

**Nuclear Upgrades Cost-Benefit Analysis**

2025 Integrated Resource Plan

# Overview

Georgia Power Company (“Georgia Power” or the “Company”) routinely evaluates forecasted conditions and resource improvements to identify opportunities that can provide customers with clean, safe, reliable, and affordable energy from a diverse fleet of generation resources. For the 2025 Integrated Resource Plan (“IRP”), the Company has identified cost-effective opportunities to increase the capacity of the existing nuclear fleet at Plant Hatch Units 1-2 and Plant Vogtle Units 1-2. The opportunity to increase capacity enhances the value of existing nuclear assets while leveraging benefits from the Inflation Reduction Act (“IRA”) and creating the potential to offer interested customers subscriptions for 24x7 carbon-free energy. The cost-benefit analysis presented in this technical appendix demonstrates that the upgrades are in the best interest of customers.

Table 1: Nuclear Upgrade Schedule

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Calendar Year[[1]](#footnote-2) | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 |
| Vogtle 1\* | 0 | 0 | 0 | 7 | 27 | 27 | 27 | 27 | 27 |
| Vogtle 2\* | 0 | 0 | 7 | 7 | 7 | 27 | 27 | 27 | 27 |
| Hatch 1 | 0 | 0 | 0 | 0 | 30 | 30 | 30 | 30 | 30 |
| Hatch 2 | 0 | 0 | 0 | 28 | 28 | 28 | 28 | 28 | 28 |
| **Total (GPC Ownership)** | **0** | **0** | **7** | **42** | **92** | **112** | **112** | **112** | **112** |

\*Delivery dates assume the earliest potential outage windows based on preliminary engineering design

# Extended Power Uprates

The proposed Extended Power Uprates (“EPU”) result in increased electrical power generation by increasing the thermal output of the reactors. The EPU process includes an extensive analysis of the plant systems and components to verify the capability and identify needed modifications to support the power upgrade at each facility. For Plant Hatch, the Company is also planning to complete the Maximum Extended Load Line Limit (MELLA+) enhancement. This enhancement is necessary with boiler water reactors such as those at Plant Hatch and supports the increased capacity of the EPU by allowing for higher thermal power without increasing core flow.

# Methodology

The Company’s analysis methodology involves a detailed comparison of continued operation for each unit, both with and without the upgrade. The analysis considers unit pairings consisting of Plant Hatch Units 1-2 and Plant Vogtle Units 1-2. The costs and benefits of each unit pairing with the proposed enhancements are directly compared to the same units without the proposed enhancements.

For the upgraded version of each unit pairing, the analysis includes applicable incremental costs and benefits. Costs encompass both capital expenditures and operations and maintenance (“O&M”) costs. The upgraded version reflects higher capital costs associated with completing the upgrades relative to the existing version. The benefits for the upgraded version include Production Tax Credits (“PTC”), Department of Energy (“DOE”) Title 1706 loan guarantees, Georgia state-level Investment Tax Credits (“ITC”), and upside opportunities for potential customer subscription program benefits. Additionally, the upgraded version offers higher capacity value and energy benefits relative to the existing unit operation.

Each nuclear unit is also modeled without the assumed upgrades. This version includes the capital and O&M costs, as well as the associated benefits of continued operation. The analysis evaluates the difference in value to customers between uprating these existing units and continuing to operate them in their current form. Assumptions utilized in the analysis are further described in Section 4 of this document.

# Key Analysis Assumptions

The following sections outline key assumptions used in the economic analysis. The study includes incremental costs or costs that are directly impacted by the decision to upgrade each unit.

## Study Period

Each of these studies begins in 2025 and runs through the end of the Subsequent License Renewal (“SLR”) period. The study periods for the specific units are as follows:

* Plant Hatch Units 1-2: Unit 1 operates until 2054; Unit 2 until 2058.
* Plant Vogtle Units 1-2: Unit 1 operates until 2067; Unit 2 until 2069.

## Ownership

The analysis reflects costs and benefits for Georgia Power’s ownership share of each unit.

* Plant Hatch Units 1-2: 50.1%
* Plant Vogtle Units 1-2: 46.83%[[2]](#footnote-3)

## Upgrade Schedule

The Company’s engineering evaluation of these upgrades remains ongoing and final delivery dates are subject to change. The schedule provided in Table 1 contains the expected capacity increase as of January 2025.

## Deferred Generation Capacity

Deferred Generation Capacity Benefit, also referred to as capacity value, represents the amount of generation capacity that can be deferred or avoided by the incremental addition of capacity. The amount of generation capacity deferred or avoided is based on a summer target reserve margin of 20% and a winter target reserve margin of 26%. As described in the 2025 IRP Main Document, the Company continues to experience substantial load growth and has increasing capacity needs. Therefore, the analysis assumes all incremental capacity receives full capacity value starting at the year of need, 2028. This forecasted capacity value is valued at the economic carrying costs of a generic combustion turbine (“ECC of a CT”).

## Energy Benefits or Production Costs Savings

Production cost savings represent the variable cost savings (predominantly fuel savings) associated with generating additional energy from the upgrades. The Company quantifies these savings using the Aurora production cost model, and these analyses were performed with Budget 2025 (“B2025”) assumptions and scenarios. The Aurora model is used to compare total production cost with and without the upgrade. The difference between these two production cost totals is production costs savings or energy benefit of the project. A material portion of production cost savings results from fuel cost savings associated with the resources operating at higher capacities. Other variable costs, such as variable O&M and emissions, are also included in production cost savings.

## Scenarios

Production cost savings were determined for seven planning scenarios, as shown in Table 2. As further described in Chapter 3 of the 2025 IRP Main Document, the scenarios reflect a range of natural gas prices and greenhouse gas pressure (“GHG”). In addition, two 111 GHG Rules-specific scenarios are used for the analyses.

Table 2: Planning Scenarios Included in Analyses

|  |  |  |
| --- | --- | --- |
| Scenario Name | Fuel View | Greenhouse Gas Pressure View |
| MG0 | Moderate | $0 |
| HG0 | High | $0 |
| LG0 | Low | $0 |
| MG20 | Moderate | $20 |
| MG50 | Moderate | $50 |
| 111-MG0 | Moderate | $0 + 111 |
| 111-MG50 | Moderate | $50 + 111 |

## Capital Costs

The analysis includes capital costs both with and without the proposed upgrades. This baseline capital budget reflects the costs of continuing to operate each unit without the proposed upgrades. This budget includes annual spending for routine maintenance, repairs, planned outages, and the replacement of major components, ensuring the unit’s reliability, safety, and compliance.

For the upgraded version of each unit, the Company adjusted the baseline capital budget to account for the increased costs associated with the upgrades. The majority of the costs associated with the EPUs are capital expenditures focused on updating existing hardware and installing new equipment to increase the reactors’ thermal output. These EPU projects also accelerate some components originally anticipated to occur later in the baseline capital budget. Capital costs are currently budgetary estimates, as the project design is still in progress and costs may change as engineering details are finalized. Therefore, the budgets with the upgrades reflect both the accelerated capital expenditures as well as the costs associated with installing new equipment. The table below contains only the incremental costs associated with the EPU projects.

Table 3: Incremental In-Service Capital Cost for Nuclear EPU

|  |  |
| --- | --- |
| **Incremental  Capital Costs** | ***GPC Ownership M$*  *(values reflect rounding)*** |
| **Hatch 1-2 Capital Cost** | **REDACTED** |
| **Vogtle 1-2 Capital Cost** | **REDACTED** |
| **Total** | **REDACTED** |

## Operations and Maintenance (“O&M”)

O&M includes all labor, materials, engineering and support services, overhead costs, and other necessary activities to operate a power plant. The Company assumes that the O&M budgets will not change both with and without the upgrades. This assumption is based on the expectation that the routine operational activities and associated costs will remain consistent, regardless of whether the units undergo the proposed upgrades.

## Tax Credits and Government Programs

These upgrade projects are anticipated to benefit from several existing federal and state tax credits and DOE loan guarantees that help reduce total project costs for customers.

The IRA enabled Section 45Y, or PTCs, which are substantial for high-capacity factor nuclear units and will provide 10 years of benefit for the upgrade capacity achieved. The Company assumes a $30/MWh PTC for Plant Hatch Units 1-2, which includes bonuses for meeting the prevailing wages and apprenticeship requirements. Plant Vogtle Units 1-2 are also expected to qualify for energy community status, qualifying them for an extra $3/MWh bonus adder on top of the bonuses for meeting prevailing wages and apprenticeship requirements. The nominal value of PTCs adjusts for inflation. For economic purposes, the Company applied a 10% risk adjustment to the value of these credits.[[3]](#footnote-4) The PTCs will be earned over the 10 years following their in-service date.

The state of Georgia offers an ITC, which is available for investments in new or existing facilities in the state. The county in which the plant is located impacts the value of this ITC.[[4]](#footnote-5) Plant Hatch is in Appling County, which is ranked as a 1st Tier County, meaning it earns a 5% credit. Plant Vogtle is in Burke County, which is ranked as a 2nd Tier County and earns a 3% credit.

The Company also assumes these projects will qualify for the DOE Title 1706 Loan Guarantee Program.

## Transmission

Transmission considerations for new resources or capacity additions at existing generation sites require evaluation of transmission-related costs. The two primary categories of transmission-related costs are costs associated with delivery of the generation and the cost associated with interconnection of the generator to the transmission system. The Company has completed certain transmission system assessments for the delivery of the incremental capacity of Plant Hatch Units 1-2 and Plant Vogtle Units 1-2. Those evaluations did not identify incremental costs for transmission delivery, including thermal and interface analysis. However, the stability portion of the transmission evaluation has not been completed at time of filing. In the event stability analysis identifies any additional costs, the analysis will be updated as appropriate.

# **Summary of Results**

Table 4 represents the net present value (“NPV”) of customer benefits associated with each unit. The results are calculated by comparing the upgraded units’ costs and benefits to the corresponding costs and benefits of the units without the upgrade. Positive values in the following table indicate a net benefit to customers resulting from the evaluated upgrades. The analysis results demonstrate that the proposed upgrades are cost-effective compared to the existing unit configurations, particularly with consideration for potential customer support through subscription opportunities. Subscriptions potentially afford interested customers the opportunity to provide economic and financial support for the upgrades in exchange for receiving the environmental attributes. Potential subscription benefits are not included in these results. Taken as a whole, the analysis demonstrates that these upgrades are beneficial.

Table 4: EPU Cost-Benefit Results

|  |  |  |
| --- | --- | --- |
| 2025 NPV  (Ownership M$) | Plant Hatch  Units 1-2 | Plant Vogtle  Units 1-2 |
| LG0 | **REDACTED** | **REDACTED** |
| MG0 | **REDACTED** | **REDACTED** |
| HG0 | **REDACTED** | **REDACTED** |
| MG20 | **REDACTED** | **REDACTED** |
| MG50 | **REDACTED** | **REDACTED** |
| 111-MG0 | **REDACTED** | **REDACTED** |
| 111-MG50 | **REDACTED** | **REDACTED** |

1. The upgrades are assumed to last through each unit’s useful life. The table is truncated for formatting purposes. [↑](#footnote-ref-2)
2. Georgia Power owns 45.7% of Plant Vogtle Units 1-2 but purchases ~1.13% of capacity and energy through a long-term buyback from Municipal Electric Authority of Georgia (“MEAG”). [↑](#footnote-ref-3)
3. The 10% risk adjustment is applied to account for potential uncertainties and market conditions that could impact the value of the PTCs. This adjustment also considers the possibility of needing to transfer the credits and other unexpected factors that may arise during the project lifecycle. [↑](#footnote-ref-4)
4. The county rankings are compiled by the Georgia Department of Community Affairs and updated annually. The Company uses the lower of the prior two years' rankings to account for potential changes in tier status during the construction period. [↑](#footnote-ref-5)