NUCLEAR ENERGY INSTITUTE

# NUCLEAR COSTS IN CONTEXT

## 2025 Cost Data, August 2026

In 2025, the average total generating cost for nuclear energy was $36.46 per megawatt-hour (MWh). The 2025 total generating cost was 5.1 percent higher than in 2024, using values converted to 2025 dollars for accurate comparisons. Total generating costs include capital, fuel, and operating costs—all the costs necessary to produce electricity from a nuclear power plant, but not the full cost of owning and operating a nuclear plant. Cost information for the U.S. nuclear fleet is collected by EUCG, with prior years converted to 2025 dollars.

## TOTAL GENERATING COSTS

The 5.1% year-over-year increase in total generating costs was driven by a 23.9 percent increase in capital expenditures and a 2.5 percent increase in fuel costs, while operating costs decreased 1.2 percent. Between 2012 and 2025, total generating costs decreased 34.6 percent, with fuel down 40.2 percent, capital down 36.4 percent and operating costs down 31.8 percent.

### U.S. Nuclear Plant Costs ($/MWh in 2025 dollars)

| Year | Fuel | Capital | Operating | Total Generating |
|---|---|---|---|---|
| **2002** | 7.43 | 5.09 | 24.13 | 36.64 |
| **2004** | 6.87 | 7.35 | 24.12 | 38.35 |
| **2007** | 6.71 | 8.00 | 24.94 | 39.65 |
| **2010** | 8.94 | 12.39 | 27.57 | 48.89 |
| **2012** | 9.96 | 15.24 | 30.52 | 55.72 |
| **2015** | 9.05 | 10.56 | 27.63 | 47.24 |
| **2016** | 8.82 | 8.85 | 26.82 | 44.50 |
| **2018** | 8.01 | 7.83 | 24.91 | 40.75 |
| **2020** | 7.05 | 6.54 | 22.37 | 35.95 |
| **2021** | 6.50 | 6.44 | 21.16 | 34.10 |
| **2022** | 5.87 | 7.52 | 20.41 | 33.80 |
| **2023** | 5.60 | 7.44 | 20.43 | 33.47 |
| **2024** | 5.81 | 7.82 | 21.06 | 34.69 |
| **2025** | 5.95 | 9.69 | 20.82 | 36.46 |
| **2024-2025 Change** | 2.5% | 23.9% | -1.2% | 5.1% |
| 2012-2025 | -40.2% | -36.4% | -31.8% | -34.6% |

Source: EUCG

## THE FULL COST OF OWNING & OPERATING A NUCLEAR PLANT

The intent of the cost data, collected by EUCG, is to perform benchmarking comparisons on operating and maintenance and capital costs among nuclear power plant operators. The total generating costs presented in this paper do not represent the full costs of operations, as they do not include market and operational risk management, property taxes, depreciation and interest costs, spent fuel storage costs or returns on investment that would be key factors in decision-making about continued operation of a nuclear plant.

Risk remains a significant cost component of operating a nuclear power plant. Nuclear power plants are fixed-cost assets, so unexpected generation losses can materially affect cost per MWh and may expose plant owners to replacement power costs or market price volatility.

Nuclear power plants also face operational risks. Because nuclear power plants are fixed cost assets, meaning their costs do not vary proportionally to their electricity output, any unforeseen loss in generation due to equipment failures or forced outages will increase the plant's cost per MWh dramatically.

Additionally, when a plant experiences an unplanned outage, it must also procure additional power for the grid due to contractual obligations, due to market dynamics the cost of replacement electricity is typically higher for nuclear plants than the payments they would have received if operating.

In order for owners to sustain the operation of a nuclear power plant, the cost of the associated risk must be covered. It is vital for the nuclear power industry to be recognized for its positive externalities related to carbon-free electricity generation, but at a level that also accounts for inherent market and operational risks.

Approximately 80 percent of the electricity generated from nuclear power in the U.S. comes from plants with multiple reactors. The economies of scale allow plant operators to spread costs over more generation, resulting in a lower total generating cost. In 2025, the average total generating cost at multiple-unit plants was $34.36 per MWh compared to $45.77 per MWh for single-unit plants. [1]The average total generating cost at single-unit plants increased by 6.3 percent compared to 2024, while multiple-unit plant costs increased by 4.8 percent. While capital costs increased for single-unit plants and multiple-unit plants, the operating costs decreased across both categories. The average total generating costs for an operator with only one plant was $41.79 per MWh compared to $35.22 per MWh for owners of multiple plants in 2025. Operators with one plant and multiple plants saw increases across all cost categories, with the exception of operating costs for operators of multiple plants.

[1] The data provided are based on averages across the operating fleet. Individual plants may vary notably from the average due to factors such as geographic location, local costs and the timing of refueling outages.

## 2025 Cost Summary ($/MWh)

| Category | Plants / Sites | Fuel | Capital | Operating | Total Generating |
|---|---|---|---|---|---|
| **All U.S.** | 55 | $5.95 | $9.69 | $20.82 | **$36.46** |
| **Plant Size** | | | | | |
| **Single-Unit** | 18 | $6.47 | $13.64 | $25.66 | **$45.77** |
| **Multiple-Unit** | 37 | $5.84 | $8.80 | $19.72 | **$34.36** |
| **Operator** | | | | | |
| **One Plant** | 10 | $6.10 | $9.39 | $26.30 | **$41.79** |
| **Multiple Plants** | 45 | $6.16 | $9.66 | $19.42 | **$35.22** |

Source: EUCG

In 2025, the average total generating cost at multiple-unit plants was $34.36 per MWh compared with $45.77 per MWh for single-unit plants. The average total generating cost for operators with one plant was $41.79 per MWh compared with $35.22 per MWh for owners of multiple plants. Merchant market plants averaged $31.47 per MWh and cost-of-service regulated plants averaged $40.31 per MWh. BWR and PWR plants both averaged approximately $36.46 per MWh.

## 2025 Cost Summary ($/MWh)

| Category | Plants / Sites | Fuel | Capital | Operating | Total Generating |
|---|---|---|---|---|---|
| **All U.S.**[2] | 55 | $5.95 | $9.69 | $20.82 | **$36.46** |
| **Revenue Source** | | | | | |
| **Merchant Market** | 23 | $5.99 | $5.15 | $20.33 | **$31.47** |
| **Cost of Service Regulation** | 32 | $5.93 | $13.19 | $21.19 | **$40.31** |
| **Type** | | | | | |
| **BWR** | 20 | $5.55 | $8.43 | $22.49 | **$36.46** |
| **PWR** | 35 | $6.16 | $10.35 | $19.96 | **$36.46** |

Source: EUCG

## Capital Costs

Industrywide, capital expenditures increased in 2025 to $7.59 billion from $6.10 billion in 2024, expressed in 2025 dollars. Capital expenditure per MWh rose from $7.82/MWh in 2024 to $9.69/MWh in 2025. Capital investment saw a step-change increase around 2003 followed by another step-change increase in 2009 before peaking in 2012. These trends are the result of a few major investment categories: upgrades related to license extensions of plants, uprates and safety-related investments post-September 11th and post-Fukushima. Since 2012, capital costs have declined 36.4 percent as these programs have been completed.[3]

[2] For the purposes of these categories, Hope Creek Unit 1 and Salem Units 1 & 2 are treated as one plant site due to their proximity.

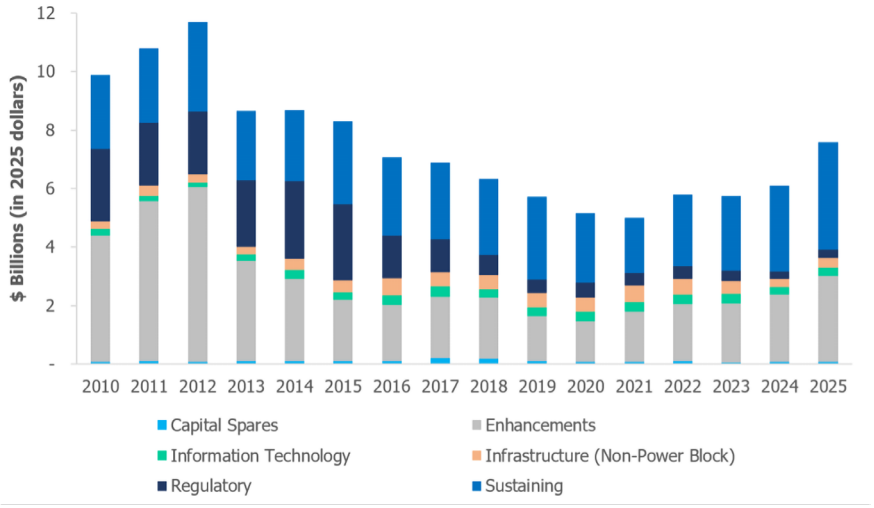
[3] As capital costs are larger, often cyclic investments that are less dependent on the megawatt-hours of production, capital costs are presented below in billions of dollars and adjusted to 2025 dolllars.

As companies prepare plants for operation after the first 40-year license and 20-year initial license renewals, a series of vessel head replacements, steam generator replacements and other upgrades have been completed. As a result of these investments, 100 reactors have received their initial license renewal (including permanently shutdown units) and 25 reactors have received a second license renewal as of August 2026.[4] Ten of these reactors, Duane Arnold, Fort Calhoun, Indian Point Units 2 and 3, Kewaunee, Oyster Creek, Palisades, Pilgrim, Three Mile Island Unit 1, and Vermont Yankee, have since ceased operations prematurely; however, Palisades, Three Mile Island Unit 1 (now Crane Clean Energy Center), and Duane Arnold are pursuing restarting because new commercial opportunities emerged. Three reactors are currently under review for second license renewal, with many more publicly announced intentions for renewal.

Power uprates have been a priority for the industry, with over 8,000 megawatts of electricity capacity approved by the U.S Nuclear Regulatory Commission. Of this, over 7,500 megawatts of capacity are at operating reactors.[5] Capital expenditures on uprates and items necessary for operation beyond 40 years moderated in recent years as most plants completed projects. Investments in uprates peaked at $3.3 billion in 2012 and declined to $66 million in 2022, but has steadily increased since, increasing to $365 million in 2025 as utilities renew efforts to expand capacity at existing plants (all numbers in 2025 dollars). Given the incentives afforded by federal tax incentives and financing, there may be opportunities for investment in additional clean, firm capacity at existing nuclear plants. According to the U.S. Nuclear Regulatory Commission, thirty power uprates are expected by 2030 for an additional 2,291 MWe of capacity added to existing plants.

Capital expenditures decreased notably between 2018 and 2024 due to the completion of other industry initiatives. Capital expenditures to meet regulatory requirements increased from $805 million in 2006 and peaked at $2.66 billion in 2014, before dropping to $270 million in 2025. This increase began with significant investments after September 11th to enhance security, followed by expenditures for post-Fukushima items. As the Fukushima-related safety upgrades have been completed, regulatory capital expenditures have reduced below 2006 levels. The increase in capital costs from 2024 to 2025 was largely driven by economy-wide inflation-related cost increases as well as plant upgrade projects as plants prepare for life extensions. The chart below breaks down capital costs since 2010 in billions of 2025 dollars.

**Nuclear Industry Capital Expenditures, 2010 to 2025 (in 2025 dollars)**




Source: EUCG

## Operating Costs

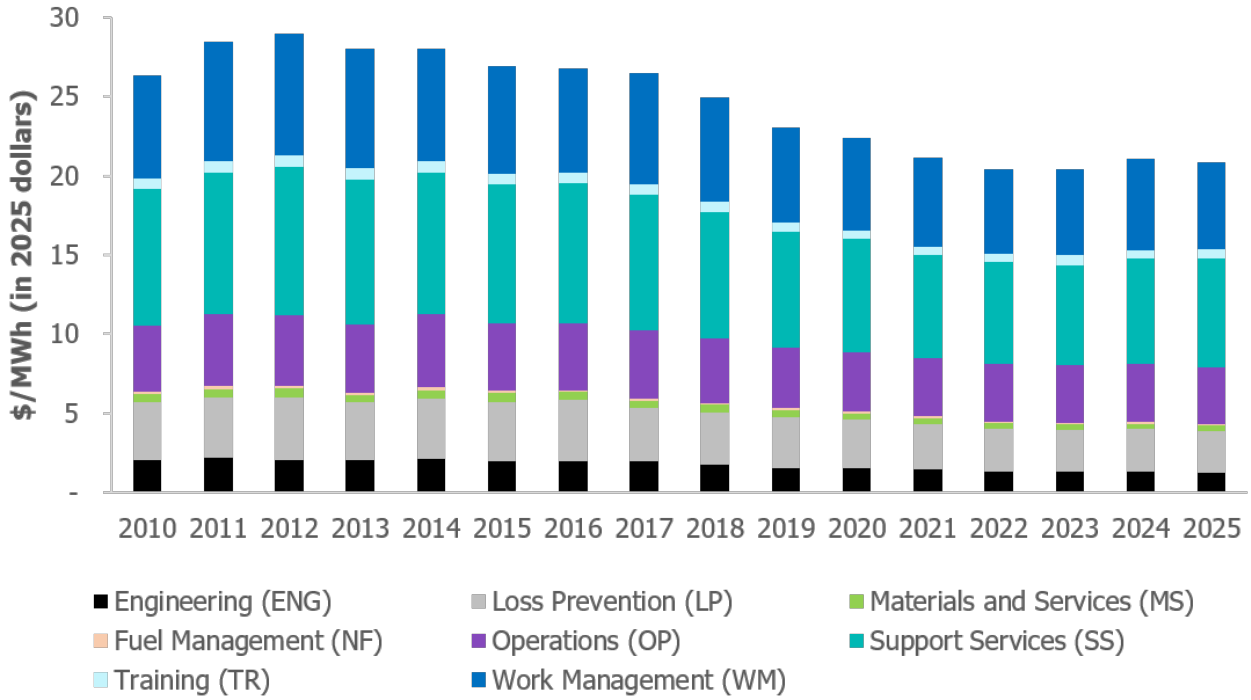
Operating costs increased from $24.13 per MWh in 2002 to $30.52 per MWh in 2012, before falling to $20.82 per MWh in 2025. In 2025, operating costs showed a 1.2 percent decrease compared to 2024 and 31.8 percent reduction compared to the peak in 2012. Operating costs include categories such as licensing, security, maintenance and human resources and are presented in dollars per megawatt-hour because they are associated with labor and actions required for the plant to produce electricity.

[4] U.S. Nuclear Regulatory Commission: Status of Initial License Renewal Applications and Industry Initiatives. April 2026. https://www.nrc.gov/reactors/operating/licensing/renewal/applications.html

[5] Nuclear Energy Institute: U.S. Nuclear Plant Actual and Expected Uprates by Plant. December 2025. https://www.nei.org/resources/statistics/us-nuclear-plant-actual-and-expected-uprates

The increase in operating costs between 2002 and 2012 was not driven by any single category, but most operating cost reductions were concentrated between 2017 and 2022. Across the different cost types, industry labor costs totaled to nearly $8.8 billion in 2025, accounting for more than half of operating costs – a share which has remained roughly the same since 2014. The chart below breaks down operations spending since 2010 by cost type in 2025 dollars per megawatt-hour.

**Nuclear Industry Operating Costs, 2010 to 2025 (in 2025 dollars)**

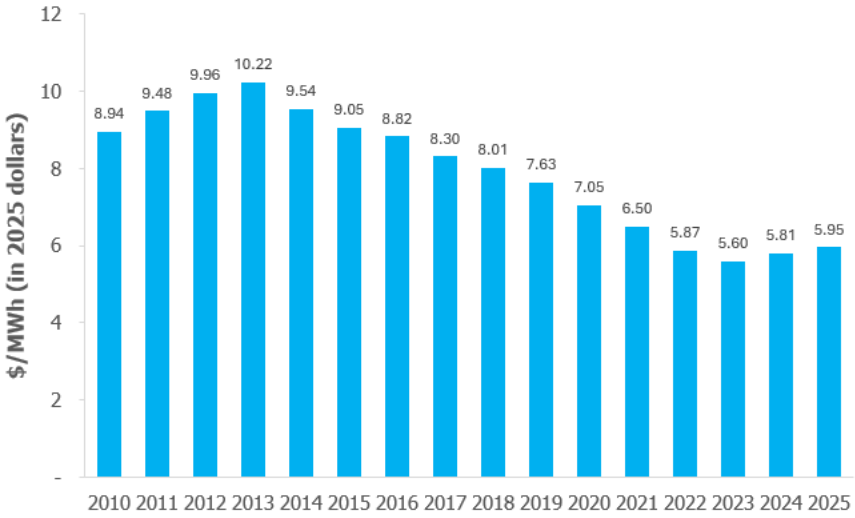



Source: EUCG

## Fuel

Fuel costs represent approximately 16.3 percent of the total generating cost. Fuel costs experienced an increase from 2009 to 2013, largely as a result of an escalation in uranium prices, which peaked in 2008. As uranium is purchased far in advance of refueling and resides in the reactor for four to six years, the effect of changes in the commodity price on the reported fuel costs appear several years after. The chart below shows fuel expenditures since 2010.

**Nuclear Industry Fuel Costs, 2010 to 2025 (in 2025 dollars)**




Source: EUCG

## QUARTILES

The following tables provide the costs by quartiles for each of the cost categories above. Within each cost category, nuclear power plants are divided into four equal quartiles, with lowest cost plants in Quartile 1 (Q1) and highest in Quartile 4 (Q4). The values shown for each quartile are the costs for the plant at the bottom of that quartile, also known as "end points." For example, if Q1 included 15 plants, the value displayed below under Q1 would be equivalent to the cost of the 15th plant in that category, and any plant with a lower cost would be in the first quartile. The fourth quartile plants are those with costs above the Q3 endpoint. Plants may be in different quartiles for different cost categories depending on their performance with respect to their peers in that specific cost category.

### Fuel Costs by Quartile (in 2025 dollars)

| ($ per MWh) | Q1 | Q2 | Q3 |
|---|---|---|---|
| Fuel Costs | $5.13 | $5.75 | $6.51 |

Source: EUCG

### Capital Expenditures by Quartile (in 2025 dollars)

| ($ per MWh) | Q1 | Q2 | Q3 |
|---|---|---|---|
| Capital Expenditures | $5.46 | $8.23 | $12.49 |

Source: EUCG

### Operating Costs by Quartile (in 2025 dollars)

| ($ per MWh) | Q1 | Q2 | Q3 |
|---|---|---|---|
| Operating Costs | $16.68 | $21.64 | $25.48 |

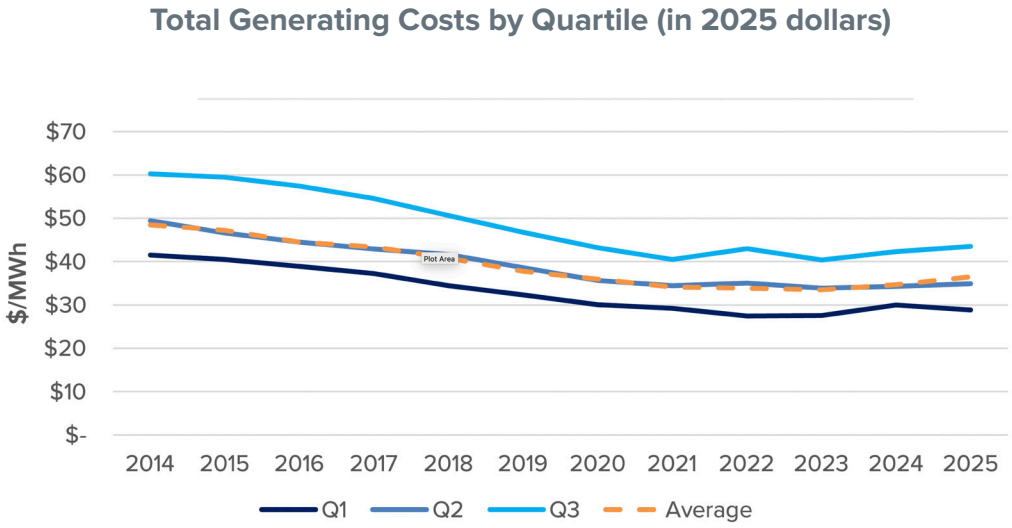
Source: EUCG

### Total Generating Costs by Quartile (in 2025 dollars)

| ($ per MWh) | Q1 | Q2 | Q3 |
|---|---|---|---|
| Total Generating Costs | $28.87 | $34.91 | $43.48 |

Source: EUCG

Since 2014, all quartiles for the total generating costs for plants have steadily decreased due to knowledge-sharing efforts emphasized through the industry's "Delivering the Nuclear Promise" initiative. In 2022, plants in Q2 and Q3 saw increases related to trends discussed in other portions of this paper, but the spread of the quartiles again reduced between 2022 and 2025. The extent of additional possible cost efficiencies for the fleet is unclear.




## THE COST VERSUS VALUE OF NUCLEAR ENERGY

The cost reductions and efficiencies achieved by the industry since 2012 are a sign of the continued pursuit of excellent performance from the U.S. commercial nuclear plants. However, some plants have still been forced to close prematurely despite significant cost reductions experienced across the nuclear fleet. Thirteen reactors in eleven states have ceased operation prematurely, resulting in the loss of 85.1 million megawatt-hours of clean electricity. Most reactors prematurely shut down in the last decade did so at least in part due to market pressures, including the suppression of wholesale power market prices by sustained low natural gas prices and increased penetration of renewable energy, as well as market designs that do not properly value the firm, carbon-free electricity that nuclear plants provide to the grid. Recently, three of these thirteen reactors have announced intention to pursue restarting operations.

Nuclear energy offers value on many fronts to the U.S. energy industry. The existing fleet is the largest source of clean electricity in the U.S., and has avoided over 18 billion metric tons of carbon emissions since 1995. The industry-wide capacity factor is 92 percent, meaning nuclear plants provide carbon-free electricity that is reliable and complementary to wind, solar and grid storage. As identified by the U.S. Department of Energy in their recent Liftoff Reports and a recent Rockefeller Foundation analysis, the ability to complement variable sources of generation and respond to electricity load requirements continues to be increasingly valuable as the grid transitions to clean energy technologies while maintaining affordable, reliable electricity service for all.

The commercial nuclear industry also provides significant economic benefits, adding $64 billion to the U.S. gross domestic product and paying $9 billion in state and local taxes. Nuclear plants are the highest-paying energy generation source by far, providing 73,000 high-quality, long-term jobs across the country at more than twice the national median wage. , The communities that host nuclear plants are supportive of their neighbors due to the jobs and clean air benefits they provide. Additionally, maintaining U.S. presence on the global commercial nuclear stage has been identified as a national security imperative for international nuclear safety and nonproliferation, making it a long-term investment in geopolitical relationships and a strong bipartisan energy solution.

In order to retain the resilient, emissions-free electricity, nuclear power plants must be properly valued by the markets they operate within. Representatives at both the state and federal level are recognizing the full value of nuclear energy to their constituents and to the nation as a whole. With the passage of federal legislation, including the Inflation Reduction Act of 2022 and the One Big Beautiful Bill Act in 2025, as well as state actions across the United States, nuclear plants are being recognized and compensated for their social and environmental attributes, preserving more than 10,000 direct jobs.


1201 F Street, NW, Suite 1100
Washington, DC 20004
**nei.org**

Envisioning a world powered by clean and reliable energy.

This document is available for download at
https://www.nei.org/resources/reports-briefs/nuclear-costs-in-context.

For additional information or for previous versions of this document,
please contact John Butler at jcb@nei.org