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Global gas turbine shortages add to LNG challenges in Vietnam and the Philippines

Bottlenecks in the global gas turbine supply chain are likely to extend project delays in Vietnam and the Philippines beyond 2030

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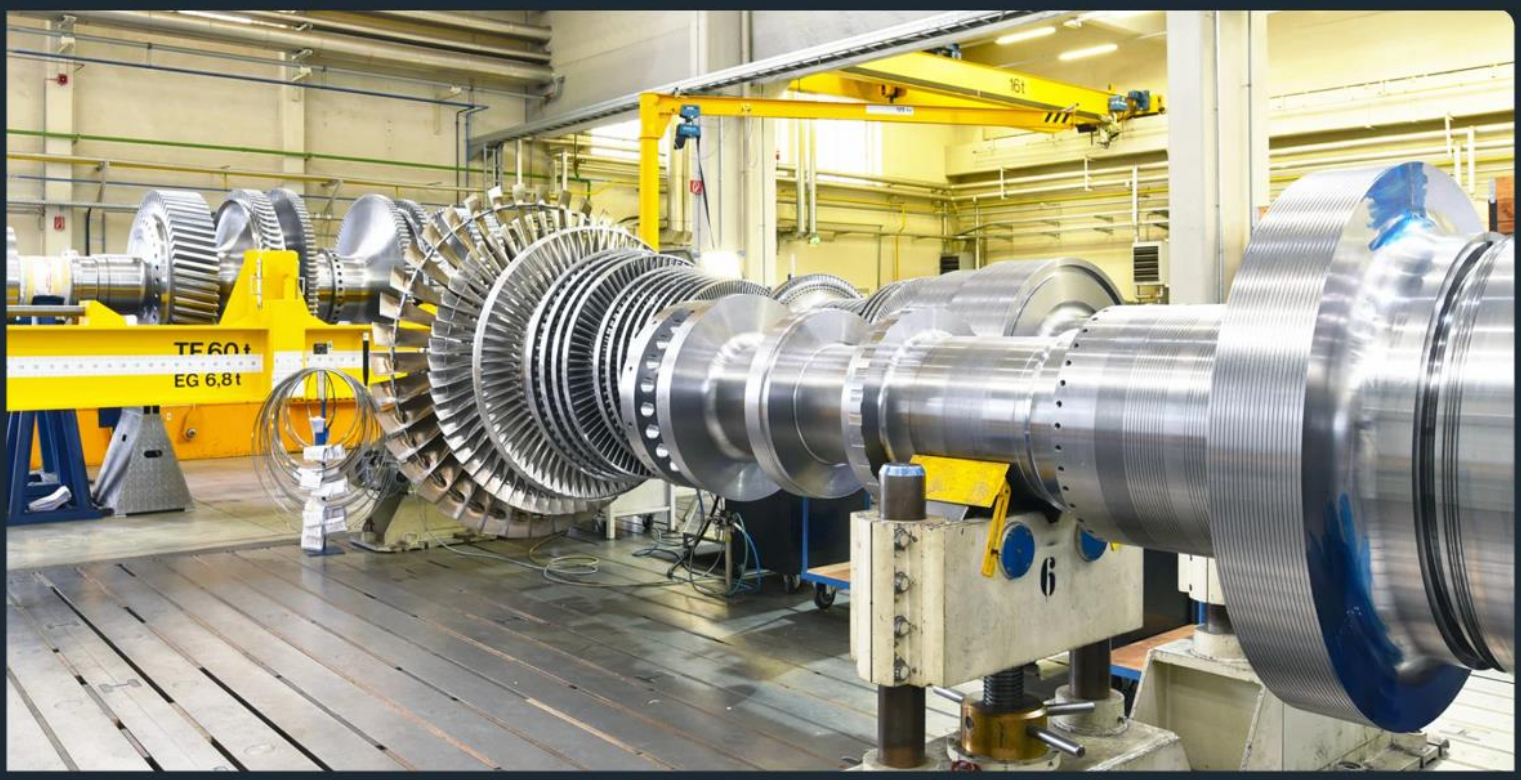


Contents

Figures and Tables

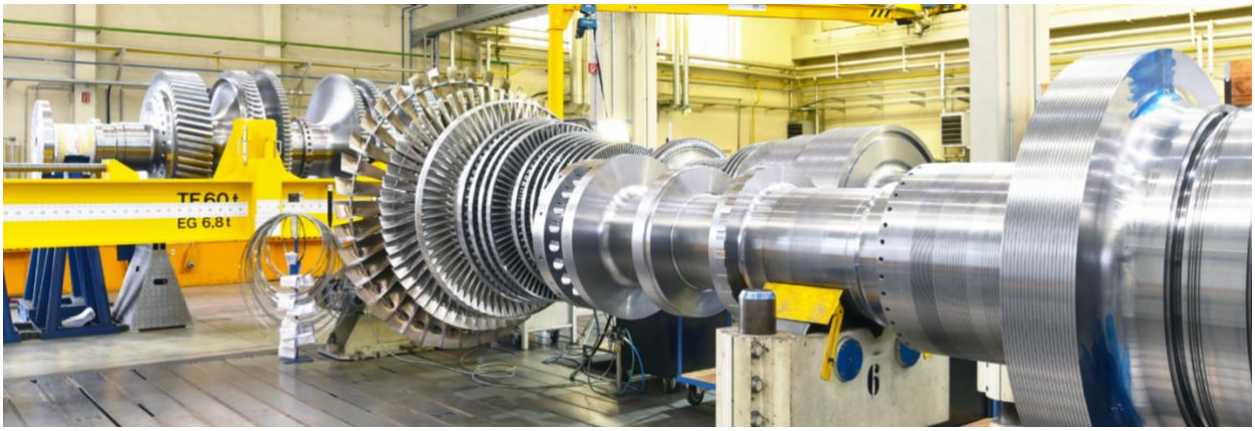
Key Findings

The world's largest gas turbine manufacturers — GE Vernova, Siemens Energy, and Mitsubishi Heavy Industries (MHI) — face extensive production backlogs and are advising developers of new gas-fired power projects to plan seven to eight years ahead for turbine procurement. Manufacturing capacity expansions are unlikely to reduce wait times or costs for gas turbines in the medium term.

Turbine bottlenecks add to a lengthy list of regulatory and bankability challenges delaying gas and liquefied natural gas (LNG) fired power plants in Vietnam and the Philippines. As a result, Vietnam is likely to miss its 2030 targets for domestic gas and LNG-fired power capacity by a combined 25.2 gigawatts (GW). Two projects have disclosed turbine contracts but still face other significant barriers to financial closure.

The Philippines has one LNG-to-power project expected to begin fully operating in 2025 but is unlikely to bring another LNG-fired power plant online this decade. All the country's remaining projects, with a combined capacity of 10.7GW, remain in early development stages and are unlikely to have secured gas turbine orders.

Delays for LNG-to-power projects extend opportunities for the growth of low-cost renewables and storage, reducing the long-term need for LNG. Although the LNG industry often cites Asia's power sector as a major demand driver, gas turbine constraints present yet another challenge to rapid LNG demand growth forecasts for key Asian economies.



Executive summary

Plans to build significant new gas-fired power capacity in the Philippines and Vietnam are running headfirst into a global gas turbine shortage, likely extending multi-year project delays and putting both countries off-track to meet gas-to-power development targets.

Existing gas projects in Vietnam and the Philippines have relied exclusively on turbines from Siemens Energy, Mitsubishi Heavy Industries (MHI), and GE Vernova — the world's three largest gas turbine manufacturers that together have accounted for roughly 90% of the global market over the last decade. Despite recent announcements to boost manufacturing capacity[1], all three companies are currently reporting extensive backlogs and delivery timelines of up to eight years.

Ongoing shortages are frequently discussed in a Western context, with little coverage of the implications for emerging Asian economies. However, for the 35.9 gigawatts (GW) of gas projects still in early development stages in Vietnam and the Philippines (Table 1), turbine backlogs will likely increase project costs, and add to an already lengthy list of regulatory, legal, and financial challenges facing gas-to-power project developers. The Institute for Energy Economics and Financial Analysis (IEEFA) expects that no new liquefied natural gas (LNG) fired power plants will come online in the Philippines this decade. While two projects in Vietnam have likely secured turbines, they still lack key contracts necessary for financial close.

Table 1: Expected gas-to-power project delays in Vietnam and the Philippines (GW)

Vietnam		Philippines	
2030 target for LNG-fired capacity	22.5	Existing gas-fired power capacity	3.7
Existing LNG-fired capacity (Nhon Trach 3&4)	1.6	Capacity expected online in 2025 (EERI Batangas CCGT)	1.6
Plants with secured gas turbines	1.2	Total pipeline of proposed gas plants	10.7
LNG capacity unlikely to be met	**19.7**	Plants with secured gas turbines	0.0
2030 target for domestic gas-fired capacity	14.9	**Total capacity unlikely by 2030**	**10.7**
Existing domestic gas-fired capacity	8.3		
Plants with secured gas turbines	1.1		
Domestic gas capacity unlikely to be met	**5.5**		
Total capacity unlikely by 2030	**25.2**		

Source: IEEFA.

[1] Bloomberg. Mitsubishi Heavy to Double Turbine Capacity as Demand Soars. 31 August 2025.

I. Introduction: Quantifying the global gas turbine shortage

Heavy-duty gas turbines have been called the "crown jewel" of the energy and power equipment manufacturing industry due to the extraordinary engineering capabilities and costs required.[2] Until recently, only a handful of countries worldwide were able to produce them, and the industry remains highly concentrated among a limited number of suppliers. Mitsubishi Heavy Industries (MHI), GE Vernova (spun off from General Electric [GE] in April 2024), and Siemens Energy have accounted for roughly 90% of heavy-duty gas turbine orders over 100 megawatts (MW) since 2015.

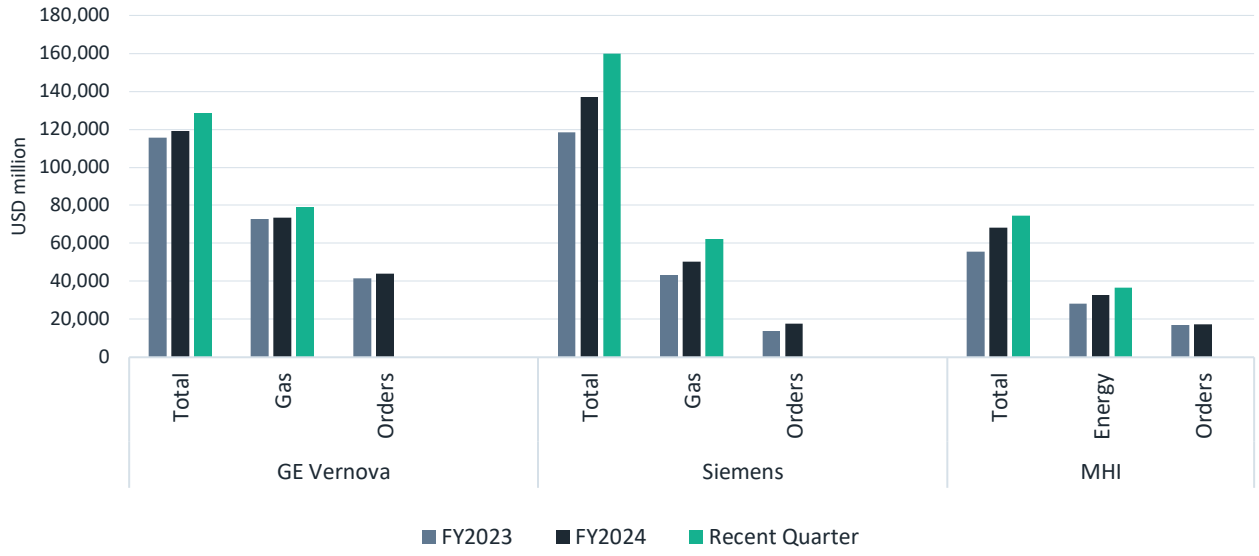
These three companies are no strangers to boom-bust cycles. Recently, demand and supply-side factors — including data center-driven electricity demand growth and coal retirements in the United States (US) and the Middle East, as well as materials, components, and labor shortages — have compounded into a global shortfall of available gas turbines.

2024 reportedly marked the highest number of turbine orders since 2002. Approximately 80 gigawatts (GW) of orders were placed[3], compared to an estimated annual production capacity of just over 30GW by the three largest original equipment manufacturers (OEMs). Annual orders are expected to surpass 100GW annually starting in 2027.[4] The US alone is expected to build 19GW of gas-fired power capacity annually through 2030.[5]

Annual orders that exceed production capacity lead to growing production backlogs. The total backlog for the three largest OEMs, particularly in their gas turbine segments, has increased dramatically (Figure 1). GE Vernova, for example, had a total queue — including turbines under contract and slot reservation agreements — of 54GW in the second quarter of 2025.[6]

[2] Business Korea. Doosan Enerbility Ushers in New Era of Domestic Gas Turbine Engine Production. 08 August 2023.
[3] Turbomachinery Magazine. Gas Turbine Market Report: 2024 Posts Highest Units, MWs in 22 Years. 25 April 2025.
[4] Bloomberg. AI-Driven Demand for Gas Turbines Risks a New Energy Crunch. 02 October 2025.
[5] Rocky Mountain Institute. Gas Turbine Supply Constraints Threaten Grid Reliability; More Affordable Near-Term Solutions Can Help. 18 June 2025.
[6] GE Vernova. 2Q 2025 Financial Results. 23 July 2025. Page 04.

Figure 1: Backlogs at major gas turbine manufacturers

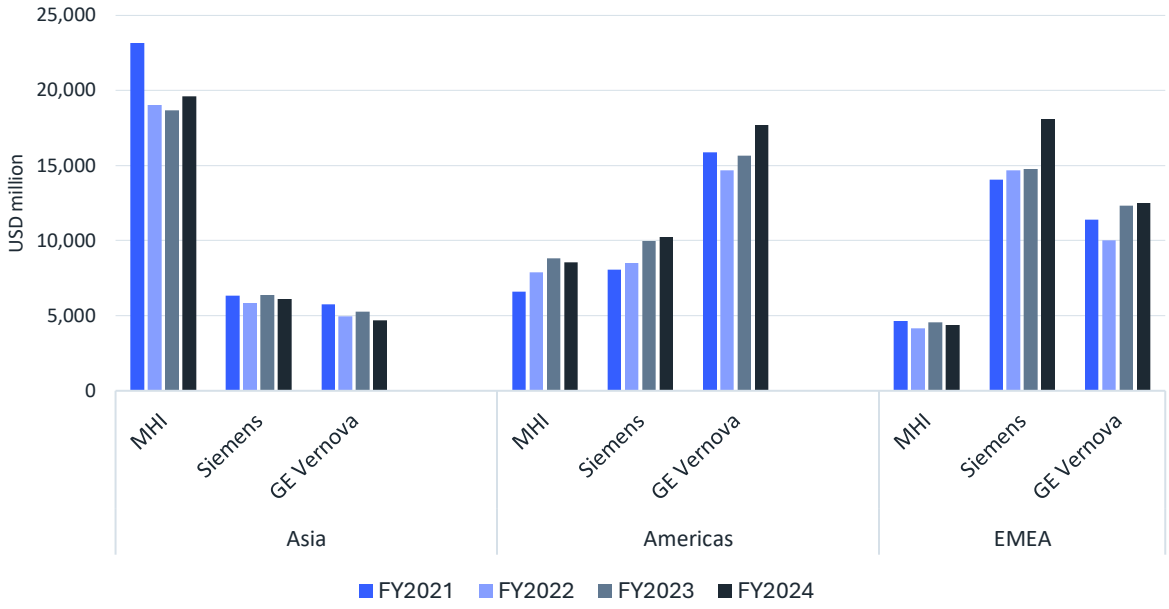


Source: Company financial reports.
Note: Fiscal years vary by company. Most recent reporting quarter is 2Q2025 for GE Vernova, 3Q2025 for Siemens Energy, and 1Q2026 for MHI. "Total" category refers to the total backlogs across all business segments. "Gas" for GE Vernova and Siemens refers specifically to backlogs at their gas business, while "Energy" refers to MHI's Energy Systems segment. "Orders" refers to the value of orders received in FY2023 and FY2024.

Company financial results also imply a shift in growth prospects away from Asia toward the US and the Middle East. MHI reports indicate that while turbine orders from the Americas and the Middle East have jumped in recent years[7], orders from Asia have fallen. GE Vernova reported that roughly 60% of its gas turbine orderbook was concentrated in the United States.[8] For Siemens, the value of orders from Asia across all business segments fell by half in 2024 to its lowest point in seven years.[9] Meanwhile, total revenues from Asia are down for all three companies since fiscal year (FY) 2021 but up sharply in the Americas (Figure 2).

[7] Mitsubishi Heavy Industries (MHI). 2024年度決算説明資料. 09 May 2025. Page 31.
[8] GE Vernova. 1Q 2025 Financial Results. 23 April 2025. Page 11.
[9] Siemens Energy. Earnings Release Q4 FY 2024. 13 November 2024. Page IX.

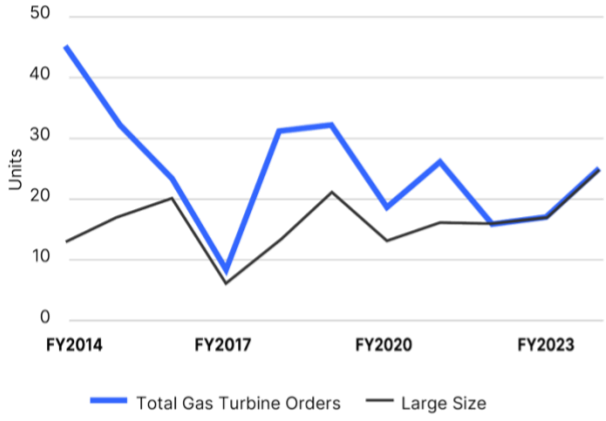
Figure 2: OEM revenues by geography since FY2021



Source: Company financial reports.
Note: "Asia" includes Japan in MHI reports and Australia in Siemens reports.

New gas turbine orders are primarily for larger, heavy-duty, utility-scale models, in contrast to lighter, smaller aeroderivatives that typically serve small-scale industrial and peaking markets. While GE Vernova's total turbine orders increased 22% from 2022 to 2024, orders for heavy-duty gas turbines — particularly the company's most advanced, efficient HA turbine class — more than doubled. Orders for MHI's large turbines have nearly doubled since 2021, and the company maintains a relatively minor presence in the lighter aeroderivative turbine market (Figure 3).

Figure 3: Annual gas turbine orders received by MHI (left) and GE Vernova (right)



Orders in Units	2022	2023	2024
Gas Turbines	92	93	112
Heavy-Duty	30	41	68
HA-Turbines	9	8	25
Aeroderivatives	62	52	44
Gas Turbines (GW)	9.8	9.5	20.2

Source: Company financial reports.

Estimates for delivery timelines vary. While turbine manufacturers are generally reporting wait times of around five years for larger turbines — up from two to three years earlier this decade — they are advising customers to plan according to seven to eight-year timelines.[10, 11]

For example, GE Vernova is currently in active discussions for reservation slots in 2030.[12] Although wait times vary according to frame sizes, GE Vernova sold 11.9GW of capacity in 2024 and is targeting a queue of 60GW by the end of 2025[13, 14], indicating a potential backlog of over five years. The company has announced plans to expand capacity in 2026, though these plans are unlikely to resolve near-term bottlenecks (see Section 3).

In the US, one developer stated they would not be able to build a new gas-fired power plant until 2032[15], and long lead times have already resulted in project cancellations.[16] Customers are also reporting longer overhaul and maintenance times of 350 days compared to the standard 120 days.[17] This is particularly true for smaller turbine operators, as manufacturers may prioritize their largest service contracts.

Along with delivery timelines, turbine costs are increasing due to limited supply, reservation fees, and rising component costs. Capital costs for gas turbines are up nearly threefold in just the last two years, from between USD700–1,000 per kilowatt (kW) to an estimated USD2,400/kW today.[18] Manufacturers are now also charging non-refundable reservation fees, with one developer reporting that they paid GE Vernova USD25 million to reserve a turbine for 2030 delivery.[19] GE Vernova has stated it will charge premium prices for earlier reservation slots.[20] Moreover, prices are rising for gas turbine materials and components — including steel, aluminum, high-temperature coatings, labor, and digital systems — as well as for other components of gas-fired power plants, including transformers and switchgears.[21]

II. Implications for Vietnam and the Philippines

For emerging Asian economies like Vietnam and the Philippines, where gas-to-power plans are already behind schedule and struggling to compete economically with coal and renewables, global turbine shortages present yet another obstacle to deployment. Both countries have relied exclusively

[10] Utility Dive. Georgia Power receives natural gas turbine as delays loom. 21 August 2025.
[11] Power Engineering. Long lead times are dooming some proposed gas plant projects. 20 February 2025.
[12] GE Vernova. 1Q 2025 Financial Results. 23 April 2025. Page 12.
[13] GE Vernova. 2024 Annual Report. Page 38.
[14] American Public Power Association. With Gas-Fired Generation Surging, Gas Turbine Backlogs Come to the Forefront. 16 July 2025.
[15] American Public Power Association. With Gas-Fired Generation Surging, Gas Turbine Backlogs Come to the Forefront. 16 July 2025.
[16] Power Engineering. Long lead times are dooming some proposed gas plant projects. 20 February 2025.
[17] Gas Turbine Hub. The Growing Backlog of Gas Turbine Orders: Implications for Customers. 01 March 2025.
[18] Gas Outlook. Costs to build gas plants triple, says CEO of NextEra Energy. 25 March 2025.
[19] GridLab. Gas Turbine Costs Report. September 2025. Page 02.
[20] GE Vernova. 1Q 2025 Financial Results. 23 April 2025. Page 05.
[21] IEEFA. Expanding ASEAN grid supply chains could mitigate critical transmission equipment shortages. 09 January 2025.

on the three largest OEMs for gas turbines (Table 2). Although both have set ambitious targets for increasing gas in their electricity mixes, these targets are unlikely to be achieved on schedule or within budget.

Table 2: Existing gas and LNG-fired power plants in Vietnam and the Philippines

Plant Name	Capacity	Owner	Gas Turbine OEM	Model
Vietnam				
Ca Mau 1,2	1,500	PV Power	Siemens	SGT5-4000F
O Mon I	660	EVN	MHI	ST-1 (Steam Turbine)
Ba Ria	370	EVN GENCO 3		
Phu My 1	1,090	EVN GENCO 3	MHI	M701F
Phu My 2.1	890	EVN GENCO 3	GE	GT13E2
Phu My 2.2	720	EVN	GE	GE 9FA+e
Phu My 3	720	EVN	Siemens	SGT5-4000F
Phu My 4	450	EVN GENCO 3	GE	GT13E2
Hiep Phuoc 1,2,3	375	Hiep Phuoc Power Co.		
Nhon Trach 1	450	PetroVietnam	GE	GT13E2
Nhon Trach 2	750	PetroVietnam	Siemens	SGT5-4000F
Philippines				
Avion	97	First Gen	GE	LM6000PC
Santa Rita	1,100	First Gen	Siemens	SGT6-4000F
San Lorenzo	550	First Gen	Siemens	SGT6-4000F
San Gabriel	430	First Gen	Siemens	SCC6-8000H
Ilijan	1,277	San Miguel	MHI	M501G1

Source: Compiled by author; Philippines Department of Energy; JICA. Preparatory Survey on O Mon III Combined Cycle Power Plant Construction in Vietnam. June 2012.
Note: Table does not include plants in commissioning stages as of August 2025.

For example, Vietnam's Eighth Power Development Plan (PDP8) includes 2030 targets to build 22.5GW of power capacity fueled by imported liquefied natural gas (LNG) and up to 14.9GW run on domestically produced gas.[22] As of September 2025, however, the country had just 1.6GW of LNG-fired power capacity and 8.3GW of capacity run on domestic gas.[23, 24]

The Institute for Energy Economics and Financial Analysis (IEEFA) expects that only two other projects are likely to have secured turbine reservations. PetroVietnam's 1.16GW O Mon IV domestic gas plant recently secured a turbine contract for two Mitsubishi JAC heavy-duty turbines[25], after awarding an engineering, procurement, and construction (EPC) contract to South Korea's Doosan

[22] A&O Shearman. Vietnam's PDP8 gets a makeover. June 2025. Page 7.
[23] The Investor. Unit of Vietnam's first LNG power complex connects to national grid. 29 June 2025.
[24] EnerData. PetroVietnam connects Nhon Trach 4 LNG-fired power plant to Vietnam's grid. 01 July 2025.
[25] Mitsubishi Power. Mitsubishi Power Signs Contract to Supply Two M701JAC Gas Turbines to O Mon 4 Power Plant. 08 September 2025.

Enerbility in June 2025. Press announcements did not specify a delivery timeline, but the order joins Mitsubishi's backlog of 48 turbines at the end of March 2025. In addition, the 1.2GW Hiep Phuoc LNG-fired plant has reportedly secured three Siemens SGT5-4000F turbines.[26]

At the 2020 Indo-Pacific Business Forum in Hanoi, GE signed two preliminary deals with Vietnamese LNG project developers.[27] These include a master teaming agreement with US-based Delta Offshore Energy, sponsor of the 3.2GW Bac Lieu LNG project, and a memorandum of understanding (MOU) with VinaCapital, which is pursuing the 3GW Long An LNG-to-power project jointly with South Korea's GS Energy. GE also signed an MOU in 2020 to supply turbines for the Long Son LNG-fired power plant[28], which initially aimed to begin operating in 2025 but has been delayed to 2031–2035.[29] However, these preliminary deals likely do not constitute secure, binding turbine contracts or reservations given that all three projects have faced extensive delays and remain in feasibility stages while turbine markets have changed dramatically.

Despite recent statements that major projects, such as the Hai Phong and Quang Trach 2 LNG-fired power plants, are set to begin construction in 2025, there have been no announcements regarding gas turbine procurement. The first two phases of Hai Phong will require six combined cycle gas turbines, each with a capacity of 800MW. Although a groundbreaking ceremony was held in September 2025[30], investors were only recently selected, and the project's design status remains unclear. Meanwhile, Quang Trach 2 aims to break ground by the end of 2025[31], with targeted completion in the fourth quarter of 2028. However, the project only recently opened EPC bidding[32], and even without a global turbine shortage, this timeline would be ambitious.

For many projects that are still bidding for investors, a bid guarantee of 1% of the total project cost has been cited as a "major deterrent."[33] In the case of Nghi Son LNG, this bid guarantee would amount to USD22 million. This suggests that the previously mentioned turbine reservation fees of USD25 million would also present considerable challenges. Although international players have expressed interest in the Nghi Son project — including JERA (Japan), Gulf Energy (Thailand), KOGAS, KOSPO, and SK E&S (South Korea), among others — they have noted significant difficulties related to investment procedures.[34] After two bidding rounds failed to attract any investor submissions, international bidding was reportedly canceled.[35]

[26] NS Energy. Siemens wins contract to upgrade Hiep Phuoc 1 steam power plant in Vietnam. 13 November 2019.
[27] Socialist Republic of Vietnam: Government News. VN, U.S. sign seven deals at the Indo-Pacific Business Forum. 28 October 2020.
[28] The Asset. General Electric signs up for Vietnam LNG power project. 02 December 2020.
[29] Power Generation Joint Stock Corporation 3 (EVNGENCO3). Vung Tau City: Long Son Power Complex Project with a total value of more than 3.7 billion USD is launched in the Quarter IV/2021. 26 May 2020.
[30] Vietnam Plus. PM attends ground-breaking ceremony for two major projects in Hai Phong city. 26 September 2025.
[31] Vietnam Investment Review. Quang Trach II LNG-fired power plant to break ground this year. 26 September 2025.
[32] Đấu thầu. Dự án Nhiệt điện LNG Quảng Trach II 52.490 tỷ đồng: Tăng tốc chon nhà thầu, phấn đấu quý IV khởi công. 17 September 2025.
[33] Vietnam Net. Billions on paper: Vietnam's LNG power ambitions stalled by policy bottlenecks. 22 September 2025.
[34] The Investor. Two multi-billion-dollar LNG power projects restarted in central Vietnam. 12 September 2025.
[35] The Investor. Two multi-billion-dollar LNG power projects restarted in central Vietnam. 12 September 2025.

All these projects face other substantial bankability challenges. None has publicly announced the finalization of a power purchase agreement (PPA), which is typically required for financial closure. PPAs for large thermal projects have historically been negotiated on a lengthy case-by-case basis that can take up to a decade.[36] Although Vietnam introduced a model PPA in 2025, it still leaves many key provisions — including force majeure terms, early termination payments, legal change protections, and dispute resolution mechanisms, among others — open to negotiation. The government has also refused to provide guarantees for payment obligations and foreign currency convertibility, which are often prerequisites for international lenders.

Offtake quantities have been another sticking point. A recent government decree requires the state utility, Electricity of Vietnam (EVN) and its subsidiaries to purchase at least 65% of an LNG-to-power project's electricity production over a maximum 10-year period.[37] However, project developers and financiers have demanded higher offtake requirements and longer commitments that match loan tenors, which are generally 15 years. Higher offtake commitments are particularly important for LNG-fueled projects, which must secure fuel supply contracts in sufficient volumes to ensure more predictable prices. Importantly, to qualify for the terms of the decree, projects must achieve commercial operations before January 2031 — a prospect that becomes even more unlikely when factoring in gas turbine delivery timelines.

One investor recently summarized Vietnam's LNG situation: "Without guaranteed cash flow, it's nearly impossible to raise capital, especially with LNG price volatility. Investing in these projects feels like entering a trap."[38]

Assuming that both O Mon IV and Hiep Phuoc LNG can achieve commercial operations this decade, IEEFA still expects Vietnam's gas development plans to fall short of 2030 targets by 19.7GW for LNG-fired power plants and 5.5GW for domestic gas-to-power capacity.

[36] Hogan Lovells. Vietnam's power development plan – From aspiration to reality. 21 June 2023.
[37] A&O Shearman. Vietnam: impact on LNG-to-power projects of the new Electricity Law guiding Decree 56. 18 March 2025.
[38] Vietnam Net. Billions on paper: Vietnam's LNG power ambitions stalled by policy bottlenecks. 22 September 2025.

Table 3: Proposed gas and LNG-fired power projects in Vietnam

Project Name	Capacity (MW)	Targeted Operations	Investors	Status
LNG-to-Power Plants				
Nhon Trach 3, 4	1,624	2025-26	PV Power	Unit 3 is operational; Unit 4 is commissioning
Hiep Phuoc 1	1,200	2025	Hiep Phuoc Power Co. Ltd.	PPA negotiations ongoing
Bac Lieu	3,200	2027-29	Delta Offshore Energy	FS ongoing; PPA negotiations ongoing
Quang Ninh 1	1,500	2028-29	QN LNG Power (owned by PV Power, Colavi, Marubeni, and Tokyo Gas)	FS ongoing
Thai Binh	1,500	2029	Thai Binh LNG Power JSC (TTVN Group, Tokyo Gas, and Kyuden)	FS ongoing
Nghi Son	1,500	2029-30	Not determined	Investor selection ongoing
Quynh Lap	1,500	2029-30	Not determined	Investor selection ongoing
Quang Trach 2	1,500	2029-30	EVNPMB2	FS ongoing
Hai Lang	1,500	2028-29	Consortium of T&T, Hanwa, KOGAS, and KOSPO	FS ongoing
Ca Na	1,500	2029-30	Not determined	Investor selection ongoing
Son My 2	2,250	2027-29	AES	Awaiting FS approval
Son My 1	2,250	2027-29	EDF-Sojitz-Kyushu Pacific consortium	Awaiting FS approval
Hai Phong 1	1,600	2025-30	Vingroup JSC, VinEnergo JSC	
Hiep Phuoc 2	1,500	2025-30	Not determined	Investor selection ongoing
Long An 1	1,500	2029-30	VinaCapital, GS Energy	Awaiting FS approval; PPA negotiations ongoing
Long An 2	1,500	2031-35	VinaCapital, GS Energy	
Long Son	1,500	2031-35	GTPP-MC-GE Group	
Cong Thanh	1,500	2031-35		
Hai Phong 2	3,200	2031-35	Vingroup JSC, VinEnergo JSC	
Vung Ang 3	1,500	2031-35		
Quang Trach 3	1,500	2031-35		
Domestic Gas-fired Power Plants (Supply Field)				
O Mon 2 (Block B)	1,050	2027	Marubeni - WTO consortium	FS approved. PPA and GSA negotiations ongoing
O Mon 3, 4 (Block B)	2,100	2028-30	PVN	EPC contractor selected for Unit 4
Dung Quat 1, 2, 3 (Blue Whale)	2,250	2028	EVN (units 1 and 3); Sembcorp Utilities Pte. Ltd. (unit 2)	Progress dependent on upstream implementation
Mien Trung 1, 2 (Blue Whale)	1,500	2030	PVN	FS ongoing. Dependent on upstream implementation
Quang Tri (Bao Vang)	340	2030	EVNGENCO1, Gazprom	No implementation

Source: IEEFA. Amended PDP8. Russin & Vecchi. Vietnam's National Power Development Plan for LNG Power Plants. May 2025; MBS Research. Power: Pioneering the green energy revolution. 06 January 2025; Baker McKenzie. Vietnam draft new decrees proposed new mechanisms for domestic natural gas and imported LNG to power projects. 31 December 2024.
Note: "FS"= feasibility study.

In the Philippines, government plans are more modest for near-term gas-to-power capacity, but investor optimism remains high. Although the Philippine Energy Plan (PEP) aims for 2.4GW of gas capacity additions by 2028, there are approximately 10.7GW of planned gas capacity at various stages of development. A new LNG-fired power plant, owned by Excellent Energy Resources Inc.

(EERI), is expected to come online this year — the first gas plant to begin operations in the country since 2016.

However, after the EERI project, none of the other proposed LNG-fired power projects appear to have progressed beyond initial stages of development. Several have been under development for many years with little progress. For example, a 650MW project owned by Australia's Energy World Corporation initially targeted operations in 2011 but has yet to secure any offtakers or be commissioned.[39] The company reported that two Siemens SGT-5000F had arrived at the site in October 2014.[40] However, there have been no updates in over four years and the project is assumed to have been shelved.[41]

Another company, Batangas Clean Energy Inc., has also been attempting to construct a 1,100MW LNG-fired power plant in the Philippines for nearly a decade. However, the project was previously stalled in 2021 due to a lack of financing, and there have been few updates since then. The project company is jointly owned by subsidiaries of the US private equity firm Blackstone and the Philippines' ACEN Corporation, which set a target for 100% renewables generation by 2025, further clouding the project's outlook.[42]

Similar to Vietnam, greenfield LNG-to-power projects in the Philippines have struggled to secure long-term offtake commitments with utilities that would underpin financing. However, unlike in Vietnam, these contracts are awarded based on competitive selection processes (CSPs), in which distribution utilities must procure power from the least-cost bidder. To date, the EERI project is the only greenfield LNG plant to have successfully secured a CSP. The country's largest distribution utility, Meralco, intends to hold two CSPs in 2025 for 600MW and 900MW of baseload power[43], but these auctions would require commercial operations by the winning bidder to begin in February 2028 and February 2030, respectively. IEEFA believes that proposed greenfield LNG-fired power projects are unlikely to meet these terms, given that most remain in early development stages and are unlikely to have procured gas turbines.

[39] IEEFA. No Guaranteed Future for Imported Gas in the Philippines. May 2021. Page 17.
[40] Energy World Corporation. Half year ended: 31 December 2015. 30 June 2015. Page 12.
[41] Global Energy Monitor. Pagbilao Grande Island LNG Terminal. Date accessed: 26 September 2025.
[42] Reuters. ACEN's energy transition journey. 22 August 2024.
[43] Manila Standard. Meralco prepares for new 900-MW supply bidding. 10 August 2025.

Table 4: Proposed gas and LNG-fired power projects in the Philippines

Project Name	Capacity (MW)	Targeted Operations	Investors	Status
Batangas CCGT 1,2,3	1,320	2025	Excellent Energy Resources Inc. (San Miguel, Meralco, Aboitiz)	Commissioning
Natural-Gas Fired Power Plant	1,100	TBD	Batangas Clean Energy, Inc. (Blackstone and ACEN)	No recent updates. No offtakers secured. Previously stalled in 2021 due to financing challenges.
Pagbilao LNG	650	TBD	Energy World Corporation	Originally planned to come online in 2011. No offtakers secured. Assumed cancelled due to lack of updates.
Batangas CCGT 4	440	TBD	Excellent Energy Resources Inc. (San Miguel, Meralco, Aboitiz)	
Atimonan One LNG Power Plant Phase 1,2	2,560	TBD	Atimonan One Energy Inc. / Meralco Powergen Corp.	Pending decision on whether project will use coal or natural gas. High, volatile fuel costs cited as a delay factor.
San Francisco Power Plant	1,200	2028	Quezon Power (Philippines) Limited Co.	MOU signed with Doosan Enerbility for EPC services.
Floating LNG Power Plant	450	Dec-29	VIRES Energy	Pre-FEED study completed in 2021. Permits for associated LNG terminal withdrawn.
Sisiman LNG Power Plant	1,200	Dec-29	GNPower Ltd. Co.	No recent updates.
Luna LNG Power Plant	1,128	2030		Previously a planned coal plant. No recent updates.
Santa Maria CCGT	1,260	TBD	First Gen EcoPower Solutions Inc.	No recent updates.

Source: IEEFA; Philippines Department of Energy. Private Sector-Initiated Power Projects as of April 2025. Date accessed: 22 September 2025.
Note: "TBD" = to be decided.

III. What comes next?

OEMs

OEMs have been hesitant to expand turbine manufacturing capacity, instead opting to manage the backlogs while prioritizing shareholder value. However, recent announcements indicate greater responsiveness to high demand. Mitsubishi recently stated that it aims to double gas turbine production capacity over the next two years, up from an earlier 30% target. GE Vernova is investing USD720 million to expand its US manufacturing capacity and increase its gas turbine production capacity to 20GW by 2027.[44] In November 2024, Siemens said that it aims to increase gas turbine production by 30%.[45]

Yet, these announcements are unlikely to reduce near-term costs or delivery timelines, and still reflect a reluctance to rapidly scale up manufacturing capacity. GE Vernova intends to maintain a backlog of 70–80GW in the coming years, meaning that increasing capacity to 20GW would do little

[44] GE Vernova. GE Vernova plans new $41 million, 50 job investment in Schenectady to expand gas power capacity. 19 August 2025.
[45] Investing.com. Earnings call: Siemens Energy reports strong Q4, sets ambitious targets. 18 November 2024.

to reduce delivery timelines below four years. The company's Chief Executive Officer Scott Strazik recently warned against adding too much capacity[46], particularly given lucrative reservation fees and "premium pricing" for earlier reservation slots.[47] Mitsubishi representatives have expressed similar concerns.[48]

This approach is based on past cycles of over-investment and market downturns in 2002, 2010, and 2017–2018, as well as future risks. For example, in November 2015, GE spent USD16.9 billion to acquire French multinational OEM Alstom in anticipation of a booming natural gas market.[49] Shortly after, turbine sales collapsed in 2017 and 2018 due largely to the growth of energy efficiency and renewable technologies[50], forcing the company to cut 12,000 jobs (18% of its power division workforce).[51] In 2018, the company's power division saw record losses and incurred a write-down of USD23 billion.[52] Siemens also cut thousands of jobs amid declining sales and even considered selling its flagship gas turbine business.[53]

Today, expanding turbine manufacturing capacity to match data center and artificial intelligence (AI) market hype presents a similarly risky proposition. Recent headlines about the potentially vast increases in electricity demand for data centers appear to be highly inflated. IEEFA reports have shown that utility demand growth forecasts in four US states exceed those of independent analysts[54], sometimes by a factor of four. The utility industry in the US is planning for about 50% more data center electricity demand than the tech industry is projecting.[55] Companies like Microsoft and Alibaba are now warning of a looming overbuild in data center capacity.[56]

Innovations in AI could cause the bubble to burst more quickly. In January 2025, the release of Deepseek AI, a start-up whose open-source model claimed to consume 40% less energy per task[57], sparked a selloff in power, natural gas, and nuclear companies, among other AI-related stocks. Share prices of all three major turbine OEMs dropped.[58] Although the long-term impact of Deepseek is highly uncertain, its release demonstrated the sensitivity of AI-related energy investments to AI innovation.

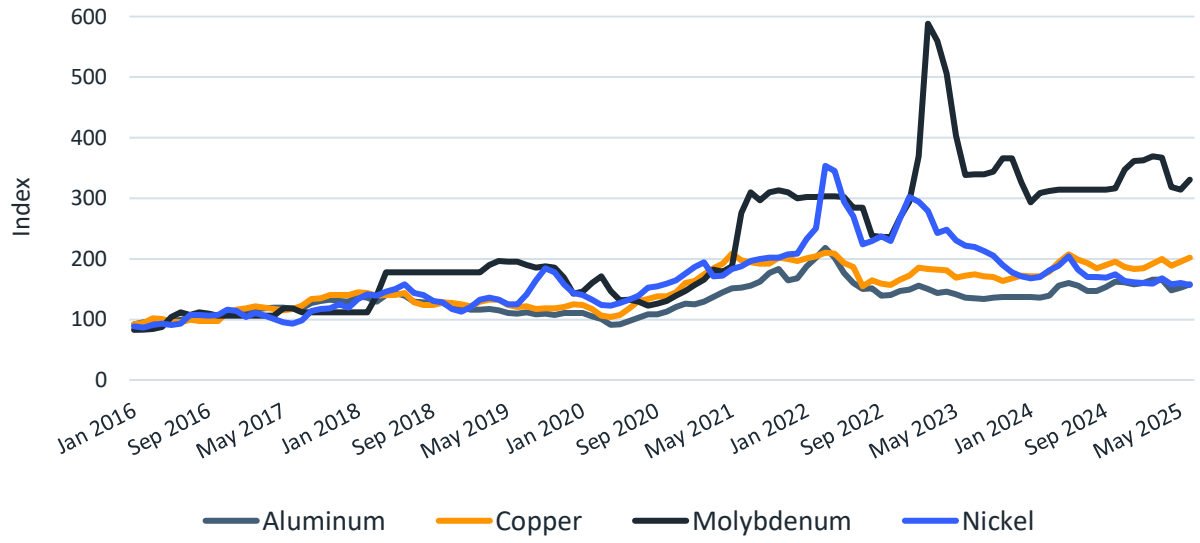
Finally, any expansion in turbine manufacturing capacity would be unlikely to reduce costs in the medium term, due to component inflation, supply constraints, and labor shortages. Gas turbines require thousands of parts, comprised of advanced alloys, that can withstand temperatures of up to 1,700 degrees Celsius. The costs of these materials — including steel, titanium, molybdenum, nickel,

[46] Heatmap. The Natural Gas Turbine Crisis. 26 February 2025.
[47] GE Vernova. 1Q 2025 Financial Results. 23 April 2025. Page 5.
[48] Seeking Alpha. Mitsubishi Heavy Industries, Ltd. (MHVYF) Q3 2025 Earnings Call Transcript. 08 February 2025.
[49] GE. GE offers $13.5 billion enterprise value to acquire Alstom Thermal, Renewables, and Grid businesses. 30 April 2014.
[50] Bloomberg. GE's $23 Billion Writedown Stems From a Bad Bet on Fossil Fuels. 22 October 2018.
[51] Reuters. General Electric to cut 12,000 jobs in power business revamp. 07 December 2017.
[52] IEEFA. General Electric Misread the Energy Transition: A Cautionary Tale. June 2019.
[53] Bloomberg. Siemens Said to Mull Sale of Flagship Gas Turbine Business. 13 June 2018.
[54] IEEFA. Data centers drive buildout of gas power plants and pipelines in the Southeast. 29 January 2025.
[55] Grid Strategies. Strategic Industries Surging: Driving US Power Demand. December 2024.
[56] IEEFA. Risk of AI-driven, overbuilt infrastructure is real. 03 June 2025.
[57] Medium. DeepSeek: Could this be a decisive shift in the Generative AI Landscape? 27 January 2025.
[58] Wall Street Journal. Asia Tech Stocks Slump After DeepSeek's Rise Triggers U.S. Chip Selloff. 28 January 2025.

and aluminum alloys — have all demonstrated significant volatility since 2020, exacerbated by recent US trade disruptions and intense competition from the aerospace and semiconductor industries. OEMs have also struggled to procure parts due to limited suppliers further up the supply chain[59], including for turbine blades, rotors, electrical control systems, nozzles, and many other components.

These factors, together with a shrinking skilled labor pool for gas turbine manufacturing, indicate that backlogs and high prices are likely to persist in the medium term.[60]

Figure 4: Commodity prices of select metals used in gas turbine manufacturing



Source: International Monetary Fund (IMF). Primary Commodity Prices. Date accessed: 16 September 2025.

Vietnam and the Philippines

For emerging Asian markets like Vietnam and the Philippines, gas turbine shortages are highly likely to persist into the next decade, exacerbating the numerous preexisting challenges for LNG expansion plans. Countries aiming to develop greenfield capacity will have several options:

1. Diversify turbine suppliers

Although Siemens, GE Vernova, and MHI dominate the global gas turbine market, backlogs could drive project sponsors in Asia to seek alternative suppliers. However, other turbine manufacturers are significantly less advanced in producing high-efficiency, heavy-duty gas turbines designed for baseload power generation. Italy's Ansaldo Energia — 40% owned by Shanghai Electric — is

[59] RBN Energy. I Will Wait - Expected Surge in Turbine Manufacturing Complicated by Rising Costs, Uncertain Demand. 29 May 2025.
[60] Gas Outlook. Costs to build gas plants triple, says CEO of NextEra Energy. 25 March 2025.

perhaps the most established. The company acquired the intellectual property rights for Alstom's 370MW GT26 and 563MW GT36 turbines during GE's acquisition in 2016.[61] Although Ansaldo has also experienced significant losses over the past three years due to impairments on the value of the GT36 technology and management issues with turnkey EPC projects[62, 63], among other factors, its turbine orders from Asia increased nearly seven-fold in 2024.[64] Out of 8GW sold to Asia in 2024, 6GW went to China.[65]

Other companies have started to make inroads into gas turbine manufacturing but remain far behind other established producers. Until recently, Chinese manufacturers struggled to crack into the heavy-duty gas turbine market[66], relying instead on foreign technology for components and control systems. Production was deemed a national priority in 2012, and the creation of a large, 300MW F-class turbine was included in the government's Made in China 2025 plan. Despite progress[67], Chinese-manufactured turbines are unlikely to resolve near-term bottlenecks beyond the domestic market.

Iran's MAPNA Group has been developing gas turbines since the early 2000s but only recently brought online its first F-class heavy-duty gas turbine[68], the 222MW MGT-75. South Korea's Doosan Enerbility began commercial operation of its first-ever domestically produced ultra-large gas turbine in 2023.[69] The company is targeting KRW7 trillion of gas turbine orders in the South Korean domestic market over the next five years[70], but is also marketing gas turbine technologies in markets like the Philippines.[71]

Beyond the limited number of established manufacturers, the use of alternative suppliers can be challenging for project developers, given the immense complexity of gas turbine systems and contractual concepts. This complexity partly explains why relationships between turbine manufacturers and buyers are often long-term in nature. Each OEM relies on proprietary technologies, engineering approaches, installation requirements, auxiliary systems, and diagnostics. Warranty terms, third-party verifications, long-term service agreements (LTSAs), retrofit offerings, damage obligations, and legal requirements — among many other key issues — vary by OEM and have significant implications for operations, project lifetimes, and the total cost of ownership. While terms and procedures for the three large manufacturers are well-known, project sponsors may face more complex contractual challenges with newer suppliers.

[61] Ansaldo Energia. Ansaldo Energia to acquire technology and other important Alstom assets from General Electric. 03 November 2015.
[62] Ansaldo Energia. Ansaldo Energia News: Press release. 24 May 2023.
[63] Ansaldo Energia. Consolidated Financial Statements. 2024. Page 12.
[64] Ansaldo Energia. Consolidated Financial Statements. 2024. Page 32.
[65] Ansaldo Energia. Consolidated Financial Statements. 2024. Page 16.
[66] Shanghai Electric. From a Dependent Learner to an Independent Innovator. 03 July 2019.
[67] South China Morning Post. 'Milestone' for China's gas turbine technology as it closes gap with the West. 09 October 2024.
[68] MAPNA Group. 'Engineering Masterpiece': MAPNA Unveils Indigenous F-Class Gas Turbine MGT-75. 18 August 2025.
[69] Power Magazine. South Korea's First 'K-Gas Turbine' Begins Commercial Operation. 01 September 2023.
[70] Doosan Enerbility. Doosan Enerbility Signs Contract to Supply 380MW K-Gas Turbine to Bundang Power Plant. 01 July 2024.
[71] Doosan Enerbility. Doosan Enerbility Promotes its Korean Gas Turbine Technology in the Philippines. 26 November 2023.

Given that project owners are contractually required to deliver high performance to both utility offtakers and lenders, they are often reluctant to take on the risk of working with second-tier OEMs.

2. Resort to using smaller, less efficient gas turbines

Advanced, high-efficiency turbines face some of the most extensive backlogs amid the current shortage and take the longest time to manufacture. As a result, project sponsors in Vietnam and the Philippines may opt for smaller, less efficient turbines. While backlogs for smaller turbines may be shorter than those for larger frames, delivery timelines are reportedly also increasing for smaller models. Table 5 shows examples of the various heavy-duty turbine classes and their operational characteristics in simple and combined cycle configurations.

Table 5: Major heavy-duty gas turbine classes and performance parameters

Heavy Duty Turbine Classes (50 Hz.)	Simple Cycle Capacity (MW)	Firing Temperature (°C)	Standalone Efficiency	Combined Cycle Capacity (MW)	Combined Cycle Efficiency	Sample Models
D and E-classes	75-140	1,200-1,300	33-37%	150-300	52-55%	GE Vernova: GT13E2 Siemens: SGT6-2000E MHI: M701D Ansaldo: AE64.3A
F-class	150–400	1,300-1,400	39-41%	400-570	57-60%	GE Vernova: 9F.04 Siemens: SGT5-4000F MHI: M701F Ansaldo: AE94.3A MAPNA Group: MGT-75
G, H, and J classes	250-590	1,450-1,600+	42-45%	650-900	62-65%	GE Vernova: 9HA.02 Siemens: SGT5-9000HL MHI: M701J Ansaldo: GT36-S5 Doosan: DGT6-300H.S2

Source: Company websites; ScienceDirect. Sustainable Power Generation: Current Status, Future Challenges, and Perspectives, 2020; Bechtel. Gas Turbines: Past, Present, and Future. 10 November 2021; TTS Energy Services. Ask The Expert: Gas Turbine Combustion Systems. 25 February 2025.

Many technical considerations must be addressed before adapting turbine requirements. From an economic perspective, though, the use of smaller turbines may present several cost and operational challenges in Vietnam and the Philippines, particularly for LNG-based power generation. First, smaller turbines typically have lower thermal efficiencies, resulting in higher fuel consumption per unit of output and other operational costs. Considering that imported LNG is already significantly more expensive than domestically produced gas, using lower-efficiency turbines would increase delivered electricity prices and further hinder the economic competitiveness of LNG-fired power.

This is particularly true for baseload operations, where smaller turbines are typically used for peaking roles due to their faster startup and ramp rates. However, peaking roles may be incompatible with the large-scale investments required for LNG importation — including import terminals, pipelines,

power plants, and midstream and fuel costs — since higher output is necessary to amortize the high fuel and related infrastructure costs over more units of generation output. Lowering output to peaking levels for the same expenses would risk dramatic increases in levelized costs.

Finally, LNG purchase contracts typically include rigid take-or-pay arrangements. This means that flexible gas plant operations make it challenging to align contractual obligations with cargo requirements, potentially leading to higher penalties due to the foregone offtake volumes. Operating LNG plants at peaking levels would likely entail a procurement approach more heavily based on short-term purchases, increasing exposure to extreme spot market volatility demonstrated over the past five years.

3. Scale up renewables and battery storage deployments

As gas and LNG-fired power plants continue to face extensive delays in Vietnam and the Philippines, renewable energy is likely to contribute a growing share of incremental capacity and generation. Timelines for solar and wind project developments are typically around one year. In contrast, LNG-to-power projects can take roughly three to four years, even before factoring in ongoing turbine shortages and other contractual and regulatory delays. In the Philippines, LNG-to-power projects were proposed as early as 2003, but the country's first import terminal was not completed until 2023.

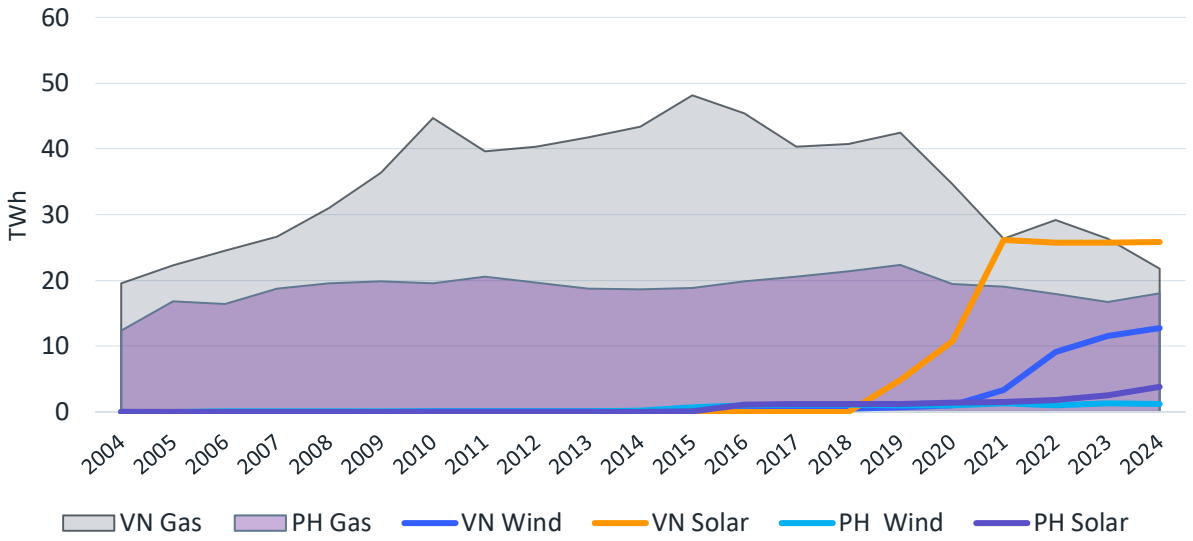
The energy transition to renewables is not waiting for gas and LNG. From 2018 to 2023, Vietnam's wind and solar capacity spiked from virtually zero to over 21GW, fueled by a generous feed-in tariff regime.[72] Although subsidies presented financial challenges for state-owned utility EVN, the country had become Southeast Asia's largest solar producer by 2023. At the same time, gas generation has fallen 55% since 2015 (Figure 5), and both domestic gas production and demand have declined. In July 2024, Vietnam issued a decree allowing private producers to sell green power to large consumers, potentially increasing renewable energy penetration without burdening the state budget. Over the long term, the country's revised PDP8 increased its 2030 solar targets sixfold[73], and the plan now aims for renewables (excluding large-scale hydropower) to provide 74%–75% of electricity generation by 2050.

Gas-fired power generation has also declined in the Philippines since 2015 (Figure 5), and falling domestic production has forced a shift to more expensive LNG imports. Renewable generation has grown more slowly than in Vietnam, but there are signs of rapid growth in the near term. Since the country held its first centralized green energy auction in 2023, solar has become the fastest-growing asset class for the first time. In the fourth auction round held in 2025, the government awarded 9.4GW of renewables contracts[74], which will aim to come online from 2026. Moreover, a 3,500MW

[72] IEEFA. From boom to balance in Vietnam's clean energy transition. 17 June 2025.
[73] International Energy Agency (IEA). Integrating Solar and Wind in Southeast Asia. September 2025. Page 21.
[74] PV Magazine. Philippines renewables auction awards 9.4 GW, short of 10.6 GW goal. 05 September 2025.

solar plus storage project — the largest in the world — is currently under construction, with an initial 1,500MW phase on track for completion next year.[75]

Figure 5: Natural gas, wind, and solar generation in Vietnam and the Philippines



Source: Philippines Department of Energy; Ember Climate data.

Along with the growth of renewables, delays in gas and LNG-fired projects are also creating opportunities for battery storage technologies to assume balancing roles. Global battery prices have fallen nearly 75% since 2017.[76] Prices for solar plus storage systems range from USD50–131 per megawatt-hour (MWh)[77], becoming increasingly competitive with fossil fuels in many parts of the world.[78]

Southeast Asia's battery storage markets are currently in nascent stages but could advance rapidly. In April 2024, Vietnam released a revised PDP8 that increased battery storage deployment targets from an initial 300MW to 10,000–16,300MW by 2030.[79] The plan also aims to bring online 14 pumped hydro storage facilities with a combined capacity of 6,277MW.[80] These targets may prove ambitious given that unclear pricing and regulations have been a barrier to storage investments in Vietnam, but the government is currently preparing circulars on tariffs and service pricing.[81]

[75] Meralco Power Gen (MGen). MTerra Solar Becomes Largest Solar PV Installation in PH. 08 July 2025.
[76] Energy Storage News. Behind the numbers: BNEF finds 40% year-on-year drop in BESS costs. 05 February 2025.
[77] Lazard. Lazard Releases 2025 Levelized Cost of Energy+ Report. 16 June 2025.
[78] Ember. Solar electricity every hour of every day is here and it changes everything. 21 June 2025.
[79] Watson Farley & Williams. Vietnam Makes Major Updates to Power Development Plan VIII. 23 April 2025.
[80] Watson Farley & Williams. Vietnam Makes Major Updates to Power Development Plan VIII. 23 April 2025.
[81] Vietnam Investment Review. Vietnam pushes ahead with battery storage market plans. 15 September 2025.

The Philippines recently inaugurated its first hybrid solar plant[82], a 197MW solar array with a 320MWh battery storage system. Moreover, the country's fourth green energy auction included a 1.1GW target for solar plus storage capacity for the first time.[83] It is estimated that the Philippines will deploy 2GW of battery storage projects over the next three years.[84]

IV. Conclusion

Following the 2022 energy crisis, emerging Asian markets that relied on imported LNG found themselves exposed to extreme volatility and unaffordable fuel prices. Price spikes were driven largely by increased competition from wealthier nations that could afford higher fuel prices.

These markets find themselves in a similar situation today — this time for the hardware. As a result of higher gas turbine demand in wealthier regions, turbine prices are rising, and price-sensitive economies once again find themselves unable to access key gas and LNG supplies.

Bottlenecks in the gas turbine industry add to an already long list of issues facing gas and LNG expansion plans in the region. With long delivery timelines and higher costs, LNG-to-power plants have become even less competitive with cheaper, domestically sourced renewable energy and storage. Every year of delays for LNG-fired power plants means that less LNG will be needed in the long run.

[82] Energy Storage News. 'Power even without the sun': President Marcos Jr inaugurates first 'solar baseload' power plant in Philippines. 16 September 2025.
[83] EnerData. The Philippines launches 4th Green Energy Auction to add over 9 GW of renewables. 17 March 2025.
[84] Electric Vehicle Association of the Philippines (EVAP) et. al. Navigating the Battery-Related Landscape in Southeast Asia and Beyond. September 2025. Page 44.

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