THE NEW REALITY OF POWER GENERATION

An Analysis of Increasing Gas Turbine Costs in the U.S.

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Energy Futures Group (EFG) is a clean energy consulting company focused on integrated resource planning as well as design, implementation, and evaluation of programs and policies to promote investments in efficiency, renewable energy, other distributed resources, and strategic electrification. EFG has performed IRP modeling and critically reviewed IRPs in over a dozen states, provinces, and territories.

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Halcyon is a software platform that uses AI to make it easy to find and analyze energy information.

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Mr. Phil Besuner has over 40 years' experience analyzing and evaluating statistical safety, risk, reliability, and related engineering issues.

The capital costs for new gas combustion turbine (CT) and combined cycle gas turbine (CCGT) power plants in the United States have increased significantly in recent years.

While anecdotes of these higher costs are becoming more common, the specific data is often difficult to access. Much of the most current and detailed market information on gas turbine costs is contained within Integrated Resource Plans (IRPs) and Certificates of Public Convenience and Necessity (CPCNs), which are often confidential. Furthermore, widely available public datasets, such as the National Renewable Energy Laboratory's (NREL) Annual Technology Baseline (ATB) or the Energy Information Administration's (EIA) Annual Energy Outlook (AEO), are often not up to date with the most current market information and therefore present an underestimated view of project costs.

With these challenges in mind, this white paper, in collaboration with GridLab experts Energy Futures Group and Halcyon, have worked to mine and make available market data from IRP and CPCN filings, providing a clearer and more accurate picture for stakeholders. Halcyon provided data from its platform, which was reviewed and analyzed by EFG. Mr. Philip Besuner, also a GridLab expert, executed several regression analyses to evaluate trends from this data.

While a number of market forces have contributed to this trend, a deeper analysis reveals that these elevated costs are likely to persist rather than decline, at least in the short-midterm. An examination of the most recent financial reports from major gas turbine original equipment manufacturers (OEMs) further supports this conclusion. Key players like GE Vernova, Siemens Energy, and Mitsubishi Power are reporting strong demand and robust order backlogs.

The surge in demand has resulted in significantly extended timelines for bringing new projects into service. Consequently, new combined cycle resources often cannot be brought online until at least **2030–2031**.[1]

These OEMs are capitalizing on global demand driven by increasing electricity consumption, the transition from coal, and the need for flexible power to support renewable energy. This collective positive performance and strategic direction from the OEMs suggest that a significant reduction in gas turbine equipment costs is not anticipated in the near term.[2]

The increasing supply scarcity has translated into greater pricing power for the OEMs, with the three OEMs requiring a reservation fee to secure a manufacturing slot.

For example, Kentucky Utilities and Louisville Gas & Electric (KU/LG&E) acknowledged in their recent CPCN filing that the Companies needed to **pay a $25 million reservation fee** to GE Vernova to reserve a turbine that will be delivered in time for the facility to reach commercial operation in 2030.[3]

It is important to note that the gas turbine market has historically been cyclical, with prices sometimes falling due to factors such as manufacturing over-capacity and heightened competition, as seen in previous years. As recently as 2022, gas turbine prices were expected to drop by 5-10%. A report by S&P Global Commodity Insights noted that while the OEMs are cautiously avoiding the oversupply issues of the early 2000s, they are strategically pursuing growth by focusing on high-margin services and targeted investments like brownfield expansions. They recognize that expansion is constrained by bottlenecks beyond their control, such as in engineering, procurement, and construction (EPC) services, which also contribute to extended project timelines.

1 See for example: KU/LG&E 2024 IRP Volume III, Technology Update, at 4 and 6. Kentucky PSC Case No. 2024-00326.; Duke Energy Indiana 2024 IRP, Table 3-9, at 85-86.; Indiana Michigan Power Company IRP Stakeholder Workshop. Retrieved from https://www.indianamichiganpower.com/lib/docs/community/projects/IM-irp/IN_Stakeholder_Meeting_2.pdf; Santee Cooper 2024 IRP Annual Update, Table 13 at 43.

2 GE Vernova Inc., "First Quarter 2025 Financial Results," press release, April 23, 2025, https://www.gevernova.com/news/press-releases/ge-vernova-reports-first-quarter-2025-financial-results; Siemens Energy AG, "Q1 FY2025 Earnings Release," press release, February 12, 2025, https://www.siemens-energy.com/global/en/home/press-releases/earnings-release-q1-fy-2025.html; Mitsubishi Heavy Industries, Ltd., "FY2024 Financial Results," press release, May 9, 2025, https://www.mhi.com/news/25050901.html

3 Direct Testimony of Lonnie E. Bellar, at 11. Kentucky PSC Case No. 2025-00045.

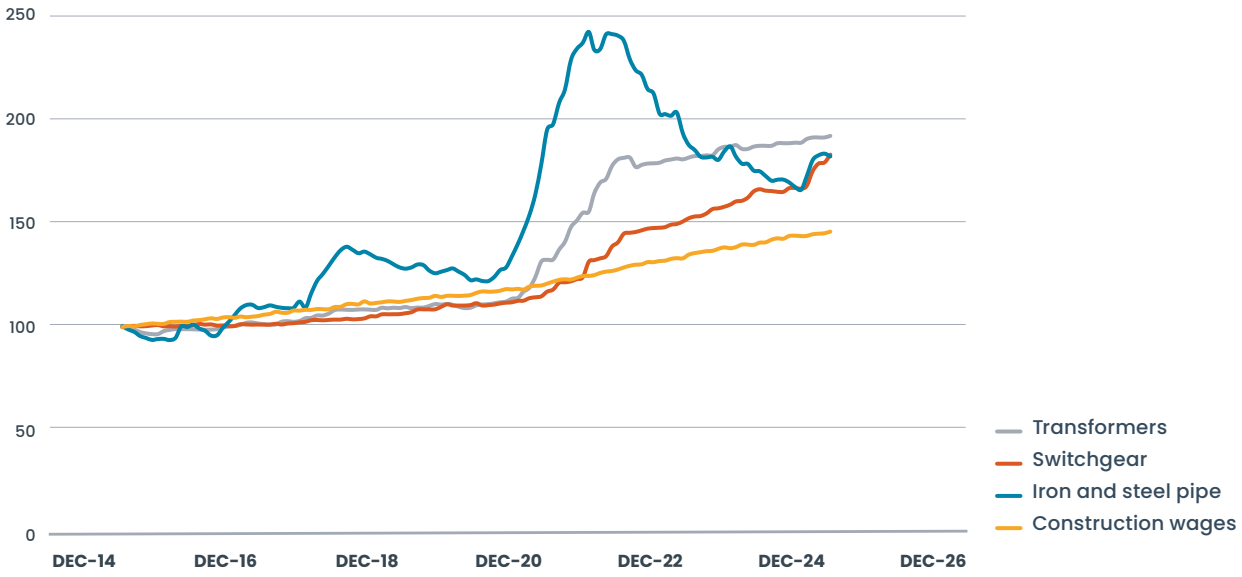
Escalating Costs of Gas Plants

Gas-fired power plants are becoming more expensive to build, and it's not just because of turbine costs, nearly all the key components are seeing price increases that are making these projects much less economically attractive (see figure below).

Transformers have experienced significant price surges due to soaring prices for raw materials such as grain-oriented electrical steel (GOES) and copper. Shortage of GOES is not new. Similarly, switchgear components have seen significant price increases as noted in the Producer Price Index[4]. Natural gas pipeline costs have ballooned in recent years due to the rising cost of steel pipes, which more than doubled between 2020 and 2021.

Along with component prices, labor costs are also increasing. Construction costs have risen due to several factors, including labor shortages, prevailing wages and inflationary pressures. A shortage of skilled workers continues to trouble the industry.

FIGURE 1. Price Index for Non-Turbine Gas Project Components



As of May 28, 2025. Source: S&P Global Commodity Insights; US Bureau of Labor Statistics. © 2025 S&P Global

4 U.S. Bureau of Labor Statistics, Producer Price Index by Industry: Switchgear and Switchboard Apparatus Manufacturing [PCU335313335313], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/PCU335313335313, August 29, 2025

Key Findings on Capital Expenditure for Simple and Combined Cycle Plants

Drawing on the data provided by Halcyon, and a review by EFG and Mr. Besuner, this section presents a detailed analysis of the capital expenditure (CAPEX) trends for new gas turbine power plants. Unlike publicly available datasets, this information provides a granular and up-to-date view of project costs, reflecting the actual market conditions faced by developers.

This paper reveals a significant and persistent increase in the capital costs of new gas combustion turbine and combined cycle gas turbine power plants in the United States. This trend marks a ***stark departure from historical cost assumptions and public cost projections***.

- **Significant Increase in Capital Costs:** Capital costs for new gas CT and CCGT power plants have risen considerably. While projects for completion in 2026 and 2027 were reported at $1,116/kW to $1,427/kW, **recent CCGT projects are routinely reporting costs of $2,000/kW or more**.
- **Costs are Expected to Persist or Increase:** These elevated costs are likely to persist rather than decline, at least in the short-to-midterm. A linear regression analysis of the data indicates that costs increase with the in-service date at a statistically significant rate.
- **Underestimated Public Datasets:** Widely available public datasets underestimate current market costs because they are often not up to date with the most current market information. This creates a significant disconnect between conventional cost assumptions and today's market realities.
- **Market Forces Driving Costs Up:** A combination of factors is contributing to these escalating costs, including:
  - **Demand and Order Backlogs** for the OEMs;
  - **OEM Pricing Power and Reservation Fees:** Increasing supply scarcity has granted greater pricing power to OEMs, who may now require a reservation fee to secure a manufacturing slot.
  - **Rising Costs of Other Components:** Beyond turbine costs, nearly all key components of gas-fired power plants are experiencing price increases.
- **Regional Cost Variations:** The analysis of available data also indicates the existence of regional cost variations, though the specific causes of these differences were not evaluated.

Figure 2 illustrates this trend by showing the reported capital cost ($/kW) for combined cycle gas turbine projects between **2026** and **2031**. Projects scheduled for completion in **2026** and **2027** were reported at a cost range of **$1,116/kW** to **$1,427/kW**, a range that is now significantly outpaced by recent CCGT projects, which are routinely reporting costs of **$2,000/kW** or more. This upward trajectory is further highlighted by the fact that the **2024** NREL ATB projected a **2030** cost of only **$1,638/kW** for a **1x1** combined cycle plant under its moderate scenario. This notable divergence between historical and projected figures and current market costs underscores the disconnect between conventional cost assumptions and today's market realities.[5]

In producing its Annual Energy Outlook, the EIA relies on a Sargent & Lundy report with a 1x1 CC capital cost at $921/kW in 2023 dollars, or $1,058/kW in 2030 if a 2% escalation rate is assumed.[6]

Our capital cost dataset included combined cycle projects with in-service dates between 2026 and 2031 and combustion turbine projects with in-service dates between 2025 and 2029 (see tables in Appendix). We assumed these costs (except for one observation)[7] were all escalated to their in-service year and then fit a linear regression line to each of the two datasets based on operating year. Not surprisingly, costs go up with in-service date at a statistically significant rate[8], which is aligned with broad industry expectations.

Figure 3 shows the simple cycle GT cost data analyzed. The content of Figure 4 directly addresses the operating year differences of both CC and simple cycle GT costs.

Our analysis of the available data, despite its limited size, indicates the existence of regional cost variations. The causes of these differences were not evaluated but are statistically apparent in the dataset and is presented in Figure 5.

5 NREL (National Renewable Energy Laboratory). 2024. "2024 Annual Technology Baseline." Golden, CO: National Renewable Energy Laboratory. https://atb.nrel.gov/. The NREL ATB is reported in 2022 dollars. The 2030 overnight capital cost was converted into nominal dollars by assuming a 2% inflation rate on the $1,398/kw reported 2030 cost in the NREL ATB.

6 Capital Cost and Performance Characteristics for Utility-Scale Electric Power Generating Technologies (January 2024). Table 1.2 at III. Retrieved from https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capital_cost_AEO2025.pdf. The report shows a 2023 cost of $921/kW. Applying a 2% inflation rate results in the 2030 cost.

7 One unit had a reported 2024 cost that was not yet escalated and we used a Handy-Whitman-based 4.7% rate to escalate that cost to its 2030 in-service year.

8 We used more complex regression models to look at the effects of manufacturer, mW capacity, and other dataset variables. All such effects fell well short of statistical significance.

FIGURE 2. CCGT Capital Cost ($/kW) with Linear Regression Fitted to Data

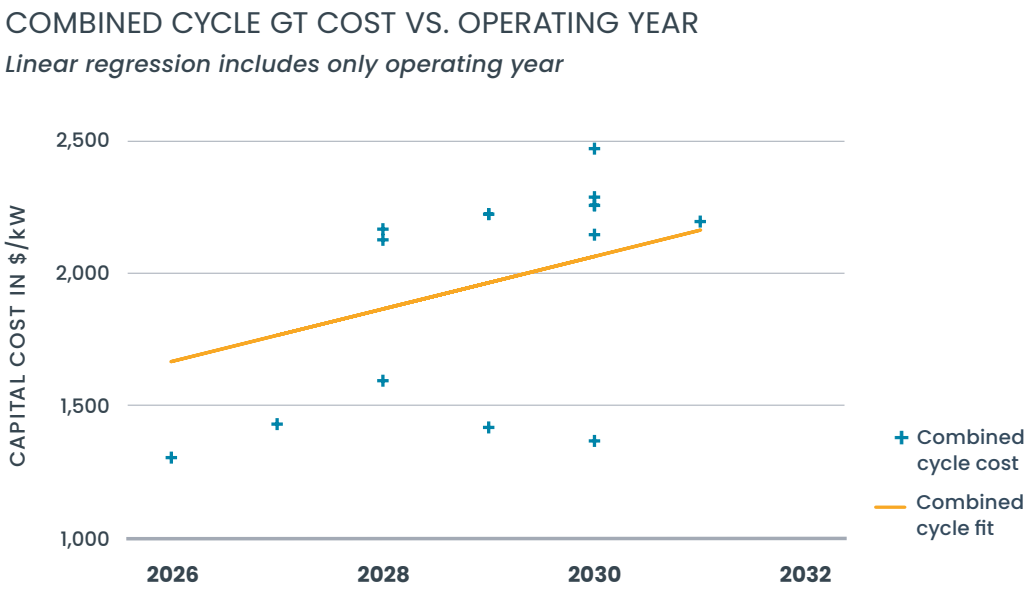


FIGURE 3. CT Capital Cost ($/kW) with Linear Regression Fitted to Data

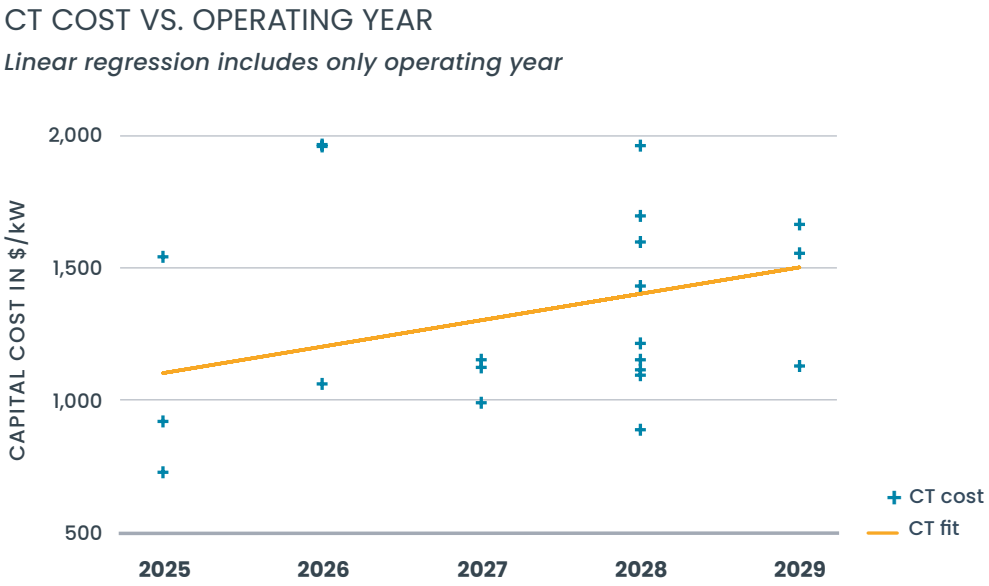


FIGURE 4. Yearly Comparison of Capital Costs

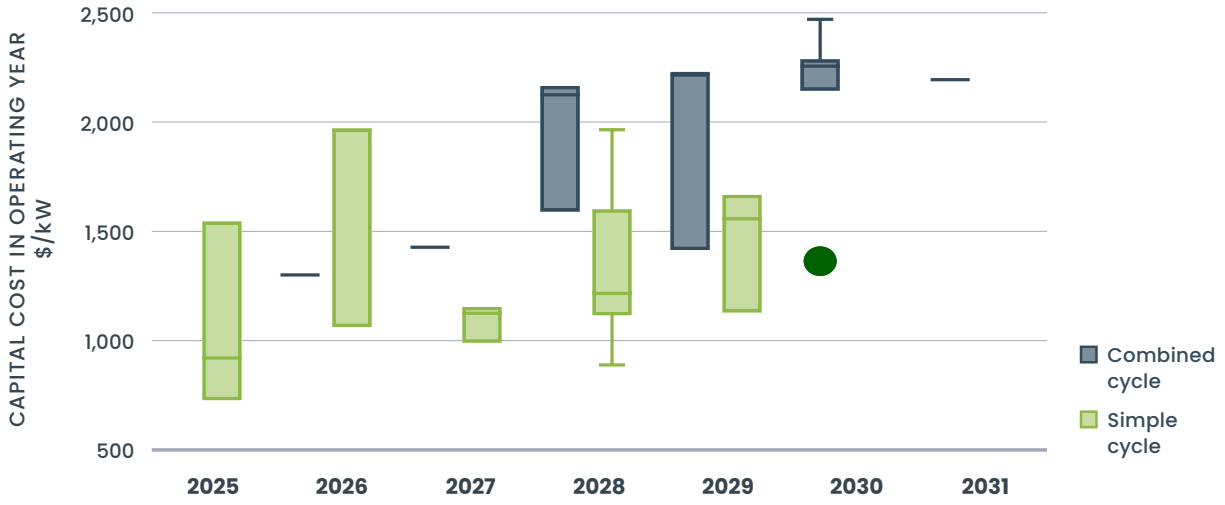


FIGURE 5. Regional Differences in Capital Cost

Implications

The sustained increase in gas turbine costs and project timelines has significant implications for energy planning, policy, and long-term grid reliability. For utilities and regulators, the outdated cost assumptions from public datasets can lead to flawed resource planning and underestimation of project budgets. The extended timelines for turbine delivery create a significant challenge for meeting future electricity demand, particularly as coal and other older fossil fuel plants are retired. The need for substantial reservation fees also affects project financing and risk.

Based on these findings, we offer the following recommendations for stakeholders:

- **Update Cost Assumptions:** Regulators and planners should re-evaluate and update their cost assumptions for gas turbine projects to reflect current market realities. This paper provides a starting point for this effort, offering a new dataset that more accurately reflects contemporary costs.
- **Prioritize Data Transparency:** Regulators should not only facilitate greater access to non-proprietary data from IRP and CPCN filings to improve market transparency, but they should also demand a higher level of contractual certainty in project cost submissions. Regulators should also require a higher level of contractual certainty in project cost submissions, mandating that major components such as EPC services are fully contracted at the time of the CPCN application.
- **Foster Collaborative Planning:** Utilities and regulatory bodies should establish formal, collaborative forums to share real-time market data, including supply chain constraints and cost information, which could inform more realistic and transparent resource planning decisions.
- **Evaluate Flexible Alternatives:** Given the rising costs and delays, a more thorough analysis of a wider array of renewable energy and storage technologies, including utility-scale solar, wind, and battery storage, is crucial to ensuring a robust and cost-effective energy transition.

The data presented in this white paper demonstrates a clear and persistent upward trend in the capital costs of new gas turbine projects in the United States. This is a significant departure from historical trends and public cost projections.

The consequences of these trends are already being felt in the form of extended project timelines, a growing reliance on reservation fees to secure equipment, and a significant disconnect between planning assumptions and on the ground realities. Therefore, it is essential for all energy stakeholders — from regulators to utilities and developers to proactively address these challenges by updating cost assumptions in planning models and rigorously evaluating all available generation and storage options.

Appendix

The two tables in this appendix are a subset of the representative data utilized in the analysis. Additional data can be requested from Halcyon.

TABLE 1. Simple Cycle Combustion Turbine Data [Limited Dataset]

PLANT / UNIT NAME	DATE OF ANNOUNCEMENT	PLANNED / OPERATING YEAR	EIA PLANT ID	EIA ENTITY NAME	STATE	COST PER KW	CAPACITY (MW)	CAPEX ($M)	TECH. TYPE	POWER MARKET	ACTUAL VS. ESTIMATED COST
A.B. Brown	6/28/2022	2025	6137	Southern Indiana Gas & Elec Co	IN	$728	460	$334.8	Simple-Cycle Gas Turbine	MISO	Actual
Aberdeen CT	1/1/2024	2026	3338	NorthWestern Energy - (SD)	SD	$1,969	1,260	-	Simple-Cycle Gas Turbine	SWPP	-
Apache Generating Station GT5 and GT6	10/1/2024	2025	160	Arizona Electric Pwr Coop Inc	AZ	$920	84	$77.3	Simple-Cycle Gas Turbine	WALC	Actual
Castle Bluff Energy Center	6/7/2024	2027	67576	Union Electric Co - (MO)	MO	$1,125	800	$900.0	Simple-Cycle Gas Turbine	MISO	Estimate
Chesterfield Energy Reliability Center	3/3/2025	2029	3797	Virginia Electric & Power Co	VA	$1,557	944	$1,470.0	Simple-Cycle Gas Turbine	PJM	Estimate
Horseshoe Lake	5/31/2023	2029	2951	Oklahoma Gas & Electric Co	OK	$1,130	448	$506.4	Simple-Cycle Gas Turbine	SWPP	Actual
Lone Star Power Station	6/4/2024	2028	-	Entergy Texas Inc.	TX	$1,699	453	$769.6	Simple-Cycle Gas Turbine	ERCOT	Estimate
North Valmy New Peakers	5/31/2024	2028	8224	Sierra Pacific Power Co	NV	$1,433	400	$573.3	Simple-Cycle Gas Turbine	NEVP	Estimated
Parr Replacement Units (GT5 and GT6)	3/10/2021	2025	3291	Dominion Energy South Carolina, Inc	SC	$1,544	114	$176.0	Simple-Cycle Gas Turbine	SCEG	Estimate
Urquhart Replacement Unit (CT #7)	3/10/2021	2028	3295	Dominion Energy South Carolina, Inc	SC	$1,965	200	$393.0	Simple-Cycle Gas Turbine	SCEG	Estimate

TABLE 2. Combined Cycle Combustion Turbine Data [Limited Dataset]

PLANT / UNIT NAME	DATE OF ANNOUNCEMENT	PLANNED / OPERATING YEAR	EIA PLANT ID	EIA ENTITY NAME	STATE	COST PER KW	CAPACITY (MW)	CAPEX ($M)	TECH. TYPE	POWER MARKET	ACTUAL VS. ESTIMATED COST
Brown 12	2/28/2025	2030	1355	Kentucky Utilities Co	KY	$2,144	645	$1,383.0	Combined-Cycle Gas Turbine	PJM	Estimate
Cayuga CC Project	2/13/2025	2029 and 2030	1001	Duke Energy Indiana, LLC	IN	$2,256	1,476	$3,330.0	Combined-Cycle Gas Turbine	MISO	Estimate
Cooper CCGT	11/21/2024	2030	1384	East Kentucky Power Coop, Inc	KY	$1,768	745	$1,317.0	Combined-Cycle Gas Turbine	PJM	Estimate
Homer City Generating Station	4/2/2025	2028/2029	3122	Homer City Generation, L.P.	PA	$2,222	4,500	$10,000.0	Combined-Cycle Gas Turbine	PJM	Estimate
Legend Power Station	6/4/2024	2028	68053	Entergy Texas Inc.	TX	$2,125	754	$1,602.0	Combined-Cycle Gas Turbine	ERCOT	Estimate
McNew Generating Station	9/3/2024	2030	68295	Evergy Kansas Central, Inc	KS	$2,255	710	$1,601.0	Combined-Cycle Gas Turbine	SWPP	-
Mill Creek 5	1/6/2023	2027	1364	Louisville Gas & Electric Co	KY	$1,427	640	$913.4	Combined-Cycle Gas Turbine	LGEE	Actual
Mill Creek 6	2/28/2025	2031	1364	Louisville Gas & Electric Co	KY	$2,194	645	$1,415.0	Combined-Cycle Gas Turbine	LGEE	Estimate
Muscatine Combined Heat and Power Project	9/11/2024	2028	1167	Board of Water Electric & Communications	IA	$2,165	45	$97.4	Combined-Cycle Gas Turbine	MISO	Estimate
Orange County Advanced Power Station (OCAPS)	9/16/2021	2026	66621	Entergy Texas Inc.	TX	$1,300	1,215	$1,580.0	Combined-Cycle Gas Turbine	MISO	Estimate