

# Investment in the Hydro Fleet

Georgia Power Company's (the "Company") hydroelectric ("hydro") resources have had a long history of serving retail customers' needs and providing a zero-emission source of energy and capacity. Many of these hydro resources are the oldest generating resources owned by the Company. Given their age, many of the components at these facilities are at or nearing the end of their useful lives. In order for customers to continue to benefit from the Company's hydro resources, investments in the modernization of these resources will be required. In the 2019 IRP, the Commission recognized the importance of maintaining these valuable, flexible, and carbon-free resources that provide unique benefits to the state of Georgia. As such, the Commission approved hydro fleet modernization projects at five of its facilities.

As explained in the 2019 IRP, the age of the hydro fleet has made procuring replacement equipment very challenging. Many of the original suppliers no longer exist and the equipment is obsolete, meaning there is no longer an industry support network for the existing parts. Therefore, the Company has deployed a comprehensive investment strategy to modernize the hydro fleet so that these resources continue to provide value to customers for decades to come. As discussed in CHAPTER 11 of the 2022 IRP Main Document, the continued investments proposed by the Company would address required maintenance and upgrades related to issues such as cavitation damage to turbines, aging gate operators, aging relays and gauges, and cracking in wicket gates. The investments would also allow for much needed generator rewinds and the replacement of turbines, cranes, piping, oil-filled circuit breakers, spillway gates and flashboards, and other equipment that is critical to operation and dam safety. The hydro modernization effort is a strategic planning effort that will optimize resources as well as design, planning, plant performance, river management, and the execution of related work.

A key benefit of the Company's strategic approach to modernization is that new replacement equipment will be consistently applied across all plants. This allows the Company to leverage economies of scale when procuring parts. It also provides for common families of equipment across the hydro fleet, which can help the Company reduce specialized training and optimize its inventories. For each plant, replacing the equipment through an optimized modernization process also allows for a consistent design across units. Replacing these major components at the same time also minimizes outages and river/lake impact. Significantly, it can also reduce construction mobilization costs at the sites. For example, if a unit has a generator failure and only the generator

is replaced, it is still possible that the turbine will also experience a failure. If the turbine and generator are not replaced together, the Company could be forced to endure multiple outages and would have to mobilize construction crews multiple times, thus creating inefficiencies. Additionally, if the turbine and generator are not both replaced together, the risk of loss of generation due to component failure or poor component performance due to age is not fully mitigated. The Company's modernization approach seeks to minimize such inefficiencies with a holistic repair of critical components. Furthermore, a holistic modernization approach allows the Company to better optimize turbine and generator design to ensure the two components work in concert with one another.

Due to the age of the hydro units, a majority of the fleet does not have modern day instrumentation and monitoring equipment needed to alert the Company of issues ahead of unit equipment failures. This makes it difficult to predict and avoid such equipment failures. For example, Plant Oliver Unit 4 experienced a generator failure on October 30, 2021, resulting in the unit being offline until modernization is completed. Similarly, Plants Terrora and Tugalo each have had a major component failure that resulted in units being offline for long periods of time prior to their modernization outages. Once modernized, these units will be equipped with updated instrumentation and digital monitoring equipment that will allow advanced data analytics, troubleshooting, and optimization of maintenance. Fortunately, Plants Oliver, Terrora, and Tugalo are among the units the Commission approved for modernization in the 2019 IRP, thus allowing for a more orderly and timely return to service for these units. However, plants that are not already approved for modernization could be delayed multiple years before returning to service in the event of a long-term outage due to equipment failure because of the time required for design, engineering, and procuring the highly specialized parts required.

The plants that have not completed modernization are increasingly likely to experience outages and equipment failures as they continue to age. The Company has determined that Plant Burton, Plant North Highlands, and Plant Sinclair are in the most urgent need of modernization due to their age and condition. Each of these plants is now at risk of major component failures. For example, at Plant Burton, the exciter rotor fit is worn on Unit 2, causing bearing damage to the generator. At Plant Sinclair, the electrical and controls systems have had a multitude of repairs, but the units are ultimately leading towards major failure. Additionally, the generator step-up transformers at Plant Sinclair are 68 years old and past the end of their expected service life. At Plant North Highlands, the turbines have significant cavitation issues and need to be replaced by turbines with a modern hydraulic design. Lastly, the turbines at many of these plants have

cavitation issues that cannot be repaired and require replacement. These issues are best addressed through the Company’s strategic hydro modernization effort, which will optimize resources as well as the design, planning, and execution of work.

In addition to Plant Burton, Plant North Highlands, and Plant Sinclair, there are eight remaining hydro modernization projects that must eventually be addressed. Until these projects are completed, the remaining generation facilities will remain at a heightened risk of potential outages and equipment failure. To mitigate such problems and ensure the safe operation of facilities in accordance with applicable FERC licensing, the Company may be forced to perform work that would otherwise be addressed during eventual modernization. One such example pertains headgates. Although modernization will ultimately address the headgates at many of the Company’s plants, a gate failure in the interim would have to be addressed outside of the modernization plan due to safety and water level control needs. Until the remaining units are approved by the Commission for inclusion in the program, managing inefficiencies and maintaining reliability of these units will remain challenged.

The Company is providing the capital budget for the three additional hydro modernization projects in Table 1. This budget includes capital traditionally incurred by these facilities, the capital costs to address performance issues, as well as the costs directly associated with the Federal Energy Regulatory Commission relicensing process.

*Table 1: Hydro Modernization Budget (\$000) of Requested Plants*

	<b>\$000</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>Total</b>
<i>Sinclair 1-2</i>		REDACTED								
<i>North Highlands 1-4</i>		REDACTED								
<i>Burton 1-2</i>		REDACTED								
<b>Total</b>		REDACTED								

The expected budget in Table 1 is based on feasibility level project estimates<sup>1</sup> and will be further refined as major equipment and construction contracts are procured. The Company will continue

<sup>1</sup> Feasibility level estimates are based on an initial schedule before major equipment and construction contracts are procured. This is the best estimate available at this time with an expected accuracy of -25% to +35%. This estimate will be further refined as each project progresses and contracts are awarded.

to keep the Commission abreast of any changes to the budget through the Bi-annual reporting process.

In Table 2 below, the Company is providing the schedules for the current approved and requested hydro modernization projects.

*Table 2: Hydro Modernization Schedule<sup>2</sup>*

<b>REDACTED</b>
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<sup>2</sup> Table 2 reflects the years in which activities are initiated.