the need for large centralized thermal power plants.³⁵

³⁰ DOE. Philippines Energy Plan 2018-2040.

³¹ Meralco. [Power Supply Procurement Plan 2021-2030](#).

³² IEEFA. [No Guaranteed Future for Imported Gas in the Philippines](#). May 2021.

³³ Business World. [Lack of financing stalls P82.5-B LNG project of Batangas Clean Energy](#). August 23, 2021.

³⁴ DOE. [Draft Circular: Prescribing the Adjusted Annual Percentage Increment to be Imposed on All Mandated Participants of the Renewable Portfolio Standards for On-Grid Areas](#). September 8, 2021.

³⁵ *Ibid.*

Conclusion

In summary, claims about the economic, financial, and environmental benefits of LNG should be viewed with caution. The current pipeline of LNG import terminals and LNG-to-power plants far exceeds demand, indicating a clear mismatch between investor expectations and market fundamentals. For the Philippines and other emerging importers in Asia, LNG should represent a fuel of last resort—a temporary solution to fill the Malampaya gas supply deficit—rather than a sustainable, long-term solution for meeting the Philippines' energy needs.

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