
Environmental Compliance Strategy

Update for 2022

Georgia Power Company

April 2022 Revision

FORWARD-LOOKING STATEMENT CAUTIONARY NOTE

Certain information contained in this report is forward-looking information based on current expectations and plans that involve risks and uncertainties. Forward-looking information includes, among other things, statements concerning environmental regulations and related compliance plans and estimated expenditures. Georgia Power cautions that there are certain factors that can cause actual results to differ materially from the forward-looking information that has been provided. The reader is cautioned not to put undue reliance on this forward-looking information, which is not a guarantee of future performance and is subject to a number of uncertainties and other factors, many of which are outside the control of Georgia Power; accordingly, there can be no assurance that such suggested results will be realized. The following factors, in addition to those discussed in Georgia Power's Annual Report on Form 10-K for the fiscal year ended December 31, 2020 and subsequent securities filings, could cause actual results to differ materially from management expectations as suggested by such forward-looking information: the impact of recent and future federal and state regulatory changes, including tax, environmental, and other laws and regulations to which Georgia Power is subject, as well as changes in application of existing laws and regulations; the extent and timing of costs and legal requirements related to coal combustion residuals; current and future litigation or regulatory investigations, proceedings, or inquiries; the ability to control costs and avoid cost and schedule overruns during the development, construction and operation of facilities or other projects; the ability to construct facilities in accordance with the requirements of permits and licenses and to satisfy any environmental performance standards and the requirements of tax credits and other incentives; advances in technology; state and federal rate regulations and the impact of pending and future rate cases and negotiations, including rate actions relating to cost recovery mechanisms; catastrophic events such as fires, earthquakes, explosions, floods, tornadoes, hurricanes and other storms, droughts, pandemic health events, political unrest, or other similar occurrences; and the effect of accounting procurements issued periodically by standard-setting bodies. Georgia Power expressly disclaims any obligation to update any forward-looking information.

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1.0 Environmental Compliance Strategy Executive Summary

1.1 Introduction

Georgia Power Company (“Georgia Power” or the “Company” or “GPC”) is committed to meeting its environmental compliance obligations while also providing customers with clean, safe, reliable, and affordable energy. The Company’s Environmental Compliance Strategy (“ECS”) seeks to continually optimize compliance plans in an increasingly dynamic regulatory environment. The comprehensive annual strategy development process considers existing and potential legislative and regulatory requirements and determines plant-specific compliance options. These options are evaluated based on available technology, cost, schedule, impact to plant operations, the environment, and surrounding communities. This iterative approach is designed to provide the Company the necessary flexibility to develop and refine compliance plans that are in the best interests of customers.

The ECS process has resulted in environmental compliance investments that have enabled the Company to cost-effectively maintain and operate a diverse generation mix to serve customers. In doing so, Georgia Power has achieved nitrogen oxides (“NO_x”) and sulfur dioxide (“SO₂”) emission reductions of approximately 96 and 99 percent, respectively, since 1990 and mercury emission reductions of approximately 99 percent since 2007. Georgia Power has reduced carbon dioxide (“CO₂”) emissions by more than 60 percent between 2007 and 2020 through the transition of the generation fleet, including the retirement of over 4,500 megawatts of coal and oil capacity, the addition of 2,500 megawatts of natural gas-fired combined cycle units, and the addition of over 2,500 megawatts of renewable resources. The Company remains committed to cost-effectively providing clean, safe, reliable and affordable energy for its customers and the communities it serves as it responsibly transitions its generation fleet toward more cost-effective, low-carbon resources.

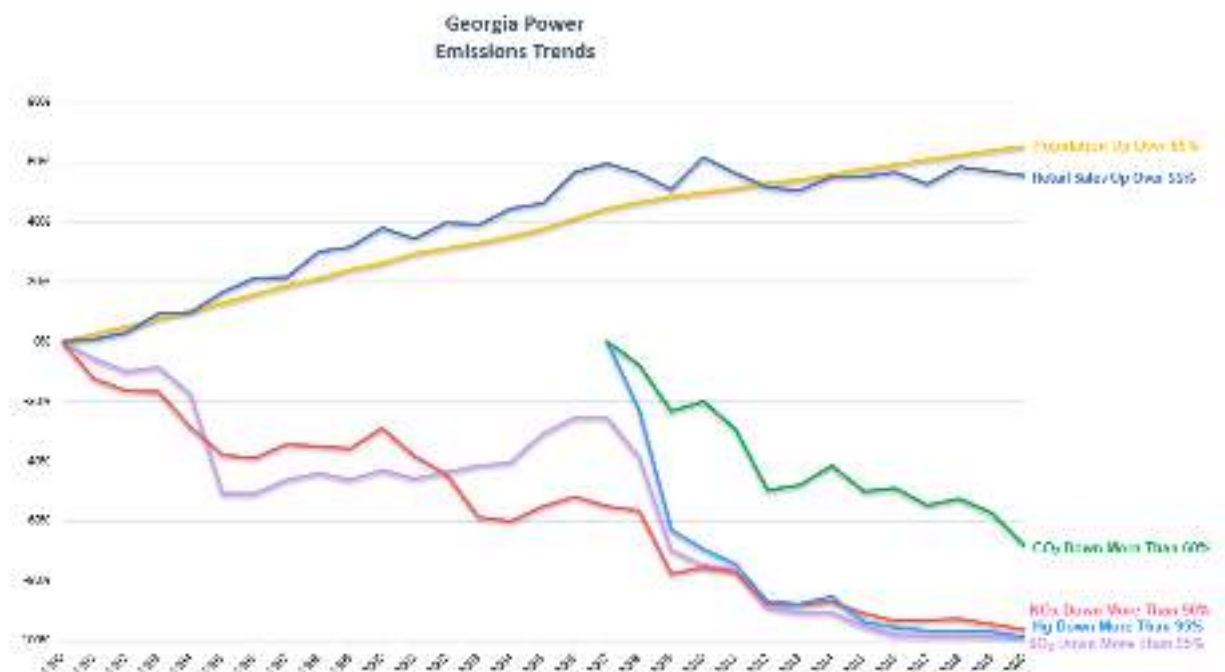


Figure 1-1 Georgia Power Emissions

Further, to-date, requirements for additional wastewater treatment and ash pond closures have resulted in the installation of fourteen wastewater treatment systems, the installation of dry or zero discharge ash handling equipment for nine units, active closure construction activities at 22 ash ponds, and preliminary sitework and final design at the remaining 7 ash ponds. In 2021, the Company secured beneficial use for 85 percent of the coal combustion residuals (“CCR”) generated from operations, significantly reducing waste streams for the benefit of customers and the environment.

As provided in the Georgia Public Service Commission (“PSC” or “Commission”) Rule 515-3-4-.04(1)(c), the Company’s ECS, a part of the 2022 Integrated Resource Plan (“IRP”), includes a detailed overview of the applicable current and proposed environmental regulations, existing environmental law, potential legislation, and a comprehensive strategy for compliance. The summary and highlights of this strategy are provided below.

1.2 Summary of the 2022 ECS

- ***Georgia Power’s environmental compliance strategy carefully balances various considerations in a manner that is in the best interest of customers.***

Various key environmental rules continue to evolve, including the Effluent Limitations Guidelines (“ELG”), CCR Rule, and power plant carbon emission regulations. However, even with significant shifts in policy from the federal government amidst administration changes, overall trends are clear. Coal-fired power plants continue to face increasingly stringent requirements from existing and new environmental regulations. Through a constructive regulatory process, the Company and Commission have effectively considered the impacts of compliance with these requirements to make decisions that are in the best interests of customers. The continued pressure from control requirements and regulatory activity targeted towards coal-fired power plants supports the continued planned transition of Georgia Power’s coal fleet.

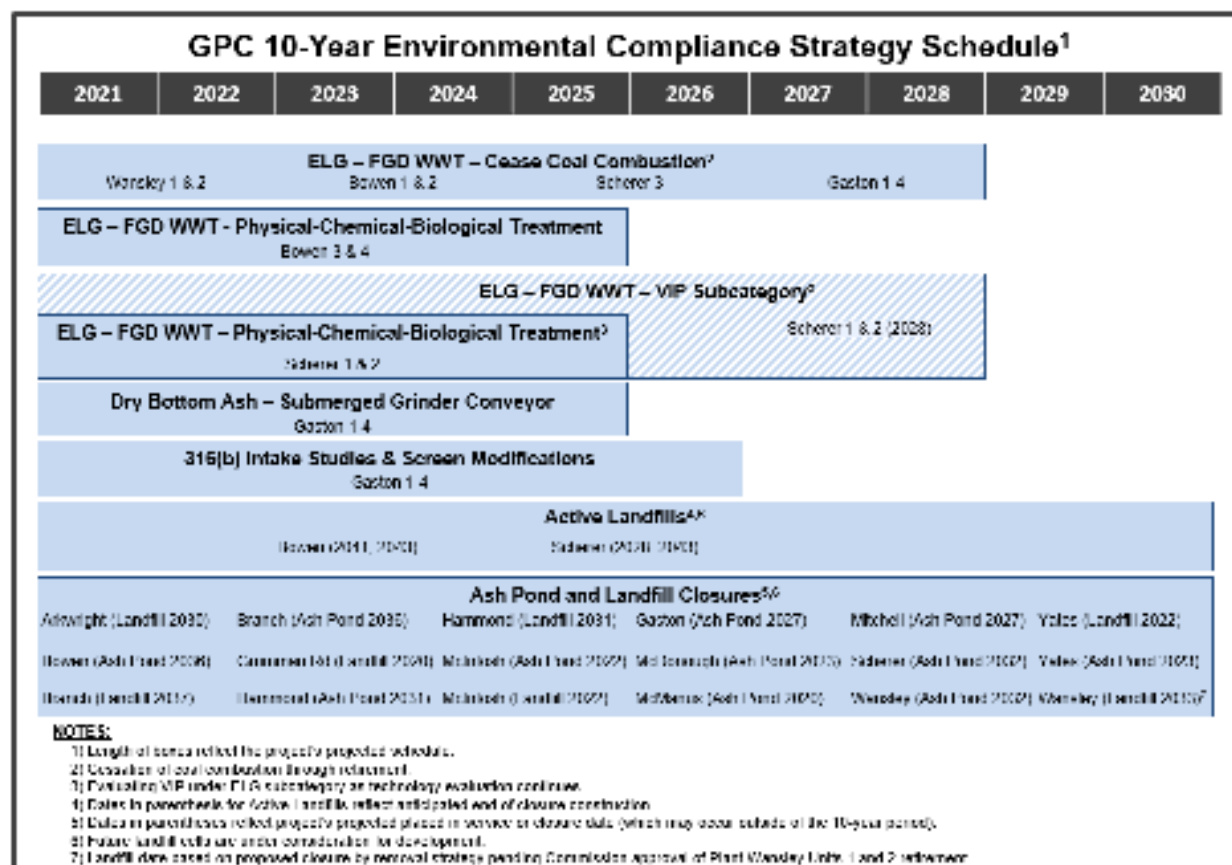
The Company’s comprehensive compliance strategy supports the planned fleet transition, which is best accomplished through long-term planning that appropriately balances a variety of factors, including necessary environmental controls and compliance actions, system reliability, cost-effective replacement generation, the growth of renewables and nuclear, and future opportunities that stem from innovation and the advancement of technology. With compliance deadlines for existing environmental requirements approaching and regulatory uncertainty likely to continue for the foreseeable future, it is critical that the Company continue to take a long-term view on planning decisions, including investing in appropriate environmental controls and making plans for fleet transition, to ensure that customer needs are met.

Georgia Power’s environmental compliance strategy includes the following major components:

- **ELG:** The Company’s ELG strategy, including unit retirements and the installation of additional environmental controls, has been developed in the best interest of customers, considering increasing environmental regulatory requirements, pressures and costs, the continued cost-effectiveness of low- and zero-carbon resources, and future system reliability and resiliency needs.
- **CCR:** The Company’s CCR strategy, approved in the 2019 IRP, continues to be effectively implemented with significant progress made over the last three years. The Company will continue to evaluate opportunities to refine and optimize its closure plans, such as the site-specific opportunity presented by the proposed retirement of Plant Wansley Units 1 and 2. As outlined further in Section 4, should the Commission approve retirement of the coal units at Plant Wansley, Georgia Power recommends modifying its ash pond closure plans at the site from closure in place to closure by removal in order to maximize the use of the existing landfill asset, manage schedule and construction risks associated with the current closure in place design, and preserve the option for future beneficial use of ash as driven by the market.
- **Climate:** The Company’s climate approach includes long-term planning scenarios that consider a range of carbon costs, including \$50 per metric ton that escalate

over time, emphasizes the importance of proactively preparing for risks associated with future carbon policy and challenges that could impact customers.

The ten-year outlook for these strategic compliance decisions for environmental compliance strategy projects are provided below, with key items explained in subsequent highlights in Section 1.



1.3 Highlights of the 2022 ECS

- ***Considering overarching environmental regulatory pressures, system reliability considerations, cost-effective replacement generation and long-term generation planning needs, the Company's ELG strategy for its coal-fired generating fleet is in the best interests of customers.***

The Company's ELG compliance strategy has been continually refined since the initial ELG Rule publication in November 2015. While legal challenges and new Environmental Protection Agency ("EPA") actions have resulted in an ever-changing ELG regulatory

landscape, the Company's environmental compliance strategy process has provided the ability to update and optimize plans with each rule iteration and continue to study technologies, while meeting compliance obligations.

In October 2020, EPA published the "Steam Electric Reconsideration Rule" ("ELG Reconsideration Rule") which provided important new and updated compliance pathways for the Company's flue gas desulfurization ("FGD") wastewater. First, the ELG Reconsideration Rule adjusted the latest possible compliance date for the generally applicable FGD wastewater effluent limitations from December 31, 2023, to December 31, 2025. Second, the rule added the following alternative options that included necessary additional time for compliance, provided notification of intent is made to the state environmental agency by October 13, 2021:

- Comply through the Voluntary Incentives Program ("VIP") with more stringent FGD wastewater effluent limitations by December 31, 2028.
- Comply with the ELG's by permanently ceasing coal combustion by December 31, 2028.

Most recently, EPA announced future revisions to the ELG rule. EPA plans to undertake proposed rulemaking by the fall of 2022 to consider more stringent limitations and standards. These developments make it clear that the Company must make thoughtful decisions on continued investments in the coal fleet.

The Company closely evaluated the impacts the recent ELG rulemaking will have on the continued operations of coal-fired generating units and has determined that a mix of unit retirements and the addition of new environmental controls is in the best interest of customers. On October 13, 2021, the Company submitted ELG compliance filings to the Georgia Environmental Protection Division ("EPD"), that stated:

- Georgia Power's intent to permanently cease coal combustion no later than December 31, 2028, for Plant Bowen Units 1 and 2, Plant Scherer Unit 3, and Plant Wansley Units 1 and 2.
- Georgia Power's intent to pursue ELG compliance through the Voluntary Incentive Program subcategory with a compliance deadline of December 31, 2028, for Plant Scherer Units 1 and 2.
- Georgia Power's intent to comply with the generally applicable requirements by December 31, 2025, for Plant Bowen Units 3 and 4.

On October 13, 2021, Alabama Power filed a Notice of Planned Participation ("NOPP") for Plant Gaston Units 1 through 4 on behalf of SEGC to the Alabama Department of Environmental Management. The NOPP filed stated that Plant Gaston Units 1-4 would permanently cease coal combustion through retirement no later than December 31, 2028.

Certifying the retirement of units by December 31, 2028, would provide a cost-effective alternative to installation of controls for ELG compliance at the nine units at Plants Bowen, Gaston, Scherer, and Wansley.

Establishing a known retirement date provides the Company with an opportunity to reduce operating costs associated with these units, while providing necessary time to prepare the system for the retirement of these units.

The Company's election to install controls at Plant Bowen Units 3 and 4 and Plant Scherer Units 1 and 2 was also carefully considered. Recognizing the necessary system planning and reliability projects to provide for the retirement of all units at Plant Bowen cannot be completed by December 31, 2028 and considering the Company's unit retirement study ("URS"), Plant Bowen Units 3 and 4 must pursue compliance with the generally applicable effluent limits through installation of physical-chemical-biological FGD wastewater treatment.

Continued operation of Plant Scherer Units 1 and 2, in conjunction with the site's co-owners, allows time for continued planning activities considering long-term system reliability. Due to plant-specific equipment and operational characteristics, Plant Scherer may benefit from the VIP compliance option using membrane-based technology as an alternative to physical-chemical-biological treatment. Therefore, for Plant Scherer Units 1 and 2, the 2022 ECS reflects the Company's and co-owners' plans to maintain flexible options by pursuing parallel paths of: 1) maintaining plans for installing physical-chemical-biological controls to meet the generally applicable effluent limits by December 31, 2025, and 2) evaluating the membrane-based treatment systems that would be required to comply with the VIP pathway by December 31, 2028.

Controls will be installed for continued operation of Plant Scherer Units 1 and 2. Should the evaluation of the membrane-based treatment system show appropriate technical performance, reliability, operational flexibility and cost compared against the physical-chemical-biological controls, the Company will install the membrane-based system.

Georgia Power's ELG strategy benefits customers by maintaining the essential flexibility to choose the best unit-specific compliance options, while also addressing reliability risks and enabling a continued orderly and staged fleet transition. This plan also best addresses the continuing uncertainty around the ultimate outcome of EPA's latest review of the ELG rule. By remaining flexible in determining the best path forward, the Company can prepare for compliance while also allowing additional information to be collected and plans to be adjusted as needed in order to make the best decision for customers.

- ***The Company's CCR strategy approved in the 2019 IRP continues to be implemented and refined to optimize closure plans, with significant progress made over the last three years. Based on the Company's proposed 2022 IRP, the recommended Plant Wansley ash pond closure strategy modification is in the best interest of customers.***

Georgia Power is required to comply with both the Federal CCR Rule and Georgia's CCR Rule at its CCR ash ponds and landfills. Georgia Power presented its compliance strategy to comply with these rules in the 2019 ECS, which was reviewed and approved by the PSC in the Company's 2019 IRP (Docket No. 42310). Since the 2019 IRP Final Order, CCR project progress and cost updates have been submitted semi-annually to the PSC through Docket No. 43083.

After the CCR Rule was finalized in 2015, EPA amended the rule numerous times, and the Company expects Federal and Georgia requirements to continue to be reviewed and updated in the future. The Company's CCR compliance strategy process is developed to respond to changing regulations and incorporate new information as it becomes available. While the strategy itself will continue to necessarily evolve, the purpose of the process has always been to maintain flexibility while producing cost-effective compliance solutions that will minimize the impact to customers while ensuring environmental compliance with all requirements.

The Company has 29 ash ponds, 12 existing CCR landfills, and 2 future landfills that will be permitted to support ash pond closures in the future. Georgia Power's ash pond and landfill closure plans and compliance strategy are designed to comply with the Federal CCR Rule, as well as the more stringent requirements of the Georgia CCR Rule. The Company's closure plans are complex, with site-specific considerations around ash pond size, volume of material, dewatering, location, geology, safety and the surrounding environment, making each project unique. Closure construction activities will continue for at least the next 15 years, while post closure care requirements are currently expected to span over approximately the next 60 years.

The Company, relying on the experience and knowledge of third-party experts with expertise in solid waste permitting and design, has evaluated the volume, complexity, and duration of these required activities on a site-specific basis and created comprehensive closure plans, designs, and construction schedules necessary to comply with the requirements and compliance deadlines of the CCR Rules. These plans are certified by independent professional engineers following a detailed, site-specific engineering analysis. The Company's plans are based on long-standing rule interpretation held by both industry and environmental regulators. In addition, the Company used industry- and agency- accepted engineering practices utilized for closure designs that are consistent with solid waste regulatory requirements, on which the CCR rule is based. The Company's compliance strategy, with the update to the Wansley ash pond closure strategy, includes permanently closing all 29 ash ponds by removing the ash from 20 ponds and closing the remaining 9 ponds in place using proven engineering methods designed to meet the requirements of the regulations. The table below summarizes the individual ash pond closure strategy across Georgia Power, pending Commission approval of the IRP and retirement of Plant Wansley Units 1 and 2.

Plant	Closure by Removal	Closure in Place	Total
Bowen		1	1
Branch	5		5
Hammond	3	1	4
Kraft	1		1
McDonough	1	3	4
McIntosh	1		1
McManus	1		1
Mitchell	3		3
Scherer		1	1
Wansley	1		1
Yates	4	3	7
Total	20	9	29

In November 2018, Georgia Power submitted to EPD 29 CCR permit applications as required by the Georgia CCR Rule for ash ponds and CCR landfills. These permit applications outlined significant and detailed engineering information about Georgia Power's ash pond closure plans and landfill operations plans. To date, the Georgia EPD has issued seven final permits for closure by removal units. Additionally, Georgia EPD has issued one draft permit and one final permit for closure in place projects. The Company continues to respond to EPD's requests for information and comments on the permit applications submitted in 2018. Should the Commission approve the IRP and retirement of Plant Wansley Units 1 and 2, the Company will work with EPD to modify the permit application to reflect the change in closure strategy. EPD permitting activities for the remaining projects are currently expected to continue through 2023, and this timeline for permit issuance is important to gain certainty for the projects. In order to advance ash pond closures and meet the stringent regulatory deadlines associated with the Federal CCR Rule and Georgia CCR Rule, regardless of permit issuance, the Company must continue to complete certain compliance requirements and proceed with closure construction.

The Company has made significant progress toward effectuating the approved compliance strategy. This includes active closure construction at 22 ash ponds and preliminary sitework and final design at the remaining ponds to prepare the sites to enter closure construction activities in the near future. To date, Georgia Power has provided landfill and ash pond closure certifications to EPD for certain CCR Units at Plants Branch, Hammond, Kraft, McDonough, McManus, McIntosh, and Yates. These closure certifications document important information regarding the closure activities, quality control, and verification of compliance with the CCR Rules. Georgia EPD has issued acknowledgement letters for completion of CCR removal for certain CCR Units at Plants McManus, McDonough, McIntosh, and Yates, demonstrating the Company's compliance with the closure requirements of the Georgia CCR Rule as well as EPD's active oversight regardless of final permit status.

Recent fleet transition plans provide an opportunity to modify the current ash pond closure plans at Plant Wansley. This opportunity was previously not available due to the need to maintain the availability of the on-site landfill to support continued operation of the coal units. Given the request to retire Plant Wansley Units 1 and 2, the Company has assessed utilizing the existing on-site landfill as part of the site's ash pond closure. This assessment considered current capacity and expansion capability of the on-site landfill, schedule and construction risk, and long-term considerations associated with post closure care. Modifying the ash pond closure plans at the site from closure in place to closure by removal utilizing the existing on-site landfill, will benefit customers by maximizing the use of the existing landfill asset, managing schedule and construction execution risks associated with the current closure in place design, and providing for future beneficial use of the ash as driven by the market.

Georgia Power is also seeking to identify opportunities and maximize the value for the beneficial use of stored coal ash at its active and retired plants across the state. For example, at Plant Mitchell, the Company continues with plans to remove the stored coal ash at its three ash ponds for beneficial use. Over the next several years, up to two million tons of ash are planned to be removed from Plant Mitchell to create Portland cement. Additionally, Georgia Power issued a request for proposals ("RFP") in December 2019 for the beneficial use of stored coal ash at Georgia Power facilities. Currently, the Company is in the final stages of the RFP evaluations and will move forward with opportunities that present value to the ash pond closure strategy including potential reduction in long term liability or potential in reduced project costs. REDACTED REDACTED REDACTED REDACTED REDACTED REDACTED REDACTED REDACTED, there is great potential for long-term benefits by reducing the amount of ash that must be managed during closure and in post closure care.

The Company will continue to refine and optimize the CCR compliance strategy to ensure plans remain in the best interest of customers. In addition, Georgia Power consistently monitors and evaluates project assumptions, including, but not limited to, timing and schedule assumptions for permits and construction, project scope, post-closure activities, and estimated future escalation. Georgia Power's forecast applicable to retail customers over approximately the next 60 years is \$8.89 billion as outlined in the April 2022 updated Selected Supporting Information Volume 2. This forecast is based on current estimates for a Plant Wansley closure by removal strategy, which is dependent on Commission approval of retirement of Plant Wansley Units 1 and 2. The \$8.89 billion estimate includes \$944 million in project to date actual costs incurred through December 31, 2021.

- ***With a long-term outlook, the Company is proactively planning for a carbon-constrained future to mitigate risks and challenges associated with potential climate policies that could impact customers.***

Environmental policy and requirements have become more stringent over time and coal-fired power plants are likely to face additional environmental compliance costs in the future. In addition, in the last five years, there has been a significant shift upward in the projected magnitude and impact of potential carbon-constraining programs, as demonstrated by numerous legislative proposals and climate policy analyses. To mitigate risks and optimize costs to customers, the Company must proactively plan long-term for increased carbon pressure.

Georgia Power has already reduced and will continue to reduce carbon emissions effectively through the constructive regulatory planning process with this Commission. The utility industry, as a whole, has also already reduced carbon emissions significantly compared to other sectors. In order to achieve further considerable incremental reductions across the economy that are sought by Federal or state climate programs, increasing carbon price pressure will be required. As such, the overall shift to higher costs and impacts from future carbon requirements is a lasting trend that will continue into the future as climate programs are deployed. Figure 4-1 in Section 4 provides an example, plotting the carbon price points of various legislative proposals from 2021 with the Georgia Power CO₂ planning scenarios.

In addition to the potential for climate legislation, EPA is required to promulgate carbon emissions standards for power plants under the Clean Air Act (“CAA”). Following the vacatur of the Affordable Clean Energy (“ACE”) Rule in January 2021, EPA is expected to take a more aggressive approach with respect to carbon emission reductions. Considering all of these factors, in addition to the impact of existing environmental regulatory drivers, such as Mercury and Air Toxics Standards (“MATS”), ELG, and CCR rules, the Company’s long-term planning process must continue to consider future carbon constraints and other potential requirements in order to make the best decisions on behalf of customers.

1.4 Conclusion

Georgia Power’s environmental compliance strategy seeks to achieve the goals of cost effective short and long-term decision-making, maintaining flexibility to adjust to new regulations and other new information, and ultimately implementing solutions in the best interest of customers. The Company has carefully considered the risks of future environmental requirements and other key factors in making compliance plans. The 2022 ECS includes, among others, plans to ensure compliance with the ELG and CCR rules, while allowing for the planned transition of the coal fleet, for the benefit of customers and reliability of our system.

Details of the Georgia Power environmental compliance strategy process, additional information on the highlights discussed above, and all information responding PSC Rule 515-3-4-.04(1)(c) are included in the ECS filed herein. The ECS sections include:

- Environmental Strategy Process

- Federal and State Regulatory, Legislation and Judicial Review
- Strategy Results and Financial Summary

2.0 Environmental Strategy

Based on the extensive regulatory and legislative activities and events described in Section 3.0 below, Georgia Power has developed a comprehensive environmental compliance strategy designed to provide cost-effective plans to comply with applicable environmental requirements. Georgia Power's environmental compliance strategy process has evolved and been refined over the years to adapt to changing regulations and assure compliance while providing clean, safe, reliable and affordable electricity to our customers. This environmental planning or strategy process is illustrated in the figure below (Fig. 2-1) and is essential for decision making and communication.

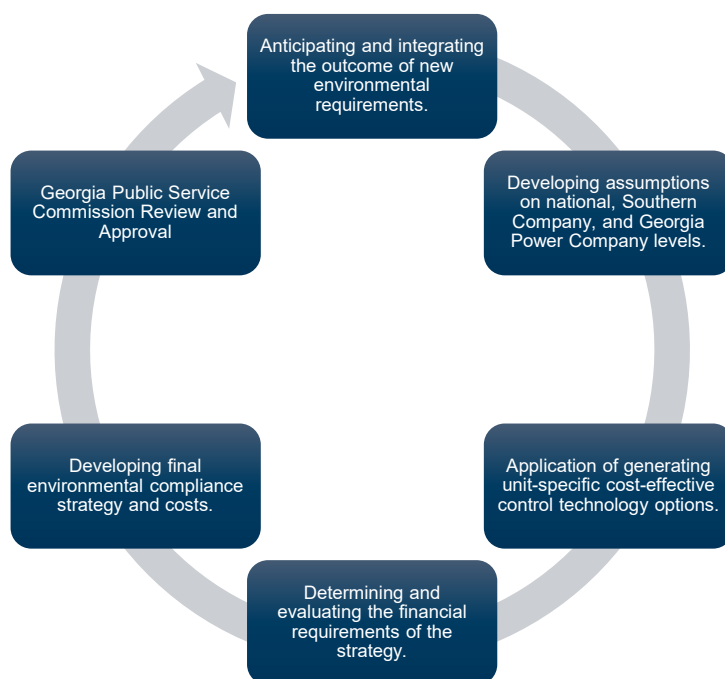


Figure 2-1 Annual Environmental Compliance Strategy Development Process for Existing Generation

2.1 Strategy Process

The process for developing the environmental compliance strategy includes the comprehensive involvement of a number of organizations within the Company. This integrated process includes four steps as discussed below.

1. **Anticipating and integrating the outcome of new environmental requirements.**
The first step involves gathering all available knowledge about current and potential future local, state, regional, and federal environmental requirements. The future requirements may be in the form of legislation that will need future rulemakings, in the form of draft or proposed new rules that must go through the formal rulemaking

process, or through a reconciliation process to become final. Some rules may be part of an allowance-based cap and trade program over a regional or national scale and others may be local or state requirements that mandate specific requirements on specific plants or assets. For many rules, the possibility that litigation will result in changes to the rule creates additional uncertainty.

2. **Developing assumptions on federal and state levels.** In order to anticipate the impacts of the requirements on the generating plants based on federal and state requirements, the Company engages in a robust integrated resource planning process. This process evaluates the economic and reliability impacts of numerous generating resource decisions across a range of scenarios. The scenarios include a range of assumptions that appropriately consider future regulatory and market uncertainty and risk. The Company makes a triennial filing with the Georgia PSC seeking approval of the IRP, which includes economic evaluations of generating plants that consider load growth, compliance costs, and other economic pressures (fuel prices).
3. **Application of generating unit-specific cost-effective control technology options.** The application of control technology is dictated initially by the environmental requirements for each specific generating plant and/or unit. In some cases, the plant or unit's environmental control requirements are mandated, such as a plant-specific limit to meet the National Pollutant Discharge Elimination System ("NPDES") permit requirements. In other cases, such as the cap-and-trade program for SO₂ established to address acid rain, utilities can choose the most cost-effective option, including fuel switching, applying a control technology, or purchasing emission allowances. The decision process reviews the cost, control effectiveness, regulatory timing requirements, system reliability impacts, and operational considerations of each of these options for each unit. All of these considerations are taken into account in developing a unit-specific decision on the application of environmental control technologies. Several of the most important environmental control technologies for Georgia Power compliance are described in the technology review discussion that follows.

The availability or options for control technology can vary by pollutant, by process and by plant specifics. For example, in cases where the Company is responding to compliance with the CCR Rule or compliance with ELG requirements, technology choices include closure of ash ponds and installation of controls that allow facilities to eliminate the discharge of ash transport water, such as dry ash handling equipment, including remote drag chain conveyors and ash coolers. Similar options apply to potential treatment of FGD wastewater, where FGD operations, coal type and process flows influence wastewater chemistry and the treatment technology that may be most appropriate, such as physical-chemical-biological treatment or membrane-based technology.

The following figure (Figure 2.1-1) illustrates possible control technologies and applications for coal-fired boilers.

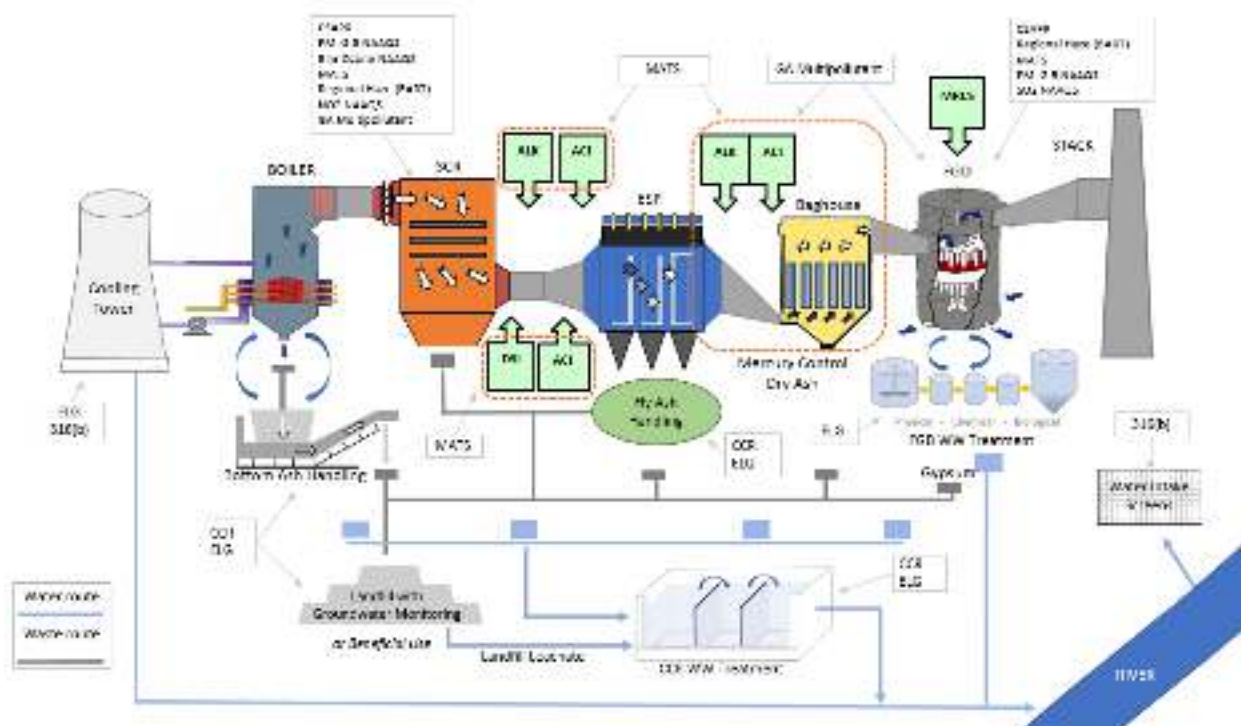


Figure 2.1-1 Possible Environmental Control Technologies for Coal-Fired Boilers

4. **Determining and evaluating the financial requirements of the strategy.** The final step is to include the environmental compliance strategy into a unit retirement study or asset valuation. Some units and plants may not be able to achieve the required environmental limits in a cost-effective manner and would need to consider other compliance options such as acquiring additional allowances, switching fuels, or retiring to comply. If environmental controls are mandated for a specific unit, then the economic value of the generating asset including future operating costs and any reliability impact to the system must be considered in the Company's integrated planning process before application of the technology.

After the compliance strategy process is completed and analyzed across the various planning scenarios, a strategy is compiled on a unit level and reviewed annually based on the most current information. One major goal of the environmental compliance strategy process is to maintain flexibility in compliance options and operations across the generating fleet.

A key advantage of this process is that it allows decision making on an incremental basis. While the strategy includes environmental control plans for the next 10 years,

final decisions on specific environmental control projects are not made until the Company has sufficient information (such as the results of rules stemming from a delay or change in scope) to complete technical and economic analysis in support of IRP proceedings. This process provides a balanced approach to providing cost-effective solutions to environmental regulations for our customers.

Future regulatory and legislative requirements that could significantly impact both the scope and the cost of compliance over the next decade are incorporated into the strategy. Georgia Power will continue to monitor emerging regulations and Executive Orders (“EO”), and these requirements will be incorporated into future strategy updates, as appropriate.

The uncertainty surrounding the legislative and regulatory environment reinforces the need for a flexible, robust compliance strategy. Accordingly, the strategy balances the need to make decisions on certain timelines (such as fuel and equipment purchases) with the need for more information relative to regulatory, reliability, and economic drivers. The analysis will be updated to determine the most cost-effective compliance decisions while maintaining future flexibility and preserving system reliability in the strategy. Because the Company’s environmental compliance strategy is impacted by factors such as new regulations, new legislation, EOs, changes to existing environmental laws and regulations, the cost of emissions allowances, technology advancements, and changes in fuel use, future environmental compliance costs will continue to be incurred.

2.2 Strategy Assumptions

Based on this extensive strategy process and the regulatory and legislative requirements discussed in Section 3.0, the Georgia Power environmental compliance strategy is reviewed and updated each year. The environmental compliance strategy combines the assumptions surrounding the regulatory requirements with the most cost-effective environmental control technology that is commercially available and results in specific environmental control applications across Georgia Power.

While there is uncertainty surrounding the stringency and timing of many of these rules, they must be, and are currently, considered in the development of the Company’s environmental compliance strategy.

2.3 Environmental Compliance Technologies

Research and Development (“R&D”) continues to be an integral part of the overall Georgia Power environmental strategy and compliance plan. Through research, development, and demonstration, technologies are evaluated, and selected for possible implementation to meet compliance with federal and state regulatory requirements. Technology-related decisions are made based on compliance alternatives, technical review (often following actual testing), schedules, equipment-vendor price quotes, total costs over the useful life, specific unit issues, and performance guarantees. Operations, maintenance, and cost-effectiveness are important parts of the decision-making process.

Since the implementation of the Clean Air Act Amendments (“CAAA”) of 1990, R&D has been crucial for Southern Company in assuring that the best-possible environmental compliance strategies are selected for implementation at Georgia Power. ECS-Appendix B provides a list of control technologies considered in an ongoing effort to meet mandated requirements in a timely manner, maintain system reliability, and assure cost-effective generation for customers.

Georgia Power and Southern Company continue a decades-long history of industry leading R&D designed to identify future opportunities and create cost-effective solutions. The Company leverages existing knowledge through industry affiliations across the U.S. and around the world to identify these opportunities and help reach cost-effective paths forward. To minimize cost and risk, only proven technologies should be implemented commercially. These industry R&D efforts have successfully tested low-NO_x burners, precipitators, catalyst materials for selective catalytic reduction systems (“SCRs”), FGDs, mercury reduction systems, and other equipment and have contributed to Georgia Power’s ability to meet stringent requirements while continuing to provide affordable energy for customers. Insight from this research benefited vendor and material selection, construction, and long-term operation, efficiency, and flexibility.

2.3.1 Water Research and Conservation Center

Originally developed in 2012 through collaboration with the Electric Power Research Institute (“EPRI”) and Southern Company, the Water Research Center (“WRC”) at Georgia Power’s Plant Bowen provided a venue for technology evaluations to address water use, withdrawal, consumption, treatment, and recycling throughout the power generation process. The WRC generated new information regarding current and future regulatory compliance issues related to water withdrawal, use, and discharge restrictions in direct support of the Company’s ongoing evaluation of the 2015 ELG Rule and ELG Reconsideration Rule and associated strategy. Testing at the WRC successfully informed technology strategies for achieving cost-effective environmental compliance. Several technologies have been implemented throughout the energy industry and across the Southern Company fleet. For example, the WRC has hosted tests of several different technologies for the treatment of FGD wastewater. This R&D resulted in decreased costs and improved performance for physical, chemical, and biological treatment systems, which Georgia Power is evaluating for FGD wastewater compliance. Due to the success of the WRC, Southern Company and EPRI expanded the WRC to become the Water Research and Conservation Center (“WRCC”) adding a state-of-the art facility at Georgia Power’s Plant McDonough. This research center provides the infrastructure needed to test and identify the most promising water technologies. To better manage and conserve water across our thermoelectric power generation sites, the WRCC at Plant McDonough promotes advancements in power plant cooling systems leading to reduced freshwater withdrawal and consumption as well as improved plant efficiency while optimizing total cost and energy generation.

The WRCC commissioning was completed in October 2020, and testing has begun on condenser tube coatings and surface modifications in the Heat Transfer Loop (“HTL”).

This testing is a part of a project funded by the U.S. Department of Energy (“DOE”) to investigate technologies to improve heat transfer and mitigate heat transfer losses due to condenser tube fouling. Testing of this technology improvement process will continue into 2022.

Currently, testing is underway on biocide technology that could be an alternative to using chlorine-based chemicals to control algae and biofouling that interfere with cooling tower performance. The WRCC is also conducting tests to improve condenser heat transfer, as well as a technology to monitor deposition on heat transfer surfaces for better identification and control of fouling and scaling.

2.3.2 Ash Beneficial Use Center

The Company, in partnership with EPRI and other utilities across the industry, has developed a center, located at Plant Bowen, for beneficial use of harvested CCR. The Ash Beneficial Use Center (“ABUC”) will strive to develop additional beneficial uses and better technologies to process the ash for beneficial use with an aim to reduce future costs to CCR closure projects and further open opportunities to reuse this byproduct.

The center aims to develop new technologies or processes that drive downward cost pressure associated with beneficial use and expand current and potential markets. This downward cost pressure would create an adjustable mechanism to obtain market equilibrium such that beneficial reuse from operating power plants is preserved. In addition, technology developments or enhancements to beneficially use CCR could ultimately allow Georgia Power to reduce the amount of CCR that is stored in landfills or reclaim CCR already stored in landfills and ash ponds. This may result in reduced capital and operation and maintenance (“O&M”) costs for CCR management. The strategy associated with introducing additional beneficiated ash into the market, as well as limiting the quantity of CCR in landfills, benefits both current and future customers.

The core capability of the center is pre-processing harvested ash for use in technology demonstrations. Pre-processing includes drying, classifying, storing and delivering the ash for beneficial use. The major mechanical components of the center were completed in February of 2021, and full commissioning and acceptance testing were completed in July 2021. The first project, involving the processing and characterization of different harvested ashes from multiple ponds, is currently under development. This project will provide baseline information about the performance and energy requirements of the center components as well as providing a comparison of the relative beneficiation potential of the different ashes. Additionally, the first round of emerging technologies for development and demonstration is under evaluation, and projects involving the production of lightweight aggregate from ash and the extraction of valuable minerals are being considered.

EPRI is also pursuing external funding opportunities through grant proposals submitted to the DOE. The Company will continue to be engaged in these various efforts as appropriate.

Additionally, Georgia Power and Southern Company are involved as participants with several DOE-supported projects, which are working to evaluate coal ash as a domestic source for rare earth elements and critical minerals. One project supported and managed by the National Energy Technology Laboratory aims to develop a framework and conceptual design for a facility that would extract rare earth elements and critical minerals from coal ash at a commercial scale, taking advantage of coal ash deposits stored throughout the southeastern U.S. Georgia Power is also participating through Southern Company on two project teams as part of DOE's Carbon Ore, Rare Earths and Critical Minerals (CORE-CM) Initiative with the goal of driving regional economic development to establish a domestic supply chain, using coal ash as an important resource.

3.0 Federal and State Regulatory, Legislation and Judicial Review

The environmental policy landscape experienced several regulatory, legislative, and judicial actions since the 2019 IRP filing. The following section provides a summary of the major US environmental laws, notable regulatory related events, expected future environmental regulatory actions, and detailed description of the changes to regulations impacting the electric utility industry. Georgia Power has taken into account all of these issues in addressing the compliance strategy later in Section 4.0.

3.1 Major US Environmental Laws

Clean Air Act

The portions of the CAA and the 1990 CAAA that impact the electric utility industry most directly are:

- Title I, National Ambient Air Quality Standards (“NAAQS”) and New and Existing Source Performance Standards
- Title III, Air Toxics
- Title IV, Acid Rain
- Title V, Permits

The core of the CAA is the NAAQS. The CAA requires that the EPA determine what level of six specific pollutants (ozone, PM, SO₂, lead, carbon monoxide (“CO”), and NO_x) in the ambient air is protective of human health and the environment with a margin of safety. EPA sets a primary standard designed to protect human health and can set a secondary standard focused on protecting the environment. Areas of the country where levels of these pollutants exceed the NAAQS are known as nonattainment areas. States must develop state implementation plans (“SIPs”) with control strategies designed to bring these areas into attainment. EPA is required to review the NAAQS every five years, update them if necessary, and is authorized to issue regulations necessary to prevent emissions in one or more states from contributing to nonattainment in other states. EPA has implemented four programs for managing interstate impacts on nonattainment that have been applicable to Georgia Power units – the NO_x Budget Trading Program (NO_x SIP Call), CAIR, and Cross State Air Pollution Rule (“CSAPR”) (as a replacement to Clean Air Interstate Rule (“CAIR”)) and the CSAPR Update Rule.

Title I of the CAA authorizes EPA to establish a list of categories of stationary sources that cause or contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare. Subsequently, EPA is authorized to establish standards of performance for new, modified and reconstructed sources within such categories. EPA is also directed to prescribe regulations which shall establish a procedure under which each State shall submit to EPA a plan which establishes standards of performance for any existing source for any air pollutant to which a standard of performance would apply if such existing source were a new source.

Title III of the CAA requires regulation of listed Hazardous Air Pollutants (“HAPs”) and requires implementation of emission limits equivalent to the Maximum Achievable Control Technology (“MACT”) for specific source categories, as determined by EPA. Several different MACT Rules affect Georgia Power, including, notably, the final MATS Rule. Once in place, MACT standards are to be reviewed by EPA every eight years.

The CAAA also added the Acid Rain Program (Title IV). This program requires reductions of SO₂ and NO_x emissions to reduce acid rain. The Acid Rain Program had the most immediate impact on Georgia Power and the electric utility industry following the 1990 amendments.

Title V of the CAAA added requirements for facilities to obtain federally enforceable operating permits. The permits are meant to clearly lay out most of the applicable air quality-related regulations for affected facilities by compiling all applicable requirements into one document. Georgia Power’s Title V permits include both state and federal requirements and are issued by the Georgia EPD.

Clean Water Act

The Clean Water Act (“CWA”) was established to restore and maintain the chemical, physical and biological integrity of the Waters of the U.S. (“WOTUS”).

Pursuant to Section 402 of the CWA, the NPDES permit program was developed and implemented to regulate pollutant discharges to WOTUS. Authority to discharge under the CWA may be granted through a NPDES permit issued by EPA, or by a state that has been delegated such authority by EPA. The NPDES permit program is used as a means of achieving and enforcing technology-based effluent limitations and water quality-based effluent limitations. Georgia EPD has been delegated the authority to issue NPDES permits in Georgia.

EPA has established ELGs for the steam electric industry and other industrial source categories based on treatment technologies. The steam electric ELGs were promulgated in 1974, amended in 1982, and most recently updated in 2015 and in 2020. EPA has announced that it will revisit the rule and issue revisions in the fall of 2022. EPA is responsible for periodically reviewing and updating these ELGs, which serve as the basis of the technology-based permit limits that appear in individual NPDES wastewater discharge permits.

Section 316(b) of the CWA, which regulates cooling water intake structures, is implemented through NPDES permits. Section 316(b) regulations are intended to protect fish and other aquatic species in the vicinity of utility cooling water intake structures. The focus of Section 316(b) is to ensure that the location, design, construction, operation, and capacity of cooling water intake structures reflect the best technology available (“BTA”) to minimize adverse impacts from impingement and entrainment of fish, shellfish, and other aquatic organisms.

Section 401 of the CWA gives states and authorized tribes authority to assess potential water quality impacts of discharges from federally permitted or licensed projects that may affect navigable waters within their borders. Section 401 is used to help protect water quality while allowing federal permitting and licensing processes to proceed in a timely manner. For Georgia Power, power delivery projects, hydroelectric relicensing, and other projects will require reviews under Section 401.

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill materials into WOTUS, including wetlands. Individual permits are reviewed by the U.S. Army Corps of Engineers (“USACE”). Nationwide permits (“NWP”) are general permits established on a national basis for certain categories of activities to streamline the permitting process some of which require agency coordination through preconstruction notifications. Maintenance and construction of power delivery infrastructure and new or expanded generation projects are a few examples of how Georgia Power can utilize the NWP program.

Resource Conservation and Recovery Act (“RCRA”)

This law governs the generation, transportation, treatment, storage and disposal of solid and hazardous waste. While there are multiple subtitles of the law, the two with the greatest impact to the electric utility industry are Subtitle C and Subtitle D. Subtitle C lays out a comprehensive program for hazardous waste management. Subtitle D outlines criteria for siting, operations, closure and post-closure care of solid waste facilities, including CCR landfills and ash ponds. Both Subtitles allow for state implementation of waste management criteria. Georgia has received approval for state implementation of EPA’s CCR Program Permitting Program from the EPA with the exception of provisions for endangered species.

EPA finalized a rule in April 2015 which regulates CCR under RCRA subtitle D as non-hazardous waste. The final rule was the result of extensive study by EPA of the effects of CCR on human health and the environment and represented a decision by EPA to uphold decades of previous Agency determinations that coal ash should be regulated as non-hazardous waste.

The relevant programs and regulations derived from these laws are discussed in more detail in the following sections.

3.2 Notable Regulatory Related Events

Georgia Power tracks environmental regulatory developments on an ongoing basis to anticipate and determine any impacts to Company operations. With the change in presidential administration in 2021, the direction and priorities of environmental policies are significantly shifting. The following section highlights the EOs from the Biden Administration that outline its environmental policy strategies and provides a timeline of recent and anticipated regulatory events.

Regulatory Review

Since assuming office in early 2021, President Biden has issued several statements and an EO pertaining to the review and potential repeal, replacement, or modification of federal actions and regulations, marking a change in direction on environmental policies from the previous administration.

On January 20, 2021, President Biden issued a statement accepting the full terms of the Paris Agreement on behalf of the United States, after the withdrawal by the previous administration. On that same day, President Biden also signed EO 13990 titled, “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis.” The EO established a goal to publish a social cost of greenhouse gases (“SC-GHGs”) for use by all federal agencies, also ordering that the SC-GHGs adequately take into account environmental justice. The EO ordered all executive departments and agencies to immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of Federal regulations and other actions during the last four years that are deemed to conflict with the national objectives to promote and protect public health and the environment.

On January 27, 2021, President Biden issued EO 14008, “Tackling the Climate Crisis at Home and Abroad,” which includes the following topics, goals, and/or the associated actions that have been taken so far:

- Put the Climate Crisis at the Center of US Foreign Policy and Nation Security:
 - Exercise U.S. leadership to promote global ambition through short term global emissions reductions and net zero global emissions by mid-century or before.
 - Hosted a Leaders’ Climate Summit on Earth Day on April 22, 2021, where President Biden announced the updated United States nationally determined contribution (“NDC”), a requirement under the Paris Agreement, committing to achieving an economy-wide greenhouse gas (“GHG”) emission reduction target of 50-52% from 2005 levels by 2030.
- Take a Government-Wide Approach to the Climate Crisis:
 - Established the White House Office of Domestic Climate Policy, led by the first ever National Climate Advisor (Gina McCarthy) and Deputy National Climate Advisor (Ali Zaidi) and their staff.
 - Established the National Climate Task Force, with 22 members, to enable a whole of government approach to combatting climate crisis.
- Use the Federal Government’s Buying Power and Real Property and Asset Management:
 - Directed the establishment of a plan, within 90 days, that revitalizes the Federal Government’s sustainability goals and uses all available procurement authorities to achieve or facilitate a carbon pollution-free electric sector no later than 2035 and clean and zero-emission vehicles for Federal, State, local, and Tribal government fleets.

- Direct federal agencies to eliminate by 2022 fossil fuel subsidies and identify opportunities to spur innovation and deployment of clean energy technologies and infrastructure.
- Empower Workers Through Revitalizing Energy Communities:
 - Established the Interagency Working Group focused on revitalizing the economies of fossil fuel and power plant communities, including projects that reduce emissions from existing and abandoned infrastructure and prevent environmental damage.

In December 2021, President Biden issued EO #14057 “Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability” establishing a net-zero carbon goal for the federal government to meet by 2050. This EO builds on the earlier climate action commitments by the administration outlined above. The EO includes the following topics, goals, and/or the associated actions:

- Electricity: Each agency shall increase the percentage use of carbon pollution-free electricity to reach 100 percent of facility electrical energy use on a net annual basis by 2030, each agency shall seek to match use on an hourly basis to achieve 50 percent of 24/7 carbon pollution-free electricity, by fiscal year 2030.
- Vehicles: 100 percent zero-emissions vehicle acquisitions by 2035, including 100 percent zero-emission light-duty vehicle acquisitions by 2027.
- Buildings: A net-zero emissions building portfolio by 2045, including a 50 percent emission reduction by 2032.
- Emissions: A 65 percent reduction in scope 1 and scope 2 GHG emissions from Federal operations by 2030 as compared to 2008 levels.
- Supplier Emissions Tracking: And net-zero emissions from Federal procurement, climate resilient infrastructure and operations, and climate- and sustainability-focused federal workforce.
- Environmental Justice: Recommends agencies consider incorporating the Justice40 Initiative on how federal investments might be made toward the goal that 40 percent of overall benefits flow to disadvantaged communities.

While many of the actions outlined in these EOs are still under development, the administration has set in motion policies and regulatory actions to implement more stringent environmental requirements and constrain carbon emissions in the future. The shifts in environmental policy can be seen in the following timeline of environmental regulatory events.

Environmental Regulatory Timeline

The following is a list of notable environmental regulatory events since the 2019 IRP through January 15, 2022, that are relevant to the electric sector.

Air

- February 2019 – EPA proposes to reconsider the 2016 supplementing finding on MATS costs and conduct the MATS Residual Risk and Technology Review (“RTR”).
- March 2019 – EPA finalizes retaining the primary 1-hour SO₂ NAAQS, without revision.
- April 2019 – EPA proposes the RTR of the National Emission Standards for Hazardous Air Pollutants (“NESHAP”) for combustion turbines.
- July 2019 – EPA finalizes a repeal of the Clean Power Plan (“CPP”) and replaces it with the ACE rule.
- August 2019 – EPA releases final guidance on developing plans to address visibility impairment for the second implementation period of the Regional Haze program.
- August 2019 – D.C. Circuit Court upholds 2015 primary ozone NAAQS but remands the secondary standard.
- September 2019 – D.C. Circuit Court dismisses the CPP litigation as moot following EPA’s repeal of the CPP and replacement with ACE.
- October 2019 – Georgia Power files a motion to intervene in support of EPA in the ACE litigation.
- March 2020 – EPA finalizes the RTR of the NESHAP for combustion turbines.
- May 2020 – EPA published the final reconsideration of the 2016 MATS supplemental finding and the MATS RTR.
- June 2020 – EPA released a proposed rule, “Increasing Consistency and Transparency in Considering Benefits and Costs in the Clean Air Act Rulemaking Process” establishing certain processes related to benefit-cost analyses that EPA will undertake when promulgating significant regulations under the CAA.
- August 2020 – EPA grants a petition for reconsideration of certain aspects of the 2020 combustion turbines NESHAP RTR.
- October 2020 – EPA publishes changes to guidance concerning the inclusion of provisions governing periods of startup, shutdown, and malfunction (“SSM”) in SIPs.
- October 2020 – EPA published a proposal to revise the 2016 Cross-State Air Pollution Rule (“CSAPR Update Rule”) in response to the D.C. Circuit’s remand of the CSAPR Update Rule.
- November 2020 – The U.S. officially exits the Paris Agreement.
- December 2020 – EPA published a final rule on NAAQS for PM, retaining all PM standards.
- December 2020 – EPA finalized Round 4 designation for the 2010 SO₂ NAAQS and designated Floyd County as Attainment/Unclassifiable.
- December 2020 – EPA published a final rule “Increasing Consistency and Transparency in Considering Benefits and Costs in the Clean Air Act Rulemaking Process” that establishes certain processes related to benefit-cost analyses that EPA will undertake when promulgating significant regulations under the CAA.

- December 2020 – EPA published a final rule to retain the primary and secondary Ozone NAAQS.
- January 2021 – EPA published a framework, “Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, and Process for Determining Significance of Other NSPS Source Categories” for determining when standards are appropriate for GHG emissions under CAA section 111.
- January 2021 – The D.C. Circuit vacated and remanded the ACE rule back to EPA.
- January 2021 – President Biden issued a number of statements and EOs, including reentering the Paris Agreement, reviewing regulations issued during the Trump Administration, and commitments to address climate change and other environmental issues.
- February 2021 – The D.C. Circuit granted EPA’s motion to hold the final 2020 MATS rule litigation in abeyance.
- February 2021 – EPA, as part of the Interagency Working Group on the Social Cost of GHGs, released interim updates to the social cost of GHGs with a starting value of \$51/ton CO₂.
- April 2021 – The D.C. Circuit issued an order granting EPA’s motion to vacate the EPA published framework, “Pollutant-Specific Significant Contribution Finding for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, and Process for Determining Significance of Other NSPS Source Categories” for determining when standards are appropriate for GHG emissions under CAA section 111.
- April 2021 – President Biden announced the updated U.S. NDC under the United Nations’ Paris Agreement.
- April 2021 – A coalition of States (including Georgia) and the North American Coal Corporation filed petitions asking the Supreme Court to review the D.C. Circuit’s decision to vacate and remand the ACE Rule.
- May 201 – EPA rescinds “Increasing Consistency and Transparency in Considering Benefits and Costs in the Clean Air Act Rulemaking Process”.
- May 2021 – EPA published a proposed rule, “Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act” developing an allocation and trading program and procedures intended to reduce the production and consumption of hydrofluorocarbons (“HFCs”) by 85 percent by 2036.
- May 2021 – The White House Office of Management and Budget (“OMB”) published a notice of availability and request for comments on the interim values for the social cost of carbon, methane, and nitrous oxide.
- June 2021 – EPA announced that it is reconsidering the decision to retain the primary and secondary NAAQS for PM published on December 18, 2020.
- July 2021 – EPA released a memorandum updating its position on guidance regarding the development, submittal, and review of SIPs for the Regional Haze second planning period.

- August 2021 – EPA sent a proposal to revise the 2020 MATS rule to the OMB for regulatory review.
- September 2021 – Environmental groups filed a suit in Northern District of California suing EPA to force action on pending 2015 SSM SIP Call revisions.
- September 2021 – EPA released a memorandum withdrawing its October 2020 guidance that approved certain SSM provisions in SIPs and reinstated the Agency’s prior position as articulated in the 2015 SSM SIP Call.
- October 2021 – EPA published a final rule, “Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act,” developing an allocation and trading program and procedures intended to reduce the production and consumption of HFCs by 85 percent by 2036.
- October 2021 – The Supreme Court accepted the petition made by a coalition of industry and states to consider the D.C. Circuit’s ruling that vacated the ACE rule.
- October 2021 – EPA announced it will reconsider the December 2020 decision to retain the primary and secondary 8-hour ozone NAAQS.
- November 2021 – EPD proposed to request the redesignation of the Atlanta area as attaining the 2015 8-hour Ozone NAAQS
- November 2021 – EPA proposed a new Clean Air Act rule, “Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review,” that would lead to significant reductions in methane emissions from new, modified, and reconstructed oil and natural gas sources.
- December 2021 – The D.C. Circuit Court reactivated the SSM SIP Call litigation and set an expedited supplemental briefing schedule.
- January 2022 – EPA published in the Federal Register that 12 states and local air pollution control agencies, including Alabama, failed to submit SIP revisions as required by the 2015 SSM SIP call.

Water

- February 2019 – The Supreme Court announced that it had granted certiorari to the petitioners in *County of Maui v. Hawaii Wildlife Fund*.
- April 2019 – The U.S. Court of Appeals for the Fifth Circuit vacated portions of the 2015 ELG Rule regulating combustion residual leachate and legacy wastewater and remanded them to EPA for reconsideration.
- August 2019 – The U.S. Court of Appeals for the Fifth Circuit ruled that EPA had the statutory authority to delay the “as soon as possible” compliance date for FGD wastewater and bottom ash transport water from the 2015 ELG rule until November 1, 2020.
- October 2019 – EPA and USACE (“the agencies”) published a final rule to repeal the 2015 “Clean Water Rule: Definition of ‘Waters of the United States’” and to restore the regulatory text that existed prior to the 2015 Clean Water Rule
- November 2019 – EPA published the proposed ELG-related “Steam Electric Reconsideration Rule” (“ELG Reconsideration Rule”) establishing revised

technology-based ELGs and applicability dates for bottom ash transport water and FGD wastewater.

- April 2020 – The Supreme Court issued its decision in *County of Maui v. Hawaii Wildlife Fund* that the CWA requires a permit for both a direct discharge from a point source and where pollutants from a point source reach navigable waters after passing through groundwater if the facts demonstrate the “functional equivalent of a direct discharge.”
- April 2020 – EPA and USACE published “The Navigable Waters Protection Rule: Definition of “Waters of the United States”, revising the definition of WOTUS under the CWA.
- July 2020 – EPA and USACE published a final rule, “Clean Water Act Section 401 Certification Rule,” addressing procedural requirements for water quality certification under Clean Water Act Section 401.
- October 2020 – EPA published the final ELG Reconsideration Rule establishing revised technology-based effluent limits and applicability dates for bottom ash transport water and FGD wastewater.
- November 2020 – Several environmental groups filed petitions challenging the ELG Reconsideration Rule, which were ultimately consolidated in the U.S. Court of Appeals for the Fourth Circuit.
- January 2021 – EPA and the USACE published the final rule, “Reissuance and Modification of Nationwide Permits” including 16 nationwide permits for CWA Section 404 Permitting for impacts to jurisdictional wetlands and waterways.
- January 2021 – EPA published their guidance “Applying the Supreme Court’s *County of Maui v. Hawaii Wildlife Fund* Decision in the Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit Program”.
- May 2021 – A coalition of environmental groups sued the USACE to vacate the newly reissued Nationwide Permit 12 (“NWP 12”).
- June 2021 – The U.S. Court of Appeals for the Fourth Circuit granted DOJ’s motion to extend the abeyance of the case on the ELG Reconsideration Rule until July 24, 2021.
- June 2021 – EPA published the Notice of Intent to Reconsider and Revise the Clean Water Act Section 401 Certification Rule.
- June 2021 – EPA published their regulatory agenda indicating a new rule making for reviewing and potentially revising ELGs for legacy wastewater and combustion residual leachate.
- July 2021 – The District of South Carolina granted the government’s request for a voluntary remand of the Navigable Waters Protection Rule (“NWPR”) without vacatur in *South Carolina Coastal Conservation League v. EPA* and dismissed the environmental groups’ lawsuit.
- August 2021 – EPA published its decision to undertake a notice-and-comment rulemaking to determine whether more stringent ELG limitations and standards are appropriate for FGD wastewater and bottom ash transport water.
- August 2021 – U.S. District Court for the District of Arizona vacated and remanded the 2020 NWPR. The EPA and USACE announced they are abandoning the

NWPR and will interpret WOTUS consistent with the framework in place prior to 2015.

- September 2021 – EPA rescinded the guidance document “Applying the Supreme Court’s County of Maui v. Hawaii Wildlife Fund Decision in the Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit Program.”
- December 2021 – EPA and the USACE published proposed rule, “Revised Definition of ‘Waters of the United States,’” to revise the NWPR.
- December 2021 – USACE published in Federal Register a final rule reissuing 40 existing NWP’s and one new NWP. The 41 NWP’s will take effect on February 25, 2022.

Land

- January 2019 – The U D.C. Circuit Court granted the Government’s motion in the CCR Rule Phase 1, Part 1 litigation, extending the timeframe for the filing of briefs in the case.
- February 2019 – Final comments were filed in response to the CCR Rule Phase 1, Part 1 litigation.
- March 2019 – The D.C. Circuit Court denied environmental groups’ motion to vacate or stay certain deadlines under the CCR rule and granted EPA’s motion seeking a remand of the rule.
- March 2019 – EPA publishes CCR Rule Final Phase 1, Part 2 Rule.
- April 2019 – EPA released its interpretive statement, “EPA Interpretative Statement on The Application of the NPDES Program to Releases of Pollutants from Point Sources to Groundwater” on the issue of hydrologically-connected groundwater.
- June 2019 – EPA published proposed partial approval of Georgia’s state CCR permit program and published to the Federal Register.
- July 2019 – The D.C. Circuit Court denied environmental groups’ challenge to the final Definition of Solid Waste rule for the RCRA hazardous waste program.
- August 2019 – EPA held a public meeting in Atlanta, GA regarding approval of Georgia EPD’s CCR program.
- August 2019 – EPA published a proposed CCR rule, “Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Enhancing Public Access to Information; Reconsideration of Beneficial Use Criteria and Piles” to address beneficial use, alternate groundwater protection standards, and groundwater reporting.
- August 2019 – EPA published its proposed rule CCR Rule Phase 2 amendments.
- September 2019 – EPA sent the proposed Federal CCR Permit Program to OMB for review.
- November 2019 – EPA releases its proposed rule “Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; A Holistic Approach to Closure Part A: Deadline To Initiate Closure” for the CCR Rule Part A Closure Rule Revised initiation of closure for unlined impoundments from October 2020 to August 31, 2020.

- January 2020 – EPA approves Georgia EPD’s CCR Program Permitting Program under the Water Infrastructure Improvements for the Nation Act (“WIIN Act”).
- February 2020 – EPA published a proposal establishing a Federal Permitting Program for CCR.
- March 2020 – EPA publishes proposed “Hazardous and Solid Waste Management System: Disposal of CCR; Holistic Approach to Closure Part B: Alternate Demonstration for Unlined Surface Impoundments; Implementation of Closure” and comments due April 17, 2020.
- March 2020 – Earthjustice requests comment period extension of the federal CCR permit program due to COVID-19 Pandemic. EPA granted extension to August 7, 2020.
- August 2020 – EPA published the final rulemaking “Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; A Holistic Approach to Closure Part A: Deadline To Initiate Closure”.
- September 2020 – EPA sends final “Disposal of CCR; Holistic Approach to Closure: Part B” to OMB for interagency review.
- October 2020 – EPA published an Advanced Notice of Proposed Rulemaking (“ANPRM”) applicable to inactive CCR surface impoundments located at inactive electricity generation facilities, or “legacy impoundments.”
- November 2020 – EPA finalized “Hazardous and Solid Waste Management System: Disposal of CCR; A Holistic Approach to Closure Part B: Alternate Demonstration for Unlined Surface Impoundments.”
- December 2020 – EPA published a Notice of Data Availability and request for comment related to the beneficial use and temporary storage of CCR.
- March 2021 – The D.C. Circuit Court granted environmental groups’ unopposed motion to voluntarily dismiss their February 11, 2021, petition for review of EPA’s final CCR “Part B” Rule.
- March 2021 – EPA reopened the comment period on the Notice of Data Availability pertaining to beneficial use criteria and temporary storage of CCR.
- June 2021 – EPA will not reconsider the previous administration’s final CCR rules after review of these rules per EO 13990. These rules included:
 - Phase One, Part One (cease receipt of waste deadline extended to October 31, 2020)
 - Part A (cease receipt of waste deadline extended from October 31, 2020 to April 11, 2021)
 - Part B (provides ability to continue operating with clay liner systems)
- January 2022 - EPA published proposed determinations for the CCR Rule Part A for nine facilities across the Midwest and Northeast which had requested extensions for compliance. In these determinations, EPA provides new positions regarding closure performance standards for closure in place requirements in its 2015 rule. The Company is in the process of reviewing the new information provided in EPA’s determinations.

Other Considerations

- June 2019 – The Council on Environmental Quality released draft National Environmental Policy Act guidance regarding consideration of GHG emissions by federal agencies in environmental assessments and impact statements.
- July 2020 – Council on Environmental Quality published a final rule *Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act* (“NEPA”).
- December 2020 – The U.S. Fish and Wildlife Service (“USFWS”) and the National Marine Fisheries Service (“NMFS”) published a final rule defining “habitat” under the Endangered Species Act (“ESA”).
- December 2020 – The USFWS published a final rule revising the ESA Section 4(b)(2) which outlines the framework for analysis of whether to exclude certain areas when designating critical habitat.
- February 2021 – Environmental groups sent the USACE a notice of intent to sue for ESA violations in connection with the January 2021 issuance, reissuance, and modification of 16 nationwide permits.

3.3 Future Key Environmental Regulatory Events

The following is a summary of upcoming key environmental developments expected to occur in the next few years. The Company evaluates new regulations and events on an ongoing basis and incorporates any additional information into the strategy process to optimize compliance plans as needed.

Air

- Interagency Working Group, including EPA, expected to release a more complete update of the social cost of GHGs in early 2022.
- Georgia EPD is expected to submit a state plan to EPA for the second-round Regional Haze Rule evaluation, which includes Plant Bowen, in mid-2022.
- EPA is expected to review and, if appropriate, propose revisions to the PM NAAQS in mid-2022.
- EPA is expected to review and, if appropriate, propose revisions to the ozone NAAQS in late 2022.
- EPA is expected to propose rules reconsidering the MATS Supplemental Cost finding and Risk and Technology Review in early and mid-2022 respectively.
- EPA is expected to develop greenhouse gas emission guidelines for existing electric generating units to replace the vacated ACE rule, in mid-2022.
- EPA is expected to review and potentially revise GHG standards for new, modified and reconstructed electric generating units, in mid-2022 with a potential final rule in mid to late 2023.
- EPA is expected to review and potentially revise GHG standards for existing sources in mid-2022 with a potential final rule in mid to late 2023.
- EPA is expected to act on SSM SIPs for states, while the D.C. Circuit Court is expected to rule on challenges to the SSM SIP Call rule in mid-2022.
- EPA is expected to reconsider portions of CT NESHAP RTR in 2022.

Water

- EPA is expected to propose an updated ELG rule in the fall of 2022 to determine whether more stringent ELGs are appropriate for FGD wastewater and bottom ash transport water. Permitting authorities are expected to continue to implement the 2020 ELG Reconsideration Rule while the EPA undertakes a new rulemaking.
- EPA is required to revise the ELGs for legacy wastewater and combustion residual leachate with a proposed rule scheduled by September 2022 and a final rule by September 2023.
- EPA is expected to propose a rule revising the Clean Water Act Section 401 Certification Rule in mid-2022.
- Georgia EPD reissued the NPDES permit for Plant Bowen in 2021 and is expected to reissue the NPDES permit for Plant Scherer in 2022. These permits address amongst other things, the ELG implementation schedule for both bottom ash transport water (“BATW”) and FGD wastewater.

Land

- Georgia EPD is currently reviewing CCR permit applications initially submitted in November 2018 and expected to issue additional CCR permits in 2021 continuing through 2023.
- EPA is expected to finalize the previously proposed amendment “Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; A Holistic Approach to Closure Part B: Implementation of Closure” in 2022. The amendment would modify closure by removal requirements to allow additional time to meet groundwater performance requirements as well as the ability to beneficially use CCR for purposes of impoundment closure.
- EPA is expected to finalize the Federal CCR Permit Program in 2022.
- Georgia EPD has initiated a proposed rule change to the Georgia CCR Rule in order to incorporate updates in the Federal CCR Rule.

Other Considerations

- The USFWS and the NMFS are expected to revise, rescind, or reinstate five ESA regulations finalized by the previous administration in 2022.
- The Council on Environmental Quality is expected to review the 2020 NEPA regulations in a two phased approach, with the first phase final rule expected mid-2022 and a proposed phase two rule expected in mid-2022.

3.4 Federal and State Detailed Regulatory, Legislative, and Judicial Review

Environmental compliance and regulation for Georgia Power is principally governed by EPA, EPD, and other state and federal authorities. The major environmental laws and regulations impacting Georgia Power, including 2020 and 2021 legislative activities, regulatory, or judicial developments, are detailed in this section.

3.4.1 New Source Review

New Source Review (“NSR”) is a pre-construction permitting program under the CAA that is required of new sources or can be triggered by changes to an existing emissions source (e.g., electric generating unit) that result in a “significant” increase of a regulated NSR pollutant. While the NSR program was established by the 1977 CAAA, NSR regulations, EPA’s interpretation of the requirements, and EPA’s NSR guidance have changed over time. While the Trump Administration stated that NSR regulatory reform was a priority, the regulations finalized by EPA during that time were generally not impactful to the electric utility industry. Under the Biden Administration, EPA’s priorities under NSR are not yet clear.

In 1999, under a broad nationwide enforcement initiative, EPA brought a civil action in the U.S. District Court for the Northern District of Georgia against Georgia Power, alleging that these subsidiaries had violated the NSR provisions of the CAA and related state laws at certain coal-fired generating facilities. The civil action sought penalties and injunctive relief, including an order requiring installation of the best available control technology at the affected units. The case against Georgia Power was administratively closed in 2001 and has not been reopened.

3.4.2 Acid Rain Program

The Acid Rain Program sets a cap on SO₂ emissions from power plants by allocating a fixed number of allowances to each unit subject to the program. At the end of each year, a unit must surrender allowances in an amount equal to the number of tons of SO₂ emitted. Unused allowances may be sold to offset the cost of compliance or saved, i.e., banked, for future use. Initial allowance allocations were received in 1995 when Phase I of the program began. When Phase II began in 2000, the number of allowances available was reduced to limit SO₂ emissions to 50% below 1980 levels by 2010. The regulations also set emission rate limitations on NO_x emissions, which can be met by individual units or by a group of units under an averaging plan.

3.4.3 National Ambient Air Quality Standards

The CAA specifically requires EPA to review the primary and secondary NAAQS every five years and to revise them as necessary. These reviews have resulted in multiple, significant changes to the ozone and PM NAAQS, the addition of short-term primary SO₂ and nitrogen dioxide (“NO₂”) NAAQS, and other air quality standards updates. Implementing these standards is generally a state responsibility; however, EPA has also issued rules, such as the NO_x SIP Call, CAIR, and CSAPR, that deal with the transport of pollutants on a regional or multi-state basis to facilitate attainment with the NAAQS.

Ozone

Ozone is formed by a chemical reaction in the atmosphere between NO_x and volatile organic compounds (“VOCs”). This reaction is driven by sunlight, and thus ozone formation is typically much more significant during the summer months. In 1979, EPA put into place an air quality standard on 1-hour ozone concentrations of 120 parts per billion. Subsequently, the Agency replaced the 1-hour standard with an 8-hour standard of 80

ppb in 1997, which was lowered to 75 ppb in 2008. For each ozone standard, portions of the Atlanta metropolitan area were designated as nonattainment during implementation. However, those areas have since been redesignated to attainment for the 1979, 1997, and 2008 standards.

In October 2015, EPA lowered the 8-hour primary and secondary standard from 75 to 70 ppb. Multiple parties challenged the standards as either too stringent or not stringent enough. In August 2019, the Court of Appeals for the District of Columbia Circuit upheld the health-based primary standard but remanded to EPA the welfare-based secondary standard for additional explanation. EPA was required to complete the next review of the ozone standards by October 2020 to meet the statutory deadline and, in December 2020, EPA issued a final rule to retain the current standards for ozone without revision based on EPA's review of the air quality criteria and the NAAQS. EPA stated that the final rule addresses the D.C. Circuit's remand of the secondary standard. All areas in Alabama and Georgia, except the Atlanta area, are designated as in attainment with the current standards. Ambient air quality monitoring showed the Atlanta area attaining the standards in 2020. On November 17, 2021, EPD proposed a revision to the Georgia SIP to request that the Atlanta area be redesignated as attaining the 2015 8-hour Ozone NAAQS. This proposed revision is expected to be submitted for EPA approval in early 2022.

As a result of President Biden's EO 13990, EPA announced in October 2021 that it intends to reconsider the 2020 ozone NAAQS to determine whether more stringent standards should be adopted. EPA stated the reconsideration is expected to conclude by the end of 2023.

Particulate Matter ("PM")

In 1997, EPA revised the PM NAAQS to add fine particulate matter, i.e., PM_{2.5}, as an indicator for the standard, while previous standards were based on particulate matter that was inclusive of larger size particles. The first PM_{2.5} standards were set at a level of 15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) on an annual average and 65 $\mu\text{g}/\text{m}^3$ on a 24-hour average. In 2005, several areas within Georgia were designated as nonattainment for the PM_{2.5} annual standard, including the Atlanta, Floyd County, Macon, and Chattanooga areas. All areas in Georgia have since been redesignated to attainment for the 1997 PM_{2.5} annual standard.

In September 2006, EPA retained the annual standard but lowered the 24-hour standard from 65 $\mu\text{g}/\text{m}^3$ to 35 $\mu\text{g}/\text{m}^3$. In 2009, all areas in Georgia were designated as attainment for the more stringent 24-hour standard.

In December 2012, EPA lowered the annual standard for PM_{2.5} to 12 $\mu\text{g}/\text{m}^3$. In April 2015, most areas in Georgia were designated as attainment for the more stringent annual standard and one year later, EPA designated the remaining areas as attainment for the 2012 standard after the state of Georgia collected additional monitoring data.

In December 2020, EPA published a final rule to retain the particulate matter NAAQS last updated in 2012, without revision. All areas in Georgia and Alabama continue to be in attainment with the current standards.

In June 2021, EPA announced that it is reconsidering the December 2020 decision to retain the primary and secondary NAAQS for PM because it now believes the standards may not be protective enough. EPA expects to issue a proposed rulemaking in Summer 2022 and a final rule in Spring 2023.

NO₂ and SO₂

In 2010, EPA significantly revised the NO₂ and SO₂ NAAQS to include new primary 1-hour standards. No areas in Georgia or Alabama were designated as nonattainment for NO₂, and the main impact of the more stringent NO₂ standard has been on modeling requirements related to permitting of new facilities. For SO₂, beginning in 2012, EPA embarked on a stepwise approach to making initial area designations for the 2010 standard, ultimately concluding the process in 2020 and resulting in no areas in Georgia or Alabama designated as nonattainment.

In April 2018 and March 2019, respectively, EPA retained the primary NO₂ and SO₂ standards, without revision.

3.4.4 CSAPR

In July 2011, EPA released the final CSAPR Rule (40 CFR Part 97), which has replaced previous interstate transport rules such as the CAIR and the NO_x Budget Trading Program. The final rule applied to 27 states, including Georgia and Alabama. CSAPR established annual allowance trading programs for SO₂ and NO_x to reduce transport of fine particulate matter under the 1997 NAAQS and a separate ozone season NO_x allowance trading program to reduce ground-level ozone under the 1997 standard. However, in a significant departure from past federal allowance trading programs, CSAPR only allowed for limited interstate trading. The rule divided states into two groups for purposes of SO₂ allowance trading – Group 1 and Group 2 and prohibited trading across the two groups. In addition, CSAPR established SO₂ and NO_x emissions budgets for each affected state, but CSAPR prohibited states from exceeding their state-wide budgets by more than a set percentage, referred to as the “variability limit.”

In August 2012, the D.C. Circuit Court vacated and remanded CSAPR and directed EPA to continue administering CAIR pending completion of a remand rulemaking to replace CSAPR with a valid rule. In October 2014, the D.C. Circuit Court granted an EPA motion to lift the stay of CSAPR and toll the compliance deadlines by three years, so that CSAPR's Phase 1 emission budgets would apply in 2015 and Phase 2 emission budgets would apply in 2017 and subsequent years. This reinstatement of CSAPR replaced CAIR.

In September 2016, EPA finalized the Cross State Air Pollution Rule Update (“CSAPR Update Rule”) to address interstate transport related to the 2008 ozone NAAQS, creating two groups for ozone allowances. Georgia was the only state remaining in Group 1, which

means allowance allocations were unchanged but facilities in Georgia could no longer trade allowances outside of the state. Alabama was among 22 states placed in Group 2 that could trade with each other but had allowance allocations reduced as a result of the CSAPR Update Rule. In October 2020, EPA issued a proposal to revise the CSAPR Update Rule in response to the D.C. Circuit Court of Appeal's decision to remand the rule back to EPA. Alabama's emissions budget remains unchanged, and this rule does not include Georgia, which is covered in Group 1. However, the revision led to the creation of Group 3 and a reduction in the number of states in Group 2, which may affect the allowance market for both groups.

In October 2021, EPA published a Federal Register notice announcing that the Agency has proposed a consent decree with several environmental groups related to the 2015 ozone NAAQS. The proposed consent decree would establish deadlines for EPA to act on 32 SIP submissions, including Alabama and Georgia, addressing interstate pollution transport for the 2015 ozone NAAQS. On December 1, EPA issued a final rule approving interstate transport provisions for the 2015 8-Hour ozone standard for Georgia but has not yet acted on the Alabama SIP. EPA's most recent regulatory agenda indicates that it may issue a proposed rule addressing interstate transport related to the 2015 ozone standard in March of 2022, which would likely not affect states like Georgia for which these requirements are already resolved.

3.4.5 Mercury and Air Toxics Standards for Coal-Fired EGUs

EPA issued the MATS Rule (40 CFR Part 63 Subpart UUUUU) under Section 112 of the CAA. The MATS Rule, which was finalized in April 2012, is a technology-based command-and-control rule that regulates mercury, acid gases and certain metal emissions from coal- and oil-fired electric generating units. MATS establishes stringent emission limits based on Maximum Achievable Control Technology for hazardous air pollutants. While the rule contains limited emissions averaging provisions, in general, the limits must be met on a unit-by-unit basis. The compliance deadline for existing sources was April 16, 2015, with the possibility of extensions granted on a case-by-case basis.

In April 2016, EPA published a final rule finding that it is appropriate and necessary to regulate hazardous air pollutants from coal and oil-fired electric generating units to address the Supreme Court's June 2015 decision that EPA did not appropriately consider the cost of compliance with the MATS rule before deciding whether the regulation was "appropriate and necessary." EPA concluded that a consideration of cost does not cause them to change the determination that regulation of HAP emissions from EGUs is appropriate and necessary.

In May 2020, EPA changed course and published a final rule *Reconsideration of Supplemental Finding and Residual Risk and Technology Review* ("RTR"). The rule concludes that the 2016 action was made in error and that it is not "appropriate and necessary" to regulate hazardous air pollutant emissions from EGUs under the CAA after all. However, EPA did not remove EGUs from the list of sources that are regulated under Section 112; therefore, EPA concluded that the MATS standards must remain in place.

Also, EPA concluded in the RTR that the remaining risk did not warrant additional standards and a technology review did not identify any new control technologies that would further reduce emissions beyond the original standard. This rule was challenged in the D.C. Circuit and was subsequently included in the list of regulations the Biden Administration directed EPA to review.

In February 2021, the D.C. Circuit granted EPA's motion to hold in abeyance the challenges to the 2020 final rule pending the Agency's review of the 2020 rule in accordance with the Biden Administration's policies. The litigation challenging the 2016 MATS Supplemental Cost Finding remains in abeyance in the D.C. Circuit. Georgia Power is a party to that litigation. In August 2021, EPA submitted a proposal reconsidering the 2020 final rule, *Reconsideration of Supplemental Finding and RTR*, to the White House OMB for regulatory review.

3.4.6 Combustion Turbine Maximum Achievable Control Technology

Simple-cycle and combined-cycle combustion turbines can also be subject to existing requirements under MACT rules. In March 2004, EPA issued a final MACT rule for combustion turbines (40 CFR Part 63 Subpart YYYY), setting standards for HAP emissions, such as formaldehyde, toluene, benzene and acetaldehyde from new gas and oil-fired combustion turbines. In August 2004, EPA issued a stay for new sources for gas-fired turbine subcategories of the rule because of ongoing deliberation about whether gas-fired units should be regulated. EPA viewed this action as necessary to avoid wasteful and unwarranted expenditures on the installation of emission controls that would otherwise not be required if these gas-fired sub-categories were delisted.

In March 2020, EPA finalized a RTR for combustion turbines, leaving the existing standards largely unchanged. In the final rule, EPA determined that the risks from this source category of emissions are acceptable and that the existing NESHAP provides an ample margin of safety to protect public health. EPA also determined that no new cost-effective controls under the technology review would achieve further emissions reductions from the source category.

Contrary to the proposal, EPA did not lift the stay of the standards for new gas-fired turbines that has been in effect since the agency proposed to delist the subcategory in 2004. Therefore, the stay of the standards for new gas-fired turbines remains in place.

In August 2020, EPA granted a petition for reconsideration of the final Stationary Combustion Turbines Residual Risk and Technology Review. EPA intends to address the issues raised in the petition, including: 1) the stay of the emission standards for new gas-fired turbines, and 2) in light of the decision of the U.S. Court of Appeals for the District of Columbia Circuit in *Louisiana Environmental Action Network v. Environmental Protection Agency*, 955 F.3d 1088(D.C. Cir. 2020), the lack of standards for certain hazardous air pollutants not currently covered by the rule.

3.4.7 Regional Haze Rule

The Regional Haze Rule (40 CFR § 51.308) was finalized in July 1999 with the goal to improve visibility conditions in specified federal Class I areas, including primarily national parks and wilderness areas, back to natural conditions by 2064. The rule requires states to develop a SIP to determine and address any SO₂ or NO_x emissions control measures necessary to make reasonable progress toward natural visibility conditions for each 10-year planning period. The first implementation period involved the application of best available retrofit technology (BART) requirements, which was determined to be satisfied for power plants by CSAPR requirements for SO₂ and NO_x.

In January 2017, EPA finalized revisions to the second planning period under the Regional Haze Rule, which covers through 2028. These revisions include the extension of the deadline for the next SIP submittal from July 2018 to July 2021 and increased requirements for state consultations with Federal Land Managers. In addition to this rulemaking, EPA has released guidance documents for Regional Haze SIP development for the second implementation period in 2016, 2019, and 2021, changing course in at least certain elements each time.

For the Regional Haze Rule, Georgia EPD has ongoing participation in a regional planning organization for the Southeast U.S., which has assessed ambient air quality data for the 2028 planning period. Based on this analysis, in July 2020, Georgia EPD selected Plant Bowen for further evaluation of SO₂ emissions to determine whether additional control measures are required to make reasonable progress toward achieving the program's goals. Georgia Power submitted the Regional Haze four-factor analysis for Plant Bowen in November 2020, recommending that no additional SO₂ emission controls were necessary. Regional Haze SIPs for the 2028 planning period were due to EPA by July 2021. Georgia EPD, along with a majority of states, did not meet this deadline and is expected to submit a SIP submission in mid-2022.

3.4.8 Georgia Multipollutant Rule and Georgia SO₂ Emissions Rule

In response to federal environmental rules as well as state-specific objectives, the state of Georgia implemented a set of state rules governing emissions from coal-fired power plants. The Georgia Multipollutant Rule (391-3-1-.02(2)(sss)) was finalized in June 2007, while the Georgia SO₂ Emissions Rule (391-3-1-.02(2)(uuu)) was finalized in January 2009.

The Georgia Multipollutant Rule was designed to reduce emissions of mercury, SO₂, and NO_x state-wide by requiring installation of specified control technologies on all of the larger coal-fired electric generating units by specific dates originally set between December 31, 2008, and June 1, 2015. Specified controls included flue gas desulfurization scrubbers, SCRs, and baghouses.

The Georgia SO₂ Emissions Rule was designed to be a companion rule to the Georgia Multipollutant Rule. The rule requires reduction of SO₂ emissions by 95% from all units required to install FGDs under the Georgia Multipollutant Rule, except Plant Yates Unit 1

where a 90% reduction was required. The rule required compliance beginning in January 2010 for units with FGDs in operation and requires reductions from the remaining units at dates that align with or are close to the Multipollutant Rule compliance dates.

In June 2011 and April 2013, revisions to both the Georgia Multipollutant Rule and Georgia SO₂ Emissions Rule were approved by the Georgia Department of Natural Resources. These revisions moved up the FGD and SCR compliance dates for certain units and allowed for additional time to install controls at other units in an attempt to streamline the compliance deadlines in the state rules with the new MATS Rule. The revision also provided the option for Plant Yates units to switch to natural gas instead of installing FGDs and SCRs. The control technology for each unit to meet the Multipollutant Rule requirements were outlined in Table 2.10-1 of the 2016 Update to the ECS, found in Docket No. 40161.

3.4.9 Startup, Shutdown and Malfunction SIP Call

In May 2015, EPA took final action on its findings of “substantial inadequacy” of the SIPs of 36 states, including Georgia, and issued a final “SIP Call” requiring the affected states to remove exemptions for excess emissions that occur during periods of startup, shutdown, and malfunction. The Sierra Club petitioned EPA to take this action, primarily based on the arguments that such provisions allow emissions that could cause or contribute to violations of ambient air quality standards and that interfere with or preclude enforcement by agencies and citizens. Georgia Power is a party to ongoing litigation in the D.C. Circuit Court challenging the 2015 SSM Rule.

In November 2016 to address the SIP Call, Georgia EPD submitted a new state SSM rule (391-3-1-.02(2)(a)(11)) to EPA for approval as a revision to the Georgia SIP, setting requirements for work practice standards for periods of startup, shutdown, and malfunction. While the new state rule is final, it does not take effect unless it is approved by EPA, and to date, EPA has not acted on the Georgia SSM SIP submittal.

In 2020, three EPA region offices took action on the SSM rules in the state implementation plans for Texas, North Carolina, and Iowa. Although the actions taken were specific to rules and requirements in each state, each action had the effect of withdrawing the SSM SIP call for those states, reversing the requirement to update or remove the state SSM rules. In October 2020, EPA issued a memorandum providing guidance that exemption provisions and affirmative defenses for SSM periods may be permissible in SIPs under certain circumstances. However, this SSM guidance was withdrawn by EPA in September 2021.

In September 2021, environmental groups filed a legal suit against EPA in the Northern District of California claiming that EPA has failed to act on the SIP revisions required by the 2015 SSM SIP Call, including SIP revisions that were submitted by 29 states and air districts, including Georgia, and has failed to promulgate a Federal Implementation Plan for states, including Alabama, that did not submit a SIP.

In December 2021, the D.C. Circuit Court reactivated the SSM SIP Call litigation at the request of EPA and set an expedited supplemental briefing schedule. With supplemental briefing and oral argument expected to be complete by Spring of 2022, the Court may decide the case by mid-2022.

In January 2022, the EPA published in the Federal Register a formal finding that 12 state and local air pollution control agencies, including Alabama, failed to submit SIP revisions as required by the 2015 SSM SIP call. The finding triggers an obligation under CAA section 110(c) for the EPA to promulgate a Federal Implementation Plan, which would replace existing startup, shutdown, malfunction state regulations, within 24 months.

3.4.10 GHG Policies and Emissions

GHG and Renewable/Clean Energy Legislation

Over the past two decades, the U.S. Congress considered many proposals to reduce GHG emissions and mandate renewable or clean energy. There has been significant activity in Congress on climate-related legislation over the last several years. Topic areas have included: international GHG commitments, carbon tax, clean/renewable energy standards, mitigation/adaptation and resiliency support, low carbon technology support, clean electricity payment program and Build Back Better Framework.

Specifically, an economy-wide carbon tax has been contemplated. These proposals typically impose an initial economy-wide price on carbon, e.g., dollars per ton CO₂, with varying degrees of escalation each year until the proposal's specific national emission reduction targets are achieved. Recently proposed carbon tax legislation, as shown in the table below, have included carbon prices starting at well over \$50 per ton. A 2021 proposal from Rep. Fitzpatrick and Rep. Carbajal starts at \$35, growing at 5% above inflation. Two of the proposals that start at a lower price increase each year, by \$10 or more per year plus inflation, such that the carbon tax quickly surpasses the \$50 per ton threshold in just a few years, as shown in Figure 4-1. The proposals over the last several years with higher carbon prices contrast with programs contemplated during the previous two decades, which typically sought lower initial prices that escalated more gradually.

Table 3-1 Carbon tax legislation proposed in the 117th Congress (2021-2022)

Bill Title	Sponsor	Bipartisan	Starting Year	Initial Tax Rate	Annual Escalation
S.2085 Save our Future Act	Sheldon Whitehouse, Brian Schatz, and 8 cosponsors	N	2023	\$54	6% + inflation
H.R.3039 MARKET CHOICE Act	Brian Fitzpatrick and Salud Carbajal	Y	2023	\$35	5% + inflation
H.R.3311 America Wins Act	John Larson, Eleanor Norton and Stephen Lynch	N	2022	\$59	6% + inflation
H.R.2307 Energy Innovation and Carbon Dividend Act of 2021	Ted Deutch and 88 cosponsors	N	2021	\$15	\$10 + inflation
H.R.2451/ S.685 America's Clean Future Fund Act	Dick Durbin/Marie Newman and 9 cosponsors	N	2023	\$25	\$10 + inflation

Another approach to climate legislation is a clean electricity standard, which does not impose a direct fee on carbon emissions but typically requires utilities to supply an annually increasing percentage of low- and/or zero-emission electricity to end users. This type of program would require significant investment by utilities to meet the standard, potentially resulting in higher costs for electricity.

As with a carbon tax, there have been both Democratic and bipartisan proposals for clean electricity standards. The recent proposals range from 100% clean electricity by 2035 to an 80% emission reduction for the electricity sector by 2050.

Table 3-2 Clean Electricity Standard (CES) Legislation proposed in the 117th Congress (2021-2022)

Clean Electricity Standard Bill	Sponsor	Bipartisan	Target
H.R.1512 CLEAN Future Act	Frank Pallone and 20 cosponsors	N	100% clean electricity by 2035
H.R.3959 American Renewable Energy Act of 2021	Peter Welch and 25 cosponsors	N	70% renewables by 2030
H.R.4153 Clean Energy Future Through Innovation Act of 2021	David McKinley, Kurt Schrader and 2 cosponsors	Y	80% emission reduction by 2050
H.R.4309 Clean Energy Innovation and Deployment Act of 2021	Diana DeGette and 2 cosponsors	N	100% clean electricity by 2050 with accelerator

Greenhouse gas legislative and/or regulatory activity has also occurred that may have indirect impacts on the electric sector. In December 2020, a COVID-19 relief and government spending bill were signed into law with a provision mandating the reduction of HFC production and consumption, such as used for air conditioning and refrigerants, by 85% by 2036. In October 2021, EPA published a final rule developing an allocation and trading program and procedures intended to reduce the production and consumption of HFCs by 85% by 2036. Although the electric sector is not directly regulated by the final rule, it could have indirect impacts due to the likely impact on the cost and availability of HFCs and their substitutes used in equipment for refrigeration, air conditioning, and fire suppression. On November 15, 2021, EPA published a proposed rule to (1) update, strengthen, and expand the new source performance standards (“NSPS”) for methane and VOC emissions from new, modified, and reconstructed sources in the oil and natural gas source category; and (2) establish emission guidelines for states to limit methane emissions from existing sources in the category. The proposed rule applies to facilities in the production, processing, and transmission and storage segments of the oil and gas sector. EPA plans to issue a supplemental proposal in 2022 that will provide proposed regulatory text and may expand on or modify the 2021 proposal in response to public input. This rulemaking does not apply to the electric sector but could impact fuel costs for power plants.

In November 2021, President Biden signed into law the Infrastructure Investment and Jobs Act, a \$1.2 trillion spending bill. The legislation includes climate-related provisions, including \$47 billion in climate resiliency measures and \$65 billion for energy and the electric grid improvements and \$7.5 billion for electric vehicle charging infrastructure to encourage the clean energy transition. Also in November 2021, the House passed a version of the Build Back Better Act, a \$1.7T budget reconciliation package that is focused

on social policy and climate change. While the bill includes significant investment in clean energy, a provision is also included that imposes a fee on methane emissions from the production, processing, and transmission and storage segments of the oil and gas sector. The methane fee would start at \$900 per ton in 2023 and escalate to \$1500 per ton for 2025 and beyond. The bill has stalled, and additional negotiations are expected that could modify the legislative provisions passed by the House, for possible actions in the Senate.

Global Climate Change – International

In 1992, countries negotiated an international treaty, the United Nations Framework Convention on Climate Change (“UNFCCC” or “Convention”) to consider addressing climate change. To date, 195 countries (“Parties to the Convention”), including the United States, have ratified the Convention. The first Conference of Parties (“COP”) 1 was held in 1995, which resulted in a “mandate” to negotiate a protocol to the Convention. In 1997, the Parties to the Convention negotiated the Kyoto Protocol which sought to bind industrialized countries to commitments to reduce emissions of greenhouse gases. The Kyoto Protocol’s first commitment period started in 2008 and ended in 2012. The second commitment period began in 2013 and will end in 2020. To date, 192 countries, not including the United States, have ratified the Kyoto Protocol.

Since 2005, the Convention has established various “working groups” to address key issues and negotiate future climate-related international agreements. Such key issues include future commitments under the Kyoto Protocol, long-term cooperative action, and a “legally binding” post-2020 emission reduction program. The Working Groups meet periodically throughout the year and, along with the formal subsidiary bodies to the Convention, again at the annual COP, a Meeting of the Parties to the Kyoto Protocol (“CMP”), and a Meeting of the Parties to the Paris Agreement (“CMA”). The COP is the supreme decision-making body of the Convention, which reviews the implementation of the Convention and other legal instruments. The CMP reviews the implementation of the Kyoto Protocol. The CMA oversees the implementation of the Paris Agreement and takes decision to promote its effective implementation. To date, there have been 24 COPs, 14 CMPs, and 3 CMAs.

COP 21 took place in late 2015 in Paris, France. The result of COP 21 was the adoption of the Paris Agreement, which establishes a universal framework for addressing GHG emissions based on nationally determined contributions. It also sets in place a process for increasing those commitments every five years. In 2016, the U.S. Administration “accepted” the Paris Agreement via executive agreement. The U.S.’s country-specific target as submitted in March 2015 is an economy-wide emission target to reduce emissions 26-28% below 2005 levels by 2025.

Under the Trump administration, in November 2019, the United States began the official process of withdrawing from the Paris Agreement by submitting formal notification to the United Nations, with the withdrawal taking effect on November 4, 2020.

Under the Biden administration, the United States reentered the Paris Agreement, with the official reentry on February 19, 2021. President Biden subsequently announced a new country-specific target for the United States to achieve a 50-52 percent reduction from 2005 levels in economy-wide net GHG emissions by 2030.

The annual COP, CMP, and CMA meetings that were scheduled for November 2020 in the United Kingdom occurred in October and November 2021. As a result of the Glasgow Climate Pact, the following pledges of note for the U.S. were made:

- A phase down of unabated coal (without carbon capture) and ending fossil fuel subsidies
- One hundred leaders, including the United States, agreed to cut methane emissions by 30% by 2030 through the Global Methane Pledge

Social Cost of GHGs

The social cost of GHGs (“SC-GHG”) is a monetary estimate of the estimated damages from climate change to society as a whole from emitting an incremental amount of GHGs. Damage estimates, which include direct and indirect impacts, have also been created for emissions of other GHGs, including methane and nitrous oxide. This tool is used to incorporate the social benefits of reductions, or the harm from emitting, GHGs into cost-benefit analysis of regulatory actions that impact cumulative global emissions. The social cost of carbon and GHGs is a priority for the Biden Administration and currently being reviewed by agencies. Following the January 2021 EO 13990, in February 2021, the Interagency Working Group on Social Cost of GHGs announced an interim Social Cost of GHGs at \$51/ton for CO₂ at a 3% discount rate. This interim value is to be used until finalization of a final SC GHGs, which is expected to be published by early 2022.

CO₂ Regulation – Permitting

In April 2007, the U.S. Supreme Court ruled that EPA has authority under the CAA to regulate GHG emissions from new motor vehicles, and EPA determined that certain GHG emissions from new motor vehicles endanger public health and welfare, effective January 2010. In April 2010, EPA issued a final rule regulating GHG emissions from new motor vehicles under the CAA, taking the position that this action then triggered CO₂ and other GHGs to become regulated pollutants under the prevention of significant deterioration (“PSD”) preconstruction permit program and the Title V operating permit program. As a result, the construction of new facilities or the major modification of existing power plants could trigger the requirement for a PSD permit and the installation of the Best Available Control Technology (“BACT”) for CO₂ and other GHGs, under the GHG Tailoring Rule (40 CFR § 51.166(b)(48)), which was finalized in May 2010.

In June 2014, the Supreme Court ruled against the GHG Tailoring Rule that EPA could not use either its PSD or Title V permitting programs to require permits solely based on GHG emissions but could require applicants that triggered permitting for other pollutants to undertake GHG analysis.

In October 2016, EPA released a proposed rule to revise PSD and Title V GHG permitting regulations and establishing a significant emission rate (“SER”), but EPA has not yet taken action to finalize these revisions.

CO₂ Regulation – Performance Standards

In June 2013, President Obama announced his Climate Action Plan designed to reduce emissions of GHGs and take additional steps to mitigate and adapt to climate change. At the same time, President Obama released a White House memorandum on “Power Sector Carbon Pollution Standards” that directed EPA to propose and finalize standards, regulations, or guidelines for new, modified, reconstructed, and existing fossil-fired electric generating units. Consistent with the Climate Action Plan and subsequent memorandum, in October 2015, EPA issued a final rule of new, modified, and reconstructed source standards for CO₂ emissions under section 111(b) of the CAA, as well as final guidelines for CO₂ emissions for existing sources under 111(d) for the CAA.

For existing sources under 111(d) of the CAA, the Clean Power Plan required states to develop a state-specific compliance plan. Numerous parties filed petitions for review and accompanying motions to stay the CPP, including Georgia Power. On February 9, 2016, the U.S. Supreme Court granted a stay of the CPP, which put the rule on hold while the legal challenge proceeds through the courts.

In October 2017, EPA began an effort to repeal and replace the CPP, starting first with the CPP repeal proposal. In August 2018, EPA proposed the ACE Rule, which would replace the CPP and establish procedures for states to develop plans to address carbon emissions from existing coal-fired power plants. There was a series of additional rulemaking activity and associated litigation over these rules that ultimately led to the CPP being repealed and replaced with the ACE Rule, as well as proposed revisions to the 111(b) standards for new, modified and reconstructed sources.

In July 2019, EPA finalized the ACE Rule, which required states to develop plans for the implementation and enforcement of the standards to be submitted to EPA by July 2022. Georgia EPD was expected to conduct a rulemaking, as well as hold a public hearing, for a state ACE Rule plan by the end of 2021. However, in January 2021, the D.C. Circuit vacated and remanded the ACE Rule back to EPA.

Prior to the recent court decisions on the ACE Rule that led Georgia EPD to cease work on the rule, Georgia Power, at the request of Georgia EPD, performed technical evaluations for the efficiency improvements listed in the ACE rule for power plants, which were submitted in October 2020. The report of technical evaluations detailed which of the listed measures have already been implemented and their associated efficiency improvement, as well as the potential efficiency improvement for the remaining measures and whether their expected improvement should be reflected in the emission standards based on cost or other factors.

With the CPP repealed and replaced by the ACE Rule, in September 2019, the D.C. Circuit Court dismissed the CPP litigation that had been held in abeyance pending the outcome of EPA's action on the CPP. However, numerous parties have challenged the repeal of the CPP and the ACE Rule (*American Lung Association v. EPA*, No. 19-1140). In October 2019, Georgia Power, in addition to a number of states, intervened on behalf of EPA in support of these actions seeing the ACE Rule as a lawful exercise of EPA's authority. In January 2021, the Court found that both the ACE rule and EPA's repeal of the CPP were unlawful because they rested on a fundamental misconstruction of the CAA. In March 2021, the D.C. Circuit Court clarified that neither the CPP nor the ACE Rule would be in effect while EPA addresses the court's remand of the ACE Rule in a new rulemaking action.

As a result of this action, EPA is required to develop a new rule to regulate GHG emissions from existing fossil fuel-fired EGUs. While EPA's Spring 2021 Agenda stated that EPA is working on a new set of emission guidelines to direct States in regulating existing fossil-fired EGUs, EPA has not provided a timeline for a proposed or final rule.

Meanwhile, the performance standards for new sources under 111(b) also experienced regulatory activity after the rule was finalized in 2015. In December 2018, EPA proposed revisions to 111(b), including the amendment of the best system of emission reduction (BSER) for new coal-fired EGUs as partial carbon capture and storage ("CCS"). However, these updates have not been finalized, and the 2015 111(b) Rule remains in place.

In January 2021 in the final days of the Trump Administration, EPA finalized the GHG Significant Contribution Rule, a new framework for determining whether emissions from individual source categories contribute significantly to endangerment and warrant regulation under Section 111. Under this new framework, EPA reaffirmed the listing of EGUs under Section 111 for GHG emissions but would likely limit the agency's future regulatory actions for other sectors. However, the Biden Administration immediately took steps to pull this framework back and re-establish its historical approach, confirming EPA's intent to regulate GHG emissions for the power sector and others as well. In April 2021, the DC Court granted EPA's unopposed motion for voluntary vacatur and remand of the GHG Significant Contribution Rule.

On October 29, 2021, the Supreme Court agreed to review the ACE rule litigation on limited but significant questions related to the extent of EPA's authority to regulate greenhouse gas emissions from existing power plants under section 111(d) of the CAA. A decision is expected before the Court's June 2022 recess.

3.4.11 316(b) Regulations

Section 316(b) of the CWA ("316(b)") requires that the location, design, construction, and capacity of any cooling water intake structure ("CWIS") reflect Best Technology Available ("BTA") to minimize adverse impacts from impingement and entrainment of fish, shellfish, and other aquatic organisms.

In August 2014, EPA published a final 316(b) rule that established impingement mortality and entrainment requirements for existing power generating facilities and manufacturing and industrial facilities that are designed to withdraw more than 2 million gallons per day of water from WOTUS and use at least 25 percent of the water they withdraw exclusively for cooling purposes.

Facilities subject to the rule must comply with one of seven options identified for impingement mortality, which include modified traveling screens and closed-cycle recirculating cooling. For entrainment, the rule relies on the determination of BTA entrainment requirements by the permitting authority on a site-specific basis.

In addition, the rule established a process whereby the USFWS and the NMFS review permit applications in order to analyze any potential impacts to federally-listed species and designated critical habitat that may result from operation of the facility's CWIS. During this review, the Services will have an opportunity to recommend control measures, monitoring, and reporting recommendations on a site-specific and species-specific basis that will minimize adverse effects of CWIS operations.

Hydroelectric facilities are not covered under the 316(b) rule as the intake structures necessary for hydroelectric power necessitate a wholly different operation than traditional fossil plants. Furthermore, hydroelectric plants are heavily regulated by the Federal Energy Regulatory Commission (FERC) which addresses aquatic species protection measures.

3.4.12 Effluent Limitations Guidelines Revision

The effluent limitation guidelines and standards for steam electric power generating facilities, 40 CFR Part 423, were previously promulgated in 1982 and established technology-based effluent limitations for discharges. Through a multi-year rulemaking process, EPA revised the standards to address changes in effluents associated with new air pollution controls, specifically ash transport water and FGD wastewater. Figure 3-1 depicts a timeline of past and future ELG regulatory changes which are further discussed below.



Figure 3-1 ELG Rule Timeline**2015 ELG Rule**

In November 2015, EPA published a final rule (“2015 Rule”) that revised or established limitations and standards for BPT (Best Practicable Control Technology Currently Available), BAT (Best Available Technology Economically Achievable), PSES (Pretreatment Standards for Existing Sources), NSPS (New Source Performance Standards), and PSNS (Pretreatment Standards for New Sources) that apply to six wastestreams: FGD wastewater, fly ash transport water, bottom ash transport water, combustion residual leachate from landfills and surface impoundments, gasification wastewater, and flue gas mercury control wastewater. Of these six waste streams, only fly ash transport water, bottom ash transport water, combustion residual leachate, and FGD wastewater are applicable to Georgia Power operations.

The 2015 Rule:

- Established a “zero discharge” limit for bottom ash transport water and fly ash transport water, with one exception applying to bottom ash transport water being recycled for the FGD in lieu of discharge.
- Established stringent BAT limits for FGD wastewater for mercury, arsenic, selenium, and nitrate-nitrite.
- Established a voluntary incentive program (VIP) option for FGD wastewater providing additional time for plants willing to meet even more stringent FGD wastewater limits based on evaporation technology, considered an advanced treatment at a time when surface impoundments were the most prevalent treatment technology. For the VIP option, the permitting authority (EPD) were required to allow up to December 31, 2023 to meet the VIP ELGs.
- Set new BAT limits for direct discharges of “legacy wastewater.” Legacy wastewater refers to “FGD wastewater, fly ash transport water, bottom ash transport water, flue gas mercury control wastewater, or gasification wastewater” generated prior to the applicability date of the new BAT limits. The water remaining in the Georgia Power ash ponds is considered legacy wastewater.

The rule also established applicability guidelines. The former, more stringent BAT limits did not apply until the permitting authority determined what date represented the earliest possible date that the plant could meet the limits in the rule, which at the time of the 2015 Rule was beginning November 1, 2018, but in no case later than December 31, 2023. In November 2015, the 2015 Rule was challenged by industry and environmental groups and the cases were subsequently consolidated in the U.S. Court of Appeals for the Fifth Circuit.

In March of 2017, the Utility Water Act Group and the Small Business Association filed separate Petitions for Reconsideration of the 2015 Rule. This action led to the EPA administrator granting the petition and staying the applicability dates of the more stringent BAT limitations of the 2015 Rule (e.g., those for fly ash transport water, bottom ash

transport water, FGD wastewater, and combustion residual leachate). In April 2017, EPA asked the court to hold the case in abeyance for 120 days while it reconsidered specific aspects of the rule. The court granted EPA's request on April 24, 2017, with the administrative stay becoming effective the following day.

2017 Postponement Rule

In June 2017, EPA (under the then new Trump administration) issued a proposed stay-by-rule on the postponement of the applicability dates for the more stringent BAT limitations and pretreatment standards of the 2015 Rule ("Postponement Rule"). The Postponement Rule was finalized on September 18, 2017, pushing out the earliest compliance dates for the 2015 BAT ELGs for bottom ash transport water and FGD wastewater until November 1, 2020, rather than November 1, 2018, so that EPA had sufficient time to reconsider the BAT and pretreatment standards for existing sources ("PSES") limits for FGD wastewater and bottom ash transport water. The applicability dates for fly ash transport water were not disturbed by the Postponement Rule.

In April 2019, the U.S. Court of Appeals for the Fifth Circuit issued an opinion vacating aspects of the 2015 Rule's ELGs pertaining to BAT for legacy wastewater and combustion residual leachate. EPA is currently considering revising the ELGs for legacy wastewater and combustion residual leachate that addresses the concerns identified by the court.

2020 ELG Reconsideration Rule

In November 2019, EPA published the proposed regulation to revise the technology based ELGs for the steam electric industry applicable to FGD wastewater and bottom ash transport water ("ELG Reconsideration Rule"). In October 2020, EPA finalized the ELG Reconsideration Rule for these two waste streams. The ELG Reconsideration Rule provides a two-year extension of compliance time frames for meeting the ELGs and added three new subcategories for both FGD wastewater and bottom ash transport water with tailored limits and applicability dates. A summary of the key provisions of the ELG Reconsideration Rule are as follows:

- 1) For FGD wastewater, the Rule established as BAT a combination of chemical precipitation followed by biological treatment (also referred to as physical, chemical, biological treatment or "phys/chem/bio") with revised numeric effluent limits for mercury, arsenic, selenium, and nitrate-nitrite as nitrogen. As compared to the 2015 Rule, the limits were slightly less stringent for arsenic and selenium and significantly more stringent for mercury and nitrate-nitrite.
- 2) For FGD wastewater, the Rule revised the voluntary incentive program (VIP) subcategory that provides until December 31, 2028, for plants to achieve more stringent ELGs on mercury, arsenic, selenium, nitrate-nitrite, bromide, and total dissolved solids based on membrane filtration.
- 3) For bottom ash transport water, the Rule established as BAT a high recycle rate predominantly non-discharging system which only allows a purge of up to 10 percent of the bottom ash transport water system's primary active wetted bottom ash system volume. A purge rate, if any is allowed, will be site-specific and

determined by the permitting authority. An exception was incorporated for bottom ash transport water sent to the FGD for use as FGD makeup. This water is considered FGD wastewater and therefore is not subject to the volumetric purge volume limit or associated discharge limits.

- 4) The final Rule established three new subcategories with tailored limits and applicability dates:
- (1) High FGD flow plants, meaning the facility has a maximum daily FGD wastewater flow greater than 4 million gallons per day, after accounting for the ability to recycle wastewater through the FGD systems.
 - (2) EGUs that will permanently cease the combustion of coal, meaning the owner certifies under § 423.19(f) that the generating unit will cease combustion of coal no later than December 31, 2028, and
 - (3) low utilization EGUs, meaning the facility owner certifies, and annually recertifies, that the two-year average annual capacity utilization rating is less than 10 percent.

Georgia Power does not have any plants that qualify as high-flow FGD plants and as such it was not available for consideration.

For both FGD wastewater and bottom ash transport water, the generally applicable BAT limits, do not apply until the permitting authority determines a date that is as soon as possible on or after October 13, 2021, but no later than December 31, 2025. The BAT limits for low utilization EGUs must be met by December 31, 2023.

In 2020, the ELG Reconsideration Rule was challenged by environmental groups and consolidated in the U.S. Court of Appeals for the Fourth Circuit with industry groups intervening in the case. Through mid-2021, several court delays were followed by EPA's motion for indefinite abeyance of the case until the new rule revising the ELG Reconsideration Rule is finalized, as discussed below.

2021 Reconsideration of the 2020 ELG Reconsideration Rule

On August 3, 2021, EPA announced in a Federal Register notice its decision to revise the ELG Reconsideration Rule. The announcement comes after EPA's review of the ELG Reconsideration Rule under the Biden Administration's EO 13990. The EPA suggests it will consider whether more stringent ELGs are appropriate for FGD wastewater based on advancement of treatment technologies, including membrane-based treatment. The notice of rulemaking clarified that permitting authorities should continue to implement the current regulations (ELG Reconsideration Rule) during the rulemaking process. EPA intends to sign a proposed rule for public comment in the Fall of 2022.

3.4.13 County of Maui

In February 2019, the U.S. Supreme Court agreed to consider the question of whether a CWA permit is required for pollutants that originate from a point source and are conveyed through a non-point source such as groundwater to a WOTUS. In November 2019, the U.S. Supreme Court heard oral argument in *County of Maui* on the issue of whether discharges of pollutants from a point source that are conveyed to surface water through

a non-point source, such as groundwater, are subject to the Clean Water Act's point source permitting program. Relying on the plain language and structure of the CWA, the County argued that such discharges are not subject to the program. The federal government—who filed an amicus brief in support of the County—agreed that such releases do not require permits because releases to groundwater are categorically excluded from regulation under the CWA's point source program. The environmental groups (who prevailed in the lower courts) argued that the CWA requires permitting for releases to groundwater when it is foreseeable that those releases will reach surface water.

In April 2020, the Court released its decision in the *County of Maui*, ruling that the CWA requires a permit for both a direct discharge from a point source into navigable waters and where pollutants from a point source reach navigable waters after passing through groundwater if the facts demonstrate the “functional equivalent of a direct discharge” and identified seven factors that could be considered. It remains unclear how district courts will interpret and apply the “functional equivalent” test.

On December 10, 2020, the EPA published draft guidance intended to clarify how the Supreme Court's *County of Maui* decision should be applied under the CWA NPDES permit program. The draft guidance addresses discharges of pollutants that reach WOTUS through groundwater.

On January 21, 2021, EPA published in the Federal Register their guidance “Applying the Supreme Court's *County of Maui v. Hawaii Wildlife Fund* Decision in the Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit Program.” The document broadly discusses how the Supreme Court's *County of Maui v. Hawaii Wildlife Fund* decision (functional equivalence test) may be applied under the NPDES permit program.

On September 16, 2021, EPA rescinded the guidance document “Applying the Supreme Court's *County of Maui v. Hawaii Wildlife Fund* Decision in the Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit Program.” The EPA provided two reasons for rescinding the guidance: 1) the addition of the eighth factor in the guidance for determining a functional equivalent (the design and performance of the system or facility from which the pollutant is released) is not consistent with the CWA or the Supreme Court decision and 2) the guidance was issued without proper deliberation within EPA or with its federal partners. EPA will continue to apply site-specific, science-based evaluations to determine whether a discharge from a point source through groundwater that reaches jurisdictional surface water is a “functional equivalent” of a direct discharge.

3.4.14 Clean Water Act Section 401 Certifications

Entities are required to obtain permits or licenses for any discharge into waters of the United States, and CWA Section 401 gives states the authority to grant, deny or waive

certification of these licenses or permits if the state determines that the discharge does not comply with existing state water quality requirements.

In September 2020, a final 401 Certification Rule updating procedural requirements for water quality certification became effective. The rule increases the predictability and timeliness of this Section 401 certification by clarifying timeframes and scope of a State's review of Federal CWA authorizations.

The final rule is being challenged in the U.S. District Court for the Eastern District of Pennsylvania.

In May 2021, EPA announced plans to revise the 2020 update to the "Clean Water Act Section 401 Certification Rule." The announcement comes after EPA's review of the rule under the Biden Administration's EP 13990. EPA's concerns include that the Rule is counter to the principles of cooperative federalism and does not reflect the authority of states and tribes to protect water resources under 401.

3.4.15 Navigable Waters Protection Rule

The Navigable Waters Protection Rule defines "waters of the United States" and outlines the scope of waters federally regulated under the Clean Water Act. The rule affects all CWA programs that rely on this definition, including the NPDES permit program under Section 402, the dredge-and-fill permit program under Section 404, and oil spill prevention and response programs under Section 311. The rule is administered by the EPA and the USACE ("the Agencies").

In August 2015, the Agencies issued a final rule re-defining WOTUS to exert very broad jurisdiction over water features, including features that have not previously been regulated, such as ephemeral drainages and isolated ponds on industrial facilities.

In April 2020, the Agencies finalized a rule to repeal the 2015 rule effectively restoring the regulatory text that existed prior to the 2015 rulemaking.

In June 2020 the final Navigable Waters Protection Rule became effective and revised the definition of WOTUS. Notable to the power generation and transmission industries, the rule retains the waste treatment system exclusion and created four categories of waters defined as WOTUS: traditional navigable waters and territorial seas; perennial and intermittent tributaries to those waters; lakes, ponds, and impoundments of jurisdictional waters; and wetlands adjacent to jurisdictional waters. The rule provides a catch-all exclusion that prohibits federal jurisdiction over any features which do not fall within one of the four categories above and identifies many specific categories of waters and water features that do not fall within the Agencies' jurisdiction.

In 2021, the Agencies, in response to court order, announced they have halted implementation of the NWPR and are interpreting WOTUS consistent with the pre-2015 regulatory regime until further notice. The Agencies have completed review of the NWPR under the Biden Administration's EO 13990 and determined the rule must be replaced.

The definition of WOTUS governs which waterways require permitting under Section 404 and 402 of the CWA. Discharge of wastewater, power delivery projects, and development of generation all have the potential to encounter waters defined as a WOTUS.

In December 2021, a proposed NWPR revision was published in the Federal Register. Interested parties have until February 7, 2022, to submit comments to EPA. The proposed rule is intended to repeal the NWPR and restore regulations defining “waters of the United States” that were in place prior to 2015, with updates to be consistent with relevant Supreme Court decisions. The proposal maintains the general waste treatment system exclusion but removes the definition of waste treatment system from the regulatory text.

3.4.16 Nationwide Permits (NWP)

NWPs authorize certain activities with minimal impact to a WOTUS, allowing projects to move forward without receiving an individual review under CWA section 404.

On January 13, 2021, the USACE finalized 16 new NWPs including a split of NWP 12 into three separate NWPs. NWP12 is now limited to activities related solely to oil and gas pipelines across certain WOTUS designated areas. Impacts from electric transmission and telecommunication to WOTUS designated areas, formally authorized under NWP 12, are now covered by NWP 57. The NWP 12 is being challenged by environmental groups on the basis of violations of the Endangered Species Act.

On December 27, 2021, the USACE published in the Federal Register a final rule reissuing 40 existing nationwide permits (NWPs) and one new NWP. The 41 new NWPs will take effect on February 25, 2022, and will expire, along the 16 NWPs previously issued, on March 14, 2026.

3.4.17 Coal Combustion Residuals

The 2015 CCR Rule

In April 2015, EPA published the “Disposal of Coal Combustion Residuals from Electric Utilities” Final Rule (“Federal CCR Rule”) (40 CFR Part 257 and Part 261) that provided a comprehensive set of requirements for the disposal of CCR as solid waste under RCRA Subtitle D. This final rule was the result of extensive study by EPA of the effects of CCR on human health and the environment and represented a decision by EPA to uphold decades of previous Agency determinations that coal ash should be regulated as non-hazardous waste. Effective October 2015, the Federal CCR Rule was issued as a “self-implementing” rule that set national minimum standards for management of CCR. The rule is primarily enforceable through citizen lawsuits and companies are held accountable by requirements to post required documents and demonstrations of compliance to publicly available company webpages.

The Federal CCR Rule set standards for certain CCR units and provided exemptions for others. Those units subject to the Federal CCR Rule included:

- new and existing CCR landfills and surface impoundments (“units” or ash ponds), including any lateral expansions of such units that dispose or otherwise manage CCR generated by electric utilities and independent power producers (“IPPs”); and
- inactive surface impoundments, located at active electric generating facilities, regardless of fuel currently used (i.e., natural gas, coal, or oil).

Those units exempted from all or portions of the Federal CCR Rule included:

- Exempted CCR landfills that ceased receiving CCR prior to October 19, 2015.
- Exempted practices that meet the definition of a beneficial use of CCR.
- Exempted CCR placement at active or abandoned underground or surface coal mines.
- Exempted municipal solid waste landfills that receive CCR.
- Exempted inactive surface impoundments that closed within three years from the operating, design, and location criteria, as well as groundwater monitoring and post closure care (the “three-year closure” exemption).
- Exempted CCR units located at sites that ceased generating electricity, regardless of the fuel type, as of October 19, 2015.

For regulated CCR units, the federal and state rules established a comprehensive set of compliance requirements related to location and siting criteria; design and operating criteria; groundwater monitoring and corrective action requirements; structural integrity requirements; closure and post-closure care requirements; a range of reporting and recordkeeping requirements and posting of information to the internet. See 40 CFR Part 257; Ga. Comp. R. & Regs. R. 391-3-4-10. Failure to demonstrate compliance with certain criteria by specified deadlines could result in required closure of the CCR unit. Timeframes for, and acceptable methods of, CCR unit closure are provided in the Federal CCR Rule. The federal CCR Rule explicitly authorizes both closure in place and closure by removal as options, with each option subject to its own set of closure performance criteria. The rule incorporates alternative closure options that allow for surface impoundments to continue to receive CCR for a limited amount of time beyond a date for which it would otherwise have to begin closure if options are not available to manage CCR without the existence of that CCR unit.

Changes to the Federal CCR Rule Over Time

Since the original publication of the Federal CCR Rule, there have been several developments generally related to litigation, administration policy changes or legislative actions, that would act to amend the Federal CCR Rule or change how the Federal CCR Rule is enforced.

2015 Litigation and 2016 Settlement Agreement

In December 2015, several parties, including industry and environmental groups filed legal challenges to the Federal CCR Rule; and in June 2016, the D.C. Circuit Court approved a settlement addressing several, but not all, issues that were raised in the CCR

litigation. As part of the settlement, the court vacated the three-year closure exemption for inactive surface impoundments. This meant that inactive CCR units that were pursuing the three-year closure exemption would be subject to the same rule requirements as existing CCR surface impoundments, except on a revised schedule. Additionally, as part of the settlement, EPA agreed to finalize a rulemaking to address the following issues:

- Requirements relating to the use of vegetation for slope protection.
- Type and magnitude of non-groundwater releases that require a facility to comply with some or all of the Rule's corrective action procedures; and
- Adding boron to the list of Appendix IV constituents.
- EPA also agreed to review whether to modify the rule's existing alternative closure provision to specifically include non-CCR waste streams.

In August 2016, EPA published a proposed and direct Extension Rule in the Federal Register to extend certain compliance dates by 547 days for ash ponds that intended to close within 3 years. On October 5, 2016, the Extension Rule became effective following no adverse comments.

GA DNR Establishes a State CCR Rule

On October 16, 2016, the Georgia Department of Natural Resources ("DNR") Board adopted amendments to Georgia's Rules for Solid Waste Management pertaining to the storage and disposal of CCR (391-3-4-.10). The Georgia CCR Rule became effective on November 22, 2016, and, at the time, did not replace the Federal CCR Rule, but acted in addition to the Federal CCR Rule. It included certain more stringent permitting, oversight and monitoring requirements than the Federal CCR Rule, such as:

- The Georgia CCR Rule adopted requirements from the Federal CCR Rule, but unlike the Federal CCR Rule, which only regulates certain facilities, the Georgia CCR Rule regulates all CCR landfills and ash ponds.
- CCR units in Georgia are regulated by Georgia EPD through a comprehensive permitting program, which is not required by the Federal CCR Rule. CCR unit development, operation, and closure must be conducted in accordance with the requirements in the permit, which is approved and enforced by Georgia EPD.
- All existing CCR units, including ash ponds and landfills previously closed, were required to submit a CCR permit application to Georgia EPD by November 22, 2018.
- These permits will set forth the requirements at each facility that Georgia Power will be subject to under the Georgia CCR Rule. The permitting process will include review of the Company's plans, engineering design, public notice, and public comment.

On March 8, 2018, Georgia adopted the Federal Direct Extension Rule extending compliance deadlines for the CCR units which intended to close within 3 years. Georgia

EPD has initiated a proposed rule change to the Georgia CCR Rule in order to incorporate updates in the Federal CCR Rule.

Congress Passes the Water Infrastructure Improvements for the Nation Act

In December 2016, the WIIN Act was approved by the U.S. Congress. It included a framework whereby states can develop and implement a state CCR permit program that would operate in lieu of the federal rule if EPA approved the state program. An EPA-approved state permit program provides more regulatory certainty and reduces the burden of overlapping regulations once a CCR permit is issued under the approved State program. In March 2017, Georgia EPD submitted Georgia's CCR Rule for EPA's review and approval as a "partial" permit program, meaning that EPD did not seek approval of certain elements of the Federal CCR Rule. Pursuant to the WIIN Act, EPA is reviewing and approving state CCR permit programs that, if approved, would authorize states to enforce state regulations for CCR units and operate a permitting program in lieu of the federal rule.

In June 2019, Georgia received notice from EPA that their application was complete, officially initiating the 180-day review and approval process. In January 2020, EPA published in the Federal Register its partial approval of Georgia's CCR permit program. Georgia's program was partially approved because the Georgia Rules for Solid Waste Management did not include provisions to cover the applicability of requirements for endangered species. Georgia's partial program approval allows the Georgia EPD to enforce rules promulgated under its solid waste statute related to CCR activities, as well as to issue permits and to enforce compliance.

Petitions for Reconsideration, A Phased Approach to Amending the Federal CCR Rule and the August 2018 D.C. Circuit Court Decision

Early 2017 was an active period related to the Federal CCR Rule for three key reasons: 1) early implementation of the WIIN Act as it related to state permit program development, 2) pending oral argument in active Federal CCR Rule litigation, and 3) a Petition for Reconsideration of the Federal CCR Rule filed by industry stakeholders. In May 2017, Utility Solid Waste Activities Group ("USWAG") filed a Petition for Reconsideration which was granted by EPA on September 13, 2017. In turn, EPA requested a delay in the active litigation while it reconsidered various aspects of the rule and, on November 15, 2017, presented a phased approach to amending the Federal CCR Rule in response to stakeholder engagement and various remaining litigation issues.

Phase One and Phase Two Amendments

In November 2017, EPA outlined a phased approach to amending the Federal CCR Rule, and subsequently issued both Phase One and Phase Two proposed rulemakings. A summary of proposed and finalized provisions is presented below. As illustrated, the Phase One rulemaking contained various provisions, but only a subset of these provisions were finalized. In July 2018, EPA published Part One of the Phase One Amendments to the Federal CCR Rule (the Phase One, Part One rule) which extended the deadline to cease receipt of both CCR and non-CCR wastes to October 31, 2020. This final rule also

established alternate groundwater protection standards for constituents that do not have established EPA maximum contaminant levels (MCLs); granted the State Director of an approved state program the authority to certify certain compliance requirements in place of a professional engineer; and granted an owner/operator the ability to demonstrate that groundwater monitoring could be suspended by demonstrating that constituent migration from the CCR unit to the underlying groundwater would not occur.

In August 2019, EPA published the Phase Two proposed amendments entitled “Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Enhancing Public Access to Information; Reconsideration of Beneficial Use Criteria and Piles”. The proposed amendments addressed:

1. Beneficial Use
 - a. Will Replace the 12,400-ton threshold that triggers an environmental demonstration with specific location-based criteria derived from existing criteria for CCR disposal units.
 - b. Establish a single approach which would apply to all temporary placement of unencapsulated CCR on the land.
2. Boron
 - a. Establish an alternative groundwater protective standard of 4 mg/L for boron using the same methodology used for other CCR constituents and would add boron to Appendix IV constituents for assessment monitoring.
3. Groundwater Data Reporting and Website
 - a. Revised the annual groundwater monitoring and corrective action report requirements to make the data easier to understand and evaluate, including the incorporation of an executive summary.
 - b. Revised the CCR website requirements to ensure that relevant facility information required by the regulations is immediately available to the public.

EPA has not taken final action on the Phase Two proposal. The proposed provisions affecting beneficial use have not been finalized, but EPA published a Notice of Data Availability in December 2020 to collect additional information that may inform a future final rulemaking.

Stage	Phase One Rulemaking	Phase Two Rulemaking
Final	<ul style="list-style-type: none"> Extended deadline to cease receipt of CCR and non-CCR wastes to unlined ash ponds to October 31, 2020. Established groundwater protection standards for Mo, Co, Pb, Li. Established ability for state director to certify in lieu of P.E. under approved state program. Established ability to suspend groundwater monitoring based on a no migration demonstration. 	<ul style="list-style-type: none"> No Phase Two final rule to date.
Proposed, but not finalized	<ul style="list-style-type: none"> Appropriate height of vegetative cover on impoundment slopes. Type and magnitude of non-groundwater releases that would require compliance with corrective action. Addition of boron to Appendix IV. Modifications to post-closure care period. Alternate points of compliance. 	<ul style="list-style-type: none"> Proposed revisions to annual groundwater reports. Requirements to enhance website transparency. Regulation of CCR piles intended for beneficial use. Establishment of siting criteria for beneficial use projects. Groundwater protection standard for boron.

The August 2018 D.C. Circuit Court of Appeals Decision

Almost immediately after EPA finalized the Phase One, Part One rule, the D.C. Circuit Court issued an opinion on the active litigation on August 21, 2018. In summary, the Court:

- Denied EPA's request to hold the case in abeyance;
- Remanded the Industry Petitioners' challenges to (1) the regulation of on-site CCR piles destined for beneficial use and (2) the 12,400-ton threshold in the fourth beneficial use criterion;
- Denied relief for the remaining Industry Petitioner claims, including the challenge to EPA's authority to regulate inactive surface impoundment; and
- Found for Environmental Petitioners on their challenges to (1) the ability of unlined impoundments to continue operating; (2) the classification of unlined impoundments with two feet of compacted clay as "lined" units; and (3) EPA's failure to regulate legacy ponds.

The consequences of the Court finding for Environmental Petitioners requires EPA to revisit elements of the CCR rule through additional formal rulemakings.

Rulemakings in Response to Ongoing Litigation: Part A and Part B

Since the August 2018 D.C. Circuit decision, EPA has proposed two separate rulemakings to address certain issues as a result of ongoing litigation. In August 2020, EPA finalized “A Holistic Approach to Closure Part A: Deadline to Initiate Closure” and published the rule to the Federal Register. This new rule incorporated the following provisions:

- New deadline for unlined impoundments to cease receipt of waste and initiate closure: as soon as technically feasible and no later than April 11, 2021;
- Extend the existing alternative closure extensions to include CCR and non-CCR waste streams;
- Addition of an executive summary to the annual groundwater monitoring and corrective action reports, and the amended requirements to the publicly accessible CCR website; and
- Classification of compacted-soil lined, or “clay-lined” surface impoundments changed from “lined” to “unlined.”

EPA then published the proposed rulemaking “Holistic Approach to Closure Part B; Alternate Demonstration for Unlined Surface Impoundments; Implementation of Closure.” In November 2020, recognizing that certain owners have been relying on natural clay liners for continued operation of surface impoundments, EPA finalized a portion of the proposed rule which provides an owner/operator the ability to demonstrate that alternative liner systems such as natural clay perform as well as or better than composite liner systems explicitly required by the CCR rule. Provisions from the proposed rule that were not addressed will be addressed in subsequent action.

A summary of finalized provisions of the Part A and B rulemakings is provided below.

Stage	Part A	Part B
Final	<ul style="list-style-type: none"> • Extension to April 11, 2021. • Revisions to the alternative closure provisions to include non-CCR. • Revisions to annual groundwater reports. • Enhancing website transparency. • Changing classification of clay-lined impoundments to “unlined.” 	<ul style="list-style-type: none"> • Procedures to allow alternate liner demonstrations for certain qualifying CCR surface impoundments.
Proposed, but not finalized		<ul style="list-style-type: none"> • Two co-proposed options to allow the use of CCR during unit closure. • An additional closure option for CCR units being closed by removal of CCR. • Requirements for annual closure progress reports.

Other CCR Regulatory Activity

Federal Permit Program - In February 2020, EPA published in the Federal Register a proposed Federal CCR Permit Program. EPA would implement this permit program directly at CCR units located in Indian Country, in states that are not actively pursuing their own state CCR permit program for approval, and to possibly cover specific rules sections that are not included in state programs with partial approval. EPA has yet to finalize the final rule.

Legacy Surface Impoundments – In October 2020, EPA published the Legacy Surface Impoundments ANPRM. This ANPRM sought data and information on the status and number of inactive surface impoundments at retired electricity generation facilities, referred to as “legacy impoundments. EPA has stated that the proposal may include adding a new definition for “legacy surface impoundments” and may propose to require such impoundments to follow existing regulatory requirements for fugitive dust, groundwater monitoring, closure and other technical requirements.

On January 11, 2022 the EPA published its proposed determinations on the CCR Rule Part A requests for nine facilities across the Midwest and Northeast. In three of these

determinations, EPA announced new positions for closure in place performance standards and groundwater monitoring networks, statistical analysis methods, alternate source demonstrations and groundwater corrective action. The EPA has published these determinations and will receive public comments through February 23, 2022.

3.4.18 Other Considerations

In addition to the regulatory actions discussed above, Georgia Power is monitoring regulatory discussions on lead, nuclear waste, environmental justice, NEPA, threatened and endangered species, and potential procedural changes. These are not currently expected to have significant impact on operations but due to the potential for future impact should regulations change, they will continue to be monitored for updates.

Currently, there are no proposed regulations relating to lead that may have an effect on the installation of equipment or changes in the operation of electric generating plants. In addition, ECS-Appendix C provides an overview of waste disposal considerations for low-level and high-level nuclear waste. Southern Company and Georgia Power will continue to monitor these issues and evaluate the Company's strategy as changes occur.

Executive Orders

President Biden has committed to a "whole of government" approach to Environmental Justice ("EJ") and climate equity. President Biden issued several executive orders related to EJ which lay out the following priorities:

- Revise President Clinton's EO 12898;
- Direct agencies to develop programs and policies to address the disproportionate health, environmental, economic, and climate impacts on disadvantaged communities;
- Direct the federal government to direct 40 percent of investment to disadvantaged communities (the "Justice40" initiative);
- Establish a White House Environmental Justice Interagency Council and a White House Environmental Justice Advisory Council to prioritize environmental justice to address current and historical environmental injustices, including strengthening monitoring and enforcement through new or strengthened offices at the EPA, DOJ, and Department of Health and Human Services;
- Initiate the development of a Climate and Environmental Justice Screening Tool, building off EPA's existing EJSCREEN, to inform equitable decision making across the federal government.

National Environmental Policy Act

The National Environmental Policy Act was established in the 1970s by the President's Council on Environmental Quality. The program requires Federal agencies to evaluate the environmental impacts of their actions and as such applies to any project receiving federal funding.

In July 2020, CEQ finalized revisions to its NEPA regulations intending to streamline the NEPA review process, reduce the scope and length of NEPA analyses, and clarify important NEPA concepts to facilitate more efficient, effective, and timely NEPA reviews by Federal agencies in connection with proposals for agency action.

CEQ is reviewing the 2020 NEPA regulations under the Biden Administration's EO 13990 and expects a phased approach to revising the regulations. In October 2021, CEQ published a proposed rule consisting of narrow set of proposed changes generally reversing actions in the 2020 NEPA regulations.

Endangered Species Act

The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. The ESA is administered by the USFWS and the Commerce Department's NMFS.

In December 2020, the USFWS and the NMFS published the final rule defining "habitat" under the ESA in the wake of the U.S. Supreme Court's decision in *Weyerhaeuser Company v. United States Fish and Wildlife Service*. In that case, the Court concluded that an area must first be "habitat" before it can be designated "critical habitat". A critical habitat designation carries with it certain obligations to protect the area and its threatened or endangered species in the event that permits are sought for new construction related to new generation siting and/or power delivery.

On December 18, 2020, the USFWS published a final rule revising the ESA Section 4(b)(2), which outlined the framework for analysis of whether to exclude certain areas when designating critical habitat. Under the final rule, every proposal for designating critical habitat will be accompanied by a draft economic analysis where the USFWS will identify areas that may be excluded from the designation.

In June 2021 the USFWS and the NMFS announced their intention to initiate rulemaking in the coming months to revise, rescind, or reinstate five ESA regulations finalized by the Trump administration.

Procedural Updates

In May 2021 EPA published in the Federal Register a final rule "Rescinding Procedures for Issuing and Modifying Guidance Documents" that will allow the Agency to act with more speed and flexibility than previously possible. This final rule specifically rescinds a Trump administration rule which established certain formal procedures for issuing, modifying, and withdrawing guidance documents. Because EPA determined that the final rule is procedural rather than substantive, the final rule is effective immediately upon publication in the Federal Register and is now final.

4.0 Strategy Results and Financial Summary

Georgia Power continues to face a host of new environmental regulations and requirements as described in Section 3.0. Consistently, the Company has responded with a timely, comprehensive, and cost-effective strategy, allowing our facilities to meet the needs of customers while maintaining compliance stemming from a dynamic environmental regulatory landscape.

The Company's current environmental compliance strategy is focused on operation and compliance activities related to air quality regulations and increasing and significant regulations governing water resources and solid waste management.

4.1 Air Compliance Strategy Review

The emission reductions Georgia Power has achieved to date have been driven by the need to comply with many state and federal regulations focused on SO₂ and NO_x emissions from power plants, including the Acid Rain Program, CSAPR, Regional Haze Rule, and state regulations designed to achieve attainment with the ozone and PM NAAQS. In addition, state and federal regulations, such as the Georgia Multipollutant Rule and MATS, have also required reductions in emissions of mercury and other HAPs through installation of controls on, and the retirement of, the Company's power plants.

Table 4.1-1 (below) summarizes the air emissions control equipment installed at Georgia Power's gas- and coal-fired steam and combined-cycle generating units since the 1990 CAAA. Continuing to operate the control equipment, as required to remain in compliance with the applicable rules, requires ongoing operation and maintenance expenditures.

Table 4.1-1 Current Emissions Control Equipment

Unit	Unit Type	NOX Control	SO ₂ Control	Mercury Control
Bowen 1 & 2	Tangentially Fired	LNCFS II / SCR	FGD	ACI / ALK / MRCS / FGD / SCR
Bowen 3 & 4	Tangentially Fired	LNCFS II / SCR	FGD	ACI / ALK / BH / FGD / SCR
Gaston 1 - 4	Wall Fired	LNB	Gas Fired	Gas Fired
McDonough 4 - 6*	Combined-Cycle	LNB / SCR	Gas Fired	Gas Fired
McIntosh 10 & 11*	Combined-Cycle	LNB / SCR	Gas Fired	Gas Fired
Scherer 1 - 3	Tangentially Fired	LNCFS III / SCR	FGD	Baghouse / ACI
Wansley 1 & 2	Tangentially Fired	LNCFS II / SCR	FGD	ACI / ALK / MRCS / FGD / SCR
Yates 6 & 7*	Tangentially Fired	LNB, SOFA	Gas Fired	Gas Fired
* Units at Plants McDonough Combined-Cycle, McIntosh Combined-Cycle, and Yates are also required by their air permits to operate oxidation catalysts for control of carbon monoxide and volatile organic compounds.				

4.1.1 SO₂ Compliance

Since 2007, the SO₂ compliance strategy and schedule for Georgia Power have largely been in response to the Georgia Multipollutant Rule and the companion SO₂ Emissions Rule. The Georgia Multipollutant Rule required the installation and operation of FGD systems at certain units by specified dates between 2008 and 2015 and required switching from coal to natural gas for units at Plant Yates. In addition to the reductions that have been driven by the Georgia Multipollutant Rule, the sections below review the historical, ongoing, and expected potential impacts of other rules on the SO₂ compliance strategy.

Acid Rain SO₂ Compliance Review

Historically, Georgia Power's compliance strategy initially relied heavily upon use of low-sulfur coal. However, the strategy transitioned to rely on FGDs for SO₂ control at coal-

fired steam units and through firing natural gas and low sulfur content fuel oil at combined-cycle, combustion turbine, and other steam units. For purposes of Acid Rain compliance, Georgia Power currently expects to continue to utilize its annual allowance allocations and banked allowances, as needed, to maintain compliance. Under current regulations for the Acid Rain Program, projections show that no Georgia Power allowance purchases will be required in the future absent a change in Acid Rain Program legislation and regulation.

CSAPR SO₂ Compliance Review

The compliance strategy for CSAPR primarily relies on FGDs for SO₂ control at coal-fired steam units and through firing natural gas and low sulfur content fuel oil at combined-cycle, combustion turbine, and other steam units. Georgia Power currently expects to continue to utilize its annual allowance allocations and banked allowances, as needed, to maintain compliance. Under current regulations for the CSAPR SO₂ trading program, projections show that no Georgia Power allowance purchases will be required in the future absent a change in CSAPR legislation and regulation.

Future Rules SO₂ Compliance Review

Georgia Power's fossil generation fleet is now composed of gas/oil-fired units or coal-fired units equipped with FGD and thus achieve state-of-the-art SO₂ control. As a result, while EPA or EPD may issue new or revised regulations related to the SO₂ and PM NAAQS and Regional Haze, no additional controls are assumed to be necessary. For Regional Haze compliance, Georgia Power proposed in the four-factor analysis requested by Georgia EPD, that Plant Bowen would meet the needs of Georgia EPD's SIP by complying with the existing MATS SO₂ limit. Georgia EPD is expected to accept and incorporate this recommendation into the Georgia Regional Haze SIP.

4.1.2 NO_x Compliance

Since 2007, the NO_x compliance strategy and schedule for Georgia Power have also largely been in response to the Georgia Multipollutant Rule, which achieved NO_x reductions through the installation and operation of SCR systems at certain units by specified dates between 2008 and 2015 and switching from coal to natural gas for units at Plant Yates. The sections below review the historical, ongoing, and expected potential impacts of other rules on the NO_x compliance strategy.

Acid Rain NO_x Compliance Review

The Georgia Power compliance strategy for Acid Rain Program for NO_x has historically consisted of installing low-NO_x burners, overfire air ("OFA") systems, and associated controls and use of the NO_x Averaging Plan. However, after the retirement of Plant McIntosh, use of the NO_x Averaging Plan was no longer necessary. Therefore, in September of 2019, the Company terminated the NO_x Averaging Plan effective January 1, 2020. Affected units covered by the regulation now demonstrate ongoing compliance through individual Acid Rain Program limits.

CSAPR Annual and Seasonal NO_x Compliance Review

The compliance strategy for the CSAPR NO_x programs rely on SCRs and low NO_x burners for NO_x control. For purposes of CSAPR NO_x compliance, Georgia Power currently expects to continue to utilize its annual allowance allocations and banked allowances, if needed, to maintain compliance. Under current regulations for the CSAPR NO_x trading programs, projections show that no Georgia Power allowance purchases will be required in the future absent a change in CSAPR legislation and regulation.

Ozone Nonattainment Compliance Review

To meet the NO_x reduction requirements for the 1-hour and 1997 8-hour ozone standards, additional controls beyond those necessary for the Acid Rain Program were required. Various technologies were considered and implemented on a case-by-case basis, including SCR, OFA, low NO_x burners, use of natural gas, and Powder River Basin (“PRB”) coal in order to meet the requirements of the Georgia SIP for ozone. The Company expects to continue to operate and maintain these controls to comply with the ozone season NO_x emission limits applicable to each unit, or each group of units when using emissions averaging, as applicable.

Future Rules NO_x Compliance Review

Within Georgia Power’s fossil generation fleet, all combined-cycle and coal-fired units operate SCRs, which represent state-of-the-art NO_x control. Gas-fired steam units at Plant Yates and simple cycle CTs achieve low NO_x emissions through combustion controls and/or are operated as peaking units with low-capacity factors. Thus, while EPA or EPD may issue new or revised regulations related to the ozone and PM NAAQS and Regional Haze in the future, no additional controls are assumed to be necessary.

4.1.3 Mercury and Air Toxics Standards

Georgia Power and Southern Company were uniquely positioned to understand and implement mercury control technology appropriately across the operating fleet in large part due to the wealth of research and demonstration experience. Southern Company has collaborated with the U.S. DOE, EPRI, equipment suppliers, and other utilities on mercury research. Building off its previous experience, the Company’s research and testing program has enabled it to make individualized, targeted decisions for each unit that optimizes the available technology while minimizing costs to the customer.

Georgia Power began complying with MATS in April 2016. While there have been multiple revisions to the rule since then, no substantive changes to the particulate matter, mercury, or acid gas standards applicable to the Company’s units have been made. Therefore, Georgia Power expects to continue to use the existing MATS compliance strategy for each coal-fired unit. The Company will continue to monitor any future rule changes, including the proposal reconsidering the 2020 MATS Reconsideration of Supplemental Finding and RTR is currently at OMB. No additional controls are currently anticipated, But the Company will incorporate new requirements into the ECS process and refine or update the strategy as needed.

For mercury, significant reductions are achieved on bituminous coal-fired units through the mercury reduction and capture co-benefits of the SCR and FGD. However, additional incremental mercury reductions are required to comply with the MATS mercury limit on a continuous basis. Therefore, Georgia Power installed activated carbon and alkali sorbent (e.g., hydrated lime) injections systems on all units at Plants Bowen, Hammond, and Wansley. In addition, to minimize operational costs associated with the injection systems, Mercury Re-emission Control Systems (“MRCSS”) were also installed at Plant Bowen Units 1-2 and at Plant Wansley Units 1-2 to prevent re-emission of mercury once it is captured in the FGD. To ensure compliance with the MATS particulate matter limits, optimization of the existing electrostatic precipitators (“ESPs”) was performed at Plant Bowen Units 1-2, and Plant Wansley Units 1-2, while baghouse retrofits were necessary at Plant Bowen Units 3-4 to capture additional particulate in the flue gases in order to comply.

Coal-fired units with FGDs have the option to comply with either the MATS HCl or alternate SO₂ emissions limit. Due to the stringency of the MATS standard and limited operational flexibility relative to the Georgia Multipollutant Rule and SO₂ Emissions Rule, the Company performed plant-specific optimization projects on the existing FGDs at Plants Bowen and Wansley to minimize potential impacts to reliability in the future as a part of the MATS compliance strategy. Additionally, measures were implemented at Plants Bowen and Wansley to optimize balance of plant performance and ensure reliability of mercury, acid gas, and particulate matter controls.

For the subbituminous coal-fired units at Plant Scherer, existing controls installed to comply with the Georgia Multipollutant Rule (i.e., FGD, SCR, and baghouse with activated carbon injection (“ACI”)) are used to comply with the MATS limits.

Plant Yates Units 6 and 7 and Plant Gaston Units 1-4 switched to natural gas as the primary fuel. By switching to natural gas, these units are no longer subject to MATS because MATS applies only to coal- and oil-fired units. Georgia Power determined that use of natural gas at these plants is the most economic choice for customers and is feasible both from a boiler technology as well as a natural gas fuel supply perspective.

For other unscrubbed coal- or oil-fired steam generating units, options for MATS compliance were very limited and/or cost prohibitive; therefore, these units were retired.

4.1.4 Greenhouse Gases

As detailed above in Section 3.2, there is a great deal of activity related to climate and carbon legislation and regulation. These potential actions are expected to result in legislative or regulatory pressures aimed at reducing carbon emissions, which would be most impactful to fossil generation units. With a wide range of possible outcomes, the Company’s scenario planning process remains the best way to capture potential financial impacts and allow for long-term planning to mitigate risks to customers. As shown in the graph below, the Georgia Power planning scenarios cover a range of potential outcomes for various carbon tax legislation. In addition, emission reductions or clean electricity

penetration that could be required in the recent clean energy standard legislative proposals are also likely to be represented by the planning scenarios range.

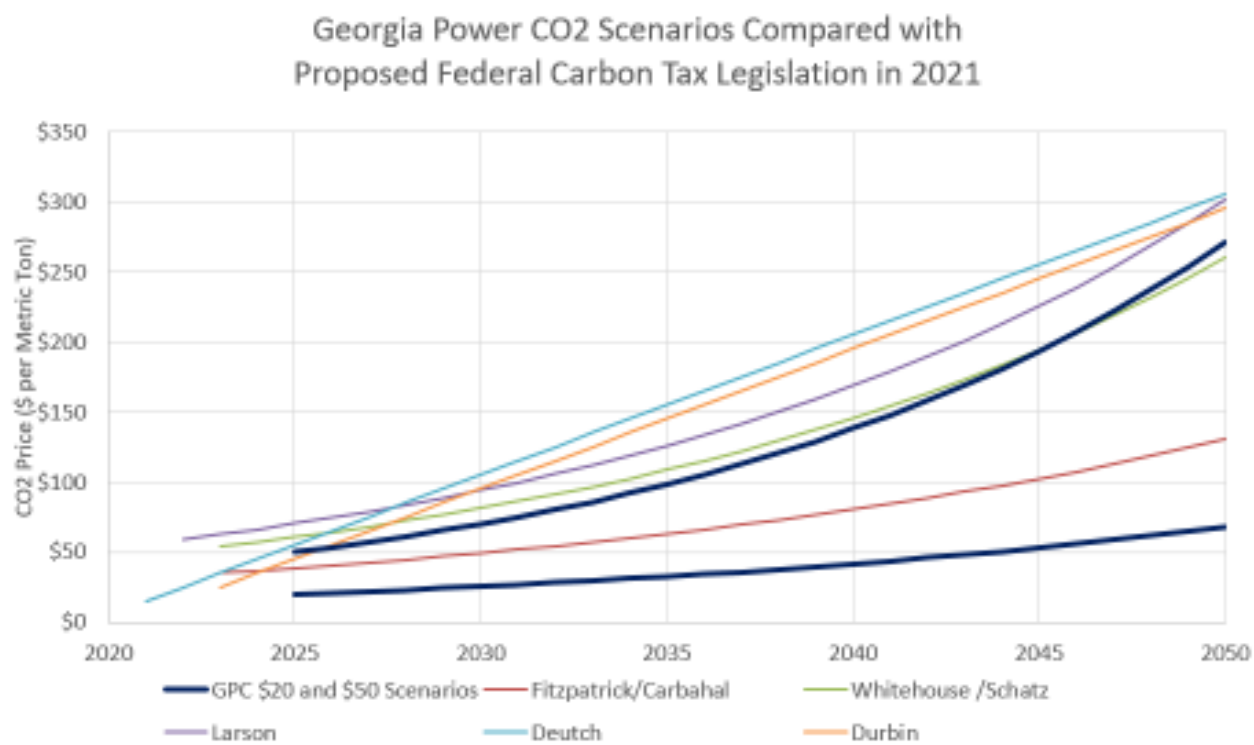


Figure 4-1 Georgia Power CO2 Scenarios Compared with Proposed Federal Carbon Tax Legislation in 2021.

When evaluating continue-to-operate or retirement options, Georgia Power's planning scenarios process not only allows for consideration of future carbon costs, but also considers other long-term planning needs, such as transmission system improvements, upcoming replacement generation resource needs, and other infrastructure. The Company will monitor and evaluate the outcome of these executive, legislative, and regulatory actions and incorporate any new information into the compliance strategy process as appropriate.

4.2 Water Compliance Strategy Review

The water compliance strategy considers a variety of regulations related to water quality and use, including both nationwide standards as well as state requirements. The strategy focuses on all facilities that use and discharge water, including fossil fueled plants and hydroelectric facilities. The strategy and actions required to meet these regulations are discussed below.

4.2.1 Cooling Water Intake Structures

For purposes of 316(b) rule compliance, Plants Bowen, McDonough, McIntosh CC, Scherer, Wansley, and Yates employ closed-cycle cooling and therefore, have been

determined by EPD to comply with the impingement and entrainment BTA requirements of the rule and their NPDES permits. EPD has required installation of flow monitoring equipment, where not already installed or an alternative calculation method, to demonstrate effective operation as a closed-cycle cooling facility. A summary of the cooling types and associated controls included in the Company's strategy for each unit is included in Table 4.2.2-1.

In 2019, the PSC approved decertification of Plant McIntosh Unit 1. While Plant McIntosh Unit 1 is no longer subject to 316(b), the site still maintains a cooling water intake structure for the operation of Units 10 and 11. As part of Georgia EPD's final BTA determination for entrainment related to the remaining units, through the NPDES permit, Plant McIntosh was required to replace the existing intake pumps, which were designed for Unit 1, with smaller pumps appropriately sized with the water intake needs and operation of the cooling towers for the combined cycle Units 10 and 11. This project was successfully completed in 2021.

In this IRP, Georgia Power is requesting decertification of GPC's ownership for Plant Gaston's Units 1-4 by December 31, 2028. Plant Gaston's strategy for 316(b) compliance includes intake screen modifications with a fish friendly return system. The 316(b) compliance strategy will be reviewed and approved via the BTA determination process and subsequent NPDES permit issuance by the Alabama Department of Environmental Protection. The timing of the installation is dependent on the permit issuance with an expected installation date of 2026. These costs are anticipated to be required even with the retirement of the Plant Gaston Units 1-4 in 2028. Specifically, the intake screen structures will serve to reduce impingement and entrainment of aquatic species.

4.2.2 Wastewater Treatment Facilities

The 2015 ELG Rule included stringent requirements for handling of fly ash, bottom ash, plant process water, as well as treatment of FGD wastewater. In compliance with both the 2015 ELG Rule, its subsequent amendments, and state and Federal CCR rules and as presented and approved in the 2016 and 2019 IRPs, the Company has completed installation of additional control systems for fly ash and bottom ash transport water at Plants Bowen, Scherer, and Wansley and low volume wastewater at Plants Bowen, McIntosh, Scherer, and Wansley. These systems were necessitated by the closure of the ash ponds and the requirement to replace their treatment functionality to meet requirements in the ELG Rule. The Company's 2022 compliance strategy for the ELG and CCR Rules builds on and refines the Commission-approved ECS in the 2019 IRP filing (Docket No. 40161) as well as the Company's 2021 ECS filing with the Commission.

As discussed in Section 3.4.12, the ELG Reconsideration Rule revised the 2015 Rule's BAT effluent limitations guidelines that apply to FGD wastewater and bottom ash transport water. These requirements are being incorporated in Georgia Power's NPDES permits by Georgia EPD with allowance for changes necessitated by any further regulatory revisions. These NPDES permits have and will require new or supplemental wastewater treatment systems on multiple waste streams at Georgia Power plants to

satisfy the ELG Reconsideration Rule. The Company is now focused on the FGD wastewater strategy at Plants Bowen, Gaston, Scherer, and Wansley.

Compliance with the ELGs for FGD wastewater is a site-specific effort that needs a tailored design for the site's water chemistry and water volume needs, as well as site-specific logistics and space availability. This site specificity makes the use of standardized designs and modular construction techniques largely impractical. It should also be noted that FGD wastewater treatment systems are not widely deployed in the U.S. Therefore, the Company has undergone, and continues, significant review and consideration of the regulatory requirements to develop a strategy to ensure cost-effective technology performance, reliability, and compliance. The Company continues to respond to Georgia EPD to incorporate requirements in site-specific NPDES permits to comply with the 2015 ELG Rule and subsequent ELG Reconsideration Rule. Factors for EPD to consider in setting applicability dates to comply with the ELG Reconsideration Rule are provided in 40 CFR § 423 and include necessary time for the Company to meet the commitments of its regulatory process with this Commission, as a key component of that evaluation.

The frequent revision of the ELG rules and the delay in promulgation of the ELG Reconsideration Rule impacted the Company's ability to finalize and implement its previous environmental compliance strategy regarding ELGs. The regulatory uncertainty from the EPA's delay and its impact on Georgia Power, was recognized by the Georgia Office of State Administrative Hearings during the 2018 Plant Hammond NPDES Permit Appeal¹. This regulatory uncertainty continues and is a key factor in the Company's analysis and ultimate strategy to comply with the 2015 ELG Rule and subsequent ELG Reconsideration Rule. Nonetheless, the Company has worked diligently to analyze compliance with the rule as part of its technical and economic process in the upcoming IRP proceeding to ensure clean, safe, reliable and affordable electricity to its customers.

The Company has evaluated the different compliance pathways allowed by the rule and on October 13, 2021, as required by the ELG Reconsideration Rule, filed information regarding ELG compliance with Georgia EPD,² including notices of planned participation

¹ See Am. Final Decision, Coosa River Basin Initiative v. Dunn, Nos. 1825406-BNR-WQC-57-Howells, 1826761-BNR-WQC-57-Howells at 13-14, 18 (OSAH Oct. 15, 2018).

² See Letters, October 13, 2021, Georgia Power to Georgia Environmental Protection Division, RE: Plant Bowen – NPDES Permit No. GA0001449, Notice of Planned Participation Bowen Units 1 and 2

October 13, 2021, Georgia Power to Georgia Environmental Protection Division, RE: Plant Scherer – NPDES Permit No. GA0035564 Notice of Planned Participation Scherer Units 1 and 2

October 13, 2021, Georgia Power to Georgia Environmental Protection Division, RE: Plant Scherer – NPDES Permit No. GA0035564 Notice of Planned Participation Scherer Unit 3

October 13, 2021, Georgia Power to Georgia Environmental Protection Division, RE: Plant Wansley – NPDES Permit No. GA0026778, Notice of Planned Participation Wansley Units 1 and 2

(NOPP), for its coal-fired generation plants. In these filings, the Company notified Georgia EPD of its selected options for FGD wastewater compliance as follows:

- Georgia Power's intent to permanently cease coal combustion no later than December 31, 2028, for Plant Bowen Units 1 and 2, Plant Scherer Unit 3, and Plant Wansley Units 1 and 2.
- Plant Scherer Units 1 and 2's intent to pursue ELG compliance through the Voluntary Incentive Program subcategory with a compliance deadline of December 31, 2028.
- Plant Bowen Units 3 and 4's intent to comply with the generally applicable requirements by December 31, 2025.

A NOPP was submitted to the Alabama Department of Environmental Management for Plant Gaston on October 13, 2021. The NOPP indicated the intent to permanently cease coal combustion through retirement by December 31, 2028 for Plant Gaston units 1-4. The compliance pathway of permanent cessation of coal combustion through the retirement of Units 1-4 at Plant Gaston provides cost-efficiencies in terms of ELG compliance. If approved by the Commission, the certainty provided by these retirement decisions should allow the Company the necessary time to plan for replacement generation and system reliability needs.

In addition to the filings noted above, the Company has requested NPDES permit conditions from the Georgia EPD that include flexible pathways for installing controls or pursuing retirement as part of its ELG compliance strategy. This includes incorporating, as applicable, the effluent limitations for FGD wastewater based on 40 CFR § 423.13(g)(1)(i) as well as alternative FGD wastewater and based on 40 CFR § 423.13(g)(3)(i), for the Voluntary Incentives Program. The parallel pathways being requested in the NPDES permits are necessary, as this allows the Company to complete technical and economic evaluations and provide the time required to work with this Commission for approval of these compliance strategies.

The wastewater treatment controls necessary to comply with the ELG wastewater limitations at Plants Bowen, Gaston, Scherer, and Wansley include installation of site-specific treatment systems. Site-specific factors were evaluated to include costs for installation and operation of these systems and those costs and schedules were included for evaluation in the URS for these facilities. However, due to the results provided by the URS and the new and updated alternative compliance pathways provided in ELG Reconsideration Rule, the Company is recommending strategies as noted throughout the ECS.

The Company's selected ELG compliance strategy includes retirement of Plants Bowen Units 1 and 2, Scherer Unit 3, and Wansley Units 1 and 2. Certifying retirement prior to December 31, 2028, through the rule's Permanent Cessation of Coal Combustion subcategory provides a cost-effective alternative for ELG compliance. If approved by the

Commission, the certainty provided by these retirement decisions should allow the Company the necessary time to plan for replacement generation and system reliability needs.

The Company's selected ELG compliance strategy is installation of FGD wastewater treatment systems at Plants Bowen Units 3 and 4 and Scherer Units 1 and 2. As discussed in Section 2.3.1, the Company's R&D and testing of water treatment technologies, supported by the Commission, has enabled these selected strategies to develop. This testing includes physical-chemical-biological treatment systems as well as membrane-based treatment systems. Based on this research and testing, the Company has selected a physical-chemical-biological treatment system for Plant Bowen Units 3 and 4 to be installed by December 31, 2025.

In reflection of plant-specific equipment and operational characteristics, Plant Scherer Units 1 and 2 have a different strategy than Plant Bowen. As a result of the Company's continued evaluation and research of wastewater treatment systems, Plant Scherer may benefit from the VIP compliance subcategory option provided for in the ELG Reconsideration Rule by using membrane-based treatment technology. This option provides an alternative to physical-chemical-biological treatment, even though the VIP subcategory includes more stringent requirements. While more study is needed on the membrane technology system before making a final determination, the Company's long-term investment in water research has positioned Plant Scherer to be able to explore multiple options, with the goal of providing the greatest benefit to customers. Thus, the Plant Scherer filing with Georgia EPD identified the Company's intent to pursue the VIP compliance pathway in the ELG Reconsideration Rule for Units 1 and 2, which affords an additional three years to complete the continued technical evaluation and install controls. However, because of the needed testing and study of the membrane-based technology, the Company has included control assumptions and costs related to installation of a physical-chemical-biological treatment system in this ECS and IRP. The benefits of this additional time provided by the VIP compliance path evaluation include the ability to perform further research and development, adjust to future regulatory changes, and provides the flexibility to install physical-chemical-biological controls or adjust the strategy and pursue retirement should conditions change.

The unique and site-specific water quality and quantity characteristics at Plant Scherer make it the only site where a VIP pathway can potentially be feasibly pursued. While the research and testing to date indicates that a membrane-based treatment solution shows promise at Plant Scherer, on-going research, testing, and design of the full membrane-based treatment solution is needed and being performed to work through technical and regulatory compliance evaluations. The additional research efforts at Plant Scherer are scheduled for completion prior to the conclusion of the 2022 IRP proceedings, and as such the Commission will be updated during that process accordingly. Controls will be installed for continued operation of Plant Scherer Units 1 and 2. Should the evaluation of the membrane-based treatment systems show appropriate technical performance,

reliability, operational flexibility and cost compared against the physical-chemical-biological controls, the Company will install the membrane-based system.

Importantly, because of the EPA's August 2021 announcement of Supplemental Rulemaking being undertaken, the executable timeline for final engineering and subsequent procurement and construction of these ELG projects may evolve as the Company moves forward. The uncertainty by the new rulemaking has added additional risk considerations to units that have existing economic and regulatory pressures. These risks as well as system reliability risks are being evaluated and further justify the Company's proposed diverse strategy for the remaining coal-fired generating units.

The Company's current wastewater treatment controls and strategy for compliance with the 2015 ELG Rule and ELG Reconsideration Rule is illustrated in Table 4.2.2-1.

Table 4.2.2-1 Cooling Type / Wastewater Treatment / ELG Technologies

Unit	Cooling Type	316(b) Cooling Water	CCR WW	BATW	Fly Ash	FGD Wastewater
Bowen 1 & 2	Closed-Cycle	Flow Monitoring	Phys/Chem	RMDC	Dry Handling	Phys/Chem Bio ₂
Bowen 3 & 4	Closed-Cycle	Flow Monitoring	Phys/Chem	RMDC	Dry Handling	Phys/Chem Bio ₁
Gaston 1 - 4	Once-Through	Intake Screens	Phys/Chem/Pond	SGC	Dry Handling	N/A
McDonough 4 - 6	Closed-Cycle	Flow Monitoring	N/A	N/A	N/A	N/A
McIntosh 10 - 11	Closed-Cycle	Intake Pump Modification	Pond	N/A	N/A	N/A
Scherer 1 & 2	Closed-Cycle	Flow Monitoring	Phys/Chem	MAC	Dry Handling	Phys/Chem Bio or VIP ₁
Scherer 3	Closed-Cycle	Flow Monitoring	Phys/Chem	MAC	Dry Handling	Phys/Chem Bio or VIP ₂
Wansley 1 & 2	Closed-Cycle	Flow Monitoring	Phys/Chem	RMDC	Dry Handling	Phys/Chem Bio ₂
<i>1 Wastewater treatment projects selected to comply with ELG rule</i> <i>2 Alternative compliance pathway selected due to results of URS to comply with ELG rule. See NOPP Filing with Georgia EPD for ELG discussed in Section 4.2.2</i>						

4.3 Solid Waste Management Compliance Strategy Review

The federal and state CCR rules regulate storage and disposal of CCR and apply to CCR landfills and ash ponds. In compliance with the Federal CCR Rule and the more stringent Georgia CCR Rule, Georgia Power has identified its strategy to close the Company's ash ponds and implement the requirements of these rules. During the 2019 IRP, Georgia Power presented its strategy for the items listed in Table 4.3-1 and received approval from the Commission. In accordance with the 2019 IRP Final Order, CCR project progress and cost updates have been submitted semi-annually to the PSC through Docket No 43083.

4.3.1 Background and Compliance Requirements

Ash ponds were designed, installed, and operated to function as a treatment system for power plant wastewaters, and they have effectively served in this capacity for decades in compliance with NPDES permits under which they were regulated.

Georgia Power's ash pond closure plans and compliance strategy are designed to comply with the Federal CCR Rule, as well as the more stringent requirements of the Georgia CCR Rule. The federal and state CCR rules explicitly authorize both closure in place and closure by removal as options, with each option subject to its own set of closure performance criteria. The Georgia CCR Rule regulates all ash ponds and landfills in the state and establishes a comprehensive permitting program through which Georgia EPD reviews and issues all permits, as well as oversees closure and post-closure activities to ensure ash pond closures meet the requirements of the Georgia CCR Rule and are protective of human health and the environment. Pursuant to the WIIN Act, the EPA approved the Georgia EPD's CCR state permit program, with the exception of certain provisions for which the state of Georgia did not seek approval. These provisions do not significantly impact the Company's CCR strategy. Georgia is the second of only three states in the nation to gain approval to operate a state CCR Permit Program.

4.3.2 Ash Pond Closure and Landfill Compliance Strategy

Since the EPA published the CCR rule in 2015, the Company has worked to develop and implement closure plans in compliance with the rule at its 29 ash ponds and 12 existing CCR landfills at 12 sites across the state. The Company developed a compliance strategy that included ceasing placement of coal ash in ash ponds, which occurred in 2019, and putting necessary actions in motion to meet the rule's strict deadlines and requirements to close ash ponds. The Company's plans are based on long-standing rule interpretation held by both industry and environmental regulators. In addition, the Company used industry- and agency- accepted engineering practices utilized for closure designs that are consistent with solid waste regulatory requirements, on which the CCR rule is based. At all times these plans have been supported by sound engineering designs, and certified by Professional Engineers with expertise in solid waste permitting and design. As discussed in Section 3.4.17, the EPA has recently announced its new positions on the nearly seven-year-old rule, and the Company remains focused on compliance and will continue to work with the Georgia EPD to ensure safe and effective closure ash ponds.

The Company has made significant progress with ash pond closures. EPA's rule created regulatory incentives, encouraged expediting ash pond closures, and established stringent deadlines for CCR compliance. Georgia Power reacted by progressing with closure of certain ash ponds at Plants Hammond, McDonough, McManus and Yates, that were no longer needed for operations. Construction for many of these projects is complete or in the final stages.

In November 2018, Georgia Power completed the submission of 29 CCR permit applications as required by the Georgia CCR Rule for ash ponds and CCR landfills. These permit applications outlined significant and detailed engineering information about Georgia Power's ash pond closure plans and landfill operations plans. The permit application process was developed and completed with significant internal resources supported by multiple third-party engineering firms and licensed professional engineers and geologists. In order to comply with regulatory requirements, the Company's ash pond closure plans and permit applications take into account detailed criteria outlined by the federal and state CCR rules as well as long-standing rule interpretation of solid waste facilities under RCRA by environmental regulators.

As part of the permitting process, Georgia EPD reviews and provides comments on the site-specific details of the individual permit applications. Georgia Power reviews comments from the Georgia EPD, updates documents, engineering designs, and any other actions necessary to respond to Georgia EPD's comments. Through this process to date, final permits for Plant Hammond AP-1, Hammond AP-2, Hammond AP-4, Plant McIntosh AP-1, Plant McManus AP-1, Plant Yates AP-1 and Gypsum Stack have been issued by the EPD. Through March 2022, Georgia EPD has additionally issued a final permit for Plant Bowen AP-1 and a draft permit for Plant Hammond AP-3, both closure in place projects. The Company continues to respond to Georgia EPD's requests for information and comments to the permit applications. Georgia EPD permitting activities for the remaining projects are currently expected to continue through 2023.

In order to advance ash pond closures and meet the stringent regulatory deadlines associated with the Federal CCR Rule and Georgia CCR Rule, regardless of permit issuance, the Company must continue to proceed with work, including groundwater monitoring, detailed engineering designs, construction activities, as well as develop and implement site-specific and comprehensive ash pond dewatering processes. This will allow Georgia Power to remain in compliance with applicable mandated closure deadlines.

The Company's CCR compliance strategy process is developed to respond to changing regulations. While the strategy itself will continue to necessarily evolve, the purpose of the process has always been to produce cost-effective compliance solutions that will minimize the impact to customers while achieving environmental objectives and ensuring compliance with all requirements.

An example of this continuous strategy process currently presents itself in connection with the Company's request to retire Plant Wansley Units 1 and 2 in the 2022 IRP. If approved, the retirement of Plant Wansley Units 1 and 2 presents an opportunity for ash pond closure alternatives that were previously not available due to assumed continued operation of the units.

The continued operation of the coal-fired units at Plant Wansley would require the use of the fully constructed on-site permitted CCR landfill to support the plant's environmental controls and handling of ash and gypsum byproducts. If the retirement of Units 1 and 2 is approved, this on-site landfill would be available for use in support of the site's ash pond closure. The Company has completed an evaluation to close Plant Wansley's ash pond by removal utilizing the existing on-site landfill. The evaluation took into consideration the current landfill capacity, the potential to increase or establish additional landfill capacity, CCR material movement/placement, and long-term considerations associated with post closure care. The result of this assessment indicates the following:

- If the retirement of Wansley Units 1 and 2 is approved, approximately 95% of the existing landfill capacity would remain unused. Under a closure by removal scenario, the existing landfill, with an expanded footprint, would be fully utilized and have capacity to accept all of the CCR from Plant Wansley AP-1.
- While the current closure in place strategy utilizing a cover system and containment structure provides a robust solution, the plan is expected to require the full regulatory closure time allowed and calls for significant site-specific engineering and specialty construction implementation related to the installation of the containment structure. The closure by removal alternative reduces the schedule duration as well as the specialty work associated with the containment structure construction and allows ash removal and placement in the on-site landfill to begin shortly after ash pond closure construction begins.
- Ash beneficial use is available throughout closure and in post closure care in the closure by removal alternative, as driven by the market; whereas, the closure in place option severely limits the volume of and timing for ash available to the market.
- Under the closure in place strategy, both the ash pond and the landfill require a minimum of 30 years of post closure care. The closure by removal strategy consolidates the ash into a single footprint within the landfill and reduces the post closure care requirements for the site.

Given these factors, if the Commission approves the retirement of Plant Wansley Units 1 and 2, Georgia Power will modify the closure strategy of Plant Wansley's ash pond from closure in place to closure by removal utilizing the on-site landfill. The Company will submit updated permit information to Georgia EPD following the issuance of the Commission's order in the 2022 IRP.

A summary of the Company's approved closure strategy method along with applicable construction updates is provided in Table 4.3-1. This information is consistent with the

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information provided in the permits and permit applications submitted to Georgia EPD and as reported in the CCR ARO Program Semi-Annual Program Status Report filed with the Commission through Docket No 43083. Georgia Power has provided landfill and ash pond closure certifications to Georgia EPD for certain CCR Units at Plants Branch, Hammond, Kraft, McDonough, McManus, McIntosh, and Yates. These closure certifications document important information regarding the closure activities, quality control information, and verification of compliance with the CCR rule. Georgia EPD has issued acknowledgement letters for completion of CCR removal for certain CCR Units at Plants McManus, McDonough, McIntosh, and Yates, demonstrating the Company's compliance with the state CCR rule's closure requirements as well as Georgia EPD's active oversight regardless of final permit status.

The Company continues to meet ongoing compliance requirements at the applicable sites through landfill and ash pond inspections, notices of intent to close CCR units, groundwater monitoring events and documentation consisting of annual and semi-annual groundwater reports, alternate source demonstrations, assessment of corrective measures progress reports, and notifications to the Georgia EPD Director for compliance with state and Federal CCR rules.

Table 4.3-1 CCR Strategy

Plant	Impoundment/Landfill	Closure Method	Description
Arkwright	LF (AP-1 Landfill, AP-2 DAS Landfill, AP-3 Landfill and Monofill)	Closure by Removal to Permitted Landfill	AP-1 Landfill, AP-2 DAS Landfill, and AP-3 Landfill and Monofill were closed in 2010 under Solid Waste Regulations applicable at the time of closure. Under the new Georgia CCR Rule, AP-1, AP-2 DAS, and AP-3 will be closed by removal to a future lined on-site landfill. The existing Monofill will also be incorporated into the future on-site landfill. Site restoration will be completed following CCR removal from the landfills.
Arkwright	Future LF	In Design Phase/Close in Place	The future lined landfill will be on-site and will receive CCR from the other on-site landfills. Permitting activities are ongoing.
Bowen	AP-1	Close in Place with Liner	AP-1 is being closed in place following excavation of CCR to install a new liner system. The CCR within AP-1 will be excavated and consolidated into a fully contained engineered structure (composite-lined and final-covered area). Construction mobilization began in the first quarter of 2021 and closure construction is ongoing. Dewatering is ongoing, consistent with Georgia EPD-approved Dewatering Plan. A draft CCR solid waste period permit has been issued by Georgia EPD. The Company is conducting additional groundwater studies to support the Assessment of Corrective Measures ("ACM") process and remedy selection.
Bowen	LF	Active LF/Close in Place	CCR landfill is to remain active as part of ongoing plant operations. The landfill will undergo closure when permitted capacity is reached or when CCR disposal is no longer needed.
Branch	AP-A	Closure by Removal	AP-A was closed by removal and consolidated within AP-E before the State CCR Rule became effective. Site restoration has been completed. Georgia Power submitted a certification of ash removal from AP-A to Georgia EPD in 2018 to provide documentation of the AP-A closure.

Plant	Impoundment/Landfill	Closure Method	Description
Branch	AP-B, C, D, E	Closure by Removal	AP-B, C, D, & E will be closed by removal to a future permitted onsite lined CCR landfill. Site restoration will be completed following CCR removal. Dewatering is ongoing, consistent with the Georgia EPD-approved Dewatering Plan. Early site preparation activities are underway, such as construction of stormwater diversion features and further site development to support dewatering. Permitting is underway for a new landfill to accept CCR from the ash pond closures. The Company is conducting additional groundwater studies to support the ACM process and remedy selection.
Branch	Future LF	In Design Phase/Closure in Place	Future lined landfill will receive CCR from the removal of on-site ash ponds. Permitting activities are ongoing. The letter of Site Acceptability for the new landfill was received from Georgia EPD in June 2020.
Hammond	AP-1, 2	Closure by Removal	AP-1 and 2 are being closed by removal to a Company-owned off-site permitted landfill (Huffaker Road). Dewatering consistent with the Georgia EPD-approved Dewatering Plan commenced in the first quarter of 2021. Closure construction mobilization began third quarter of 2021. Work is continuing with the removal of CCR from AP-2 to Huffaker Road. Site restoration will be completed following CCR removal. The Company is conducting additional groundwater studies to support the ACM process and remedy selection.
Hammond	AP-3	Closure in Place	AP-3 has been closed in place with the installation of an impermeable cover system that includes a geomembrane. A closure certification report was submitted to Georgia EPD in 2018. Consistent with the post-closure plan, and to enhance the effectiveness of closure, a TreeWell® system will be installed outside and downgradient of the CCR footprint. A draft CCR solid waste permit has been issued by Georgia EPD. The Company is conducting additional groundwater studies to support the ACM process and remedy selection. AP-3 is under interim post-closure care.
Hammond	AP-4	Closure by Removal	Dewatering consistent with the Georgia EPD-approved Dewatering Plan commenced in the first quarter of 2021. The Company is progressing the detailed design package. AP-4 will be closed by removal to a Company-

Plant	Impoundment/Landfill	Closure Method	Description
			owned offsite permitted landfill (Huffaker Road) or another off-site permitted landfill. Site restoration will be completed following the CCR removal.
Hammond	LF (Huffaker Rd)	Active LF/Closure in Place	CCR landfill is to be closed following placement of CCR from certain ash ponds at Hammond.
Kraft	AP-1	Closure by Removal	AP-1 was closed by removal to offsite permitted landfills prior to the Georgia CCR Rule. The removal was part of an expanded plant retirement project and was regulated by Georgia EPD's Response and Remediation Program. Georgia Power submitted a certification of ash removal from AP-1 to Georgia EPD in 2018 as part of a site-wide Compliance Status Report. Georgia EPD provided concurrence with the Compliance Status Report in June 2020 and removed the site from Georgia EPD Hazardous Sites Inventory in 2021.
Kraft	LF (Grumman Rd)	Inactive LF /Closure in Place	Grumman Road Landfill is an inactive landfill and has been closed in place, and a final construction certification report was submitted to Georgia EPD in 2019. The Company completed additional restoration activities in 2020 and is conducting additional groundwater studies to support the ACM process and remedy selection.
McDonough	AP-1	Closure in Place	AP-1 closure construction is ongoing. The closure includes installation of a geosynthetic cap cover system which is substantially complete and the installation of a barrier wall to enhance the effectiveness of the closure. The Company is conducting additional groundwater studies to support the ACM process and remedy selection.
McDonough	AP-2	Closure by Removal	AP-2 has been removed and the ash consolidated with AP-1 and AP-3&4. A certification of ash removal was submitted to Georgia EPD in March 2020. In October 2020, Georgia EPD acknowledged that CCR removal activities in AP-2 have been completed. Site restoration is

Plant	Impoundment/Landfill	Closure Method	Description
			underway. The Company is conducting additional groundwater studies to support the ACM process and remedy selection.
McDonough	AP-3 & AP-4	Closure in Place	AP-3 & AP-4 are being consolidated and closed in place with a geosynthetic cap cover system. Consistent with closure plans, closure construction includes an underslope drainage system and the continued use of temporary dewatering wells to enhance the closure. The Company is conducting additional groundwater studies to support the ACM process and remedy selection.
McIntosh	AP-1	Closure by Removal	AP-1 has been removed with the ash placed in a permitted on-site landfill. Restoration activities are underway. A final certification of ash removal was submitted to Georgia EPD in the third quarter of 2021 with Georgia EPD acknowledgement in October 2021. AP-1 is under interim post-closure care.
McIntosh	LF3	Closed in Place LF	CCR Landfill 3 was closed in place in 2008 in accordance with the current landfill permit and is now in post-closure care.
McIntosh	LF4	Active LF /Closure in Place	A final cover system is currently being installed on CCR Landfill 4, Cell 2A following completion of the ash pond closure construction activities, in accordance with the landfill permit. The landfill will undergo final closure when CCR disposal is no longer needed.
McManus	AP-1	Closure by Removal	AP-1 has been removed. Excavated CCR was placed in an off-site permitted landfill. A certification of ash removal was submitted to Georgia EPD in 2019. In January 2020, Georgia EPD acknowledged completion of CCR removal activities. Site restoration activities were completed in 2020. A final CCR permit was issued for AP-1 on June 18, 2021. On July 1, 2021 a modified NPDES permit became effective following Georgia EPD acknowledgment of the completion of dewatering activities. The Company is conducting additional groundwater studies to support the ACM process and remedy selection. AP-1 is in post closure care.

Plant	Impoundment/Landfill	Closure Method	Description
Mitchell	AP-A, 1, 2	Closure by Removal	AP-A, 1, and 2 are being closed by removal of CCR for beneficial use. Ash removal began in the second quarter of 2020 from the combined ash pond area and is being transported off site for beneficial use. Dewatering consistent with the Georgia EPD-approved Dewatering Plan commenced in the first quarter of 2021. After CCR removal, the site will be restored.
Scherer	AP-1	Closure in Place	AP-1 will be closed in place. Consistent with the closure plans, the closure construction includes consolidation of the current ash pond footprint, with extension of the final cover system over non-CCR containing areas to minimize stormwater infiltration. Design is being finalized and constructability reviews were completed in 2021. Early site preparation work began in 2021 and dewatering is expected to commence in 2022. The Company is conducting additional groundwater studies to support the ACM process and remedy selection.
Scherer	LF	Active LF /Closure in Place	CCR landfill to remain active as part of ongoing plant operations. The landfill will undergo closure when permitted capacity is reached or when CCR disposal is no longer needed.
Wansley	AP-1	Closure by Removal	The ash pond closure strategy has been further evaluated based on the Company's request in the 2022 IRP to retire Plant Wansley Units 1 and 2. If the Commission approves the retirement of Plant Wansley Units 1 and 2, the Company will modify its ash pond closure strategy to a closure by removal using the existing on-site landfill. Georgia Power has notified Georgia EPD of this recommendation and – pending PSC approval of the retirement of Wansley Units 1 and 2 – expects to advance design and engineering as well as submit revised permit information for a closure by removal strategy with Georgia EPD by the end of 2022.
Wansley	LF	Active LF /Closure in Place	If the Commission approves the retirement of Plant Wansley Units 1 and 2, the Company will utilize the existing on-site landfill for storage of removed CCR from AP-1. The landfill would then be closed following placement of CCR from AP-1. Georgia Power has notified Georgia EPD of this recommendation and – pending PSC approval of the retirement of Wansley Units 1 and 2 – expects to submit a permit modification to

Plant	Impoundment/Landfill	Closure Method	Description
			Georgia EPD for a landfill expansion to facilitate this proposed strategy and advance engineering, design and permit modifications in 2022.
Yates	AP-1	Closure by Removal	AP-1 was removed to R6 and AP-B' and AP-3. Removal activities at AP-1 were completed in 2018. A certification of ash removal was submitted to Georgia EPD in 2019. In November 2020, Georgia EPD acknowledged that CCR removal activities in AP-1 have been completed. A final CCR solid waste permit has been issued by Georgia EPD. AP-1 is under interim post-closure care.
Yates	AP-2	Closure by Removal	AP-2 is being closed by removal to AP-B' and AP-3. Dewatering is ongoing, and all ash contact water from AP-2 and the other ponds is managed as required by Georgia EPD-approved Dewatering Plan. Site restoration will be completed following CCR removal. A partial certification of removal report for AP-2 was submitted to Georgia EPD and acknowledged in March 2021.
Yates	AP-3, B'	Closure in Place	AP-3 and AP-B' are being consolidated and will be closed in place with a geosynthetic engineered cap-cover system. Installation of a cap cover system that includes a geomembrane is underway and will ultimately cover the entire consolidated footprint. A certification of removal report was submitted to Georgia EPD in October 2020 for the perimeter road and other areas inside this combined CCR unit. In March 2021, Georgia EPD acknowledged that CCR removal activities within these areas have been completed. Consistent with the closure plans, a subsurface hydraulic conveyance system has been incorporated into the closure construction activities to enhance the effectiveness of closure. The Company is conducting additional groundwater studies to support the ACM process and remedy selection.
Yates	AP-A	Closure by Removal	AP-A was removed and the ash placed in AP-B' and AP-3. Restoration activities at AP-A are ongoing. A certification of removal was submitted

Plant	Impoundment/Landfill	Closure Method	Description
			to Georgia EPD in October 2020. In March 2021, Georgia EPD acknowledged that CCR removal activities in AP-A have been completed.
Yates	AP-B	Closure by Removal	AP-B is being closed by removal to AP-B' and AP-3. Site restoration will be completed following CCR removal. A certification of ash removal is currently scheduled to be completed and submitted in 2022.
Yates	AP-C	Closure in Place	The former ash pond was previously incorporated into the on-site permitted landfill, R6, and is being closed in place in accordance with the current landfill permit requirements.
Yates	LF (R-6)	Inactive LF/Closure in Place	CCR Landfill R6 is currently being closed in accordance with its current landfill permit requirements.
Yates	LF (Gypsum)	Closed by Removal	The Gypsum landfill has been removed and is currently in IPCC. A final construction certification report was submitted to Georgia EPD in January 2017. In October 2020, Georgia EPD acknowledged that CCR removal activities have been completed. A final CCR solid waste permit has been issued by Georgia EPD.

4.3.3 Ash Pond Dewatering

Georgia Power's ash pond closure activities include comprehensive and customized dewatering processes during ash pond closures. The Company's process treats the water to meet the requirements of the plants' wastewater discharge permits approved by the Georgia EPD and to ensure protection of water quality standards.

These dewatering activities are on-going and tailored to each ash pond closure site. Ash pond dewatering plans are prepared for each site and describe the water treatment system, controls, and monitoring that will be used during the process to ensure that the water discharged is protective of water quality standards. The dewatering activities occur under the direction of independent third-party licensed wastewater operators throughout the duration of each closure project. In addition, the Company has also engaged independent, third-party contractors for effluent and receiving stream sampling, and accredited independent laboratories for analysis. Monitoring results are submitted to Georgia EPD and posted to the Company's website each month.

As of December 31, 2021, the Company has submitted and received approval from Georgia EPD for eight active dewatering plans at Plants Bowen, Branch, Hammond, McDonough, McIntosh, Mitchell, Wansley, and Yates. Georgia Power will submit dewatering plans to the Georgia EPD for approval prior to commencement of dewatering at the remaining sites. The dewatering plan for Plant McManus is no longer in place, following removal of ash and Georgia EPD acknowledgment of the completion of dewatering activities at that site.

4.3.4 Ongoing and Post Closure Requirements

Throughout the ash pond closure process and in the post-closure care period, Georgia Power will continue to perform compliance activities including to monitor groundwater and regularly report the results to the Georgia EPD as well as post regular updates to the Company's website. Georgia Power has installed over 600 groundwater monitoring wells around its ash ponds and on-site landfills to actively monitor groundwater quality. Independent, third-party engineers and groundwater professionals installed the groundwater monitoring well networks at each site. Third-party independent consultants sample and maintain the wells in the monitoring network, statistically analyze and evaluate the data, and write reports interpreting and summarizing results. The Company will continue to install additional groundwater monitoring wells and sample as required through both the ash pond closure process and the post closure care phases.

Once ash pond closure is complete, post closure care will be implemented in accordance with the Federal and Georgia CCR rules. Post closure care will include inspecting CCR landfills and former ash ponds that are closed in place to verify continued structural integrity, maintaining the integrity and effectiveness of the final cover system for close in place units, maintaining and sampling the groundwater monitoring systems, and regulatory reporting.

4.3.5 Beneficial Use

Following the conversions of coal ash handling systems and installation of dry handling equipment in 2019, Georgia Power ceased placement of coal ash in ash ponds. The Company will primarily rely on Company-owned CCR landfills for future disposal of CCR generated from coal-fired facilities when beneficial use opportunities are not available.

To minimize or offset costs related to CCR storage, landfill construction, and associated O&M, Georgia Power currently markets more than 85% of the CCR generated from operations for beneficial use. As further discussed in Section 2.0, Georgia Power is evaluating opportunities to recycle ponded ash during closures as viable opportunities arise and technology and markets develop. As the ABUC is located in Georgia, it will likely provide additional future market opportunities for the beneficial use of CCR. The Company will continue to seek out beneficial use opportunities during ash pond closures, where it adds value for the Company and our customers and will continue working with Georgia EPD to obtain any permit modifications in the future to support beneficial use.

At Plant Mitchell, the Company continues with plans to remove the stored coal ash at its three ash ponds for beneficial use. Over the next several years, the Company plans to remove approximately two million tons of ash from the site to help create Portland cement, which is used to make concrete. Through December 2021, approximately 149,500 tons of ash has already been removed from the site for this purpose. These plans will reduce the amount of ash required to be removed to an off-site landfill, saving valuable landfill space, and ultimately serving to produce a valuable product.

In December 2019, Georgia Power announced an RFP for the beneficial use of stored coal ash at Georgia Power facilities, seeking to identify opportunities and maximize the value for the beneficial use of stored coal ash at its active and retired plants across the state. Initial bids were received from 16 bidders in October 2020. In early 2021, discussions were held with each of the entities that submitted proposals, and bidders were allowed to update their proposals.

The aforementioned proposals provided numerous options for consideration and a thorough review of the proposals was performed. A third-party engineering consultant supported the Company's evaluation to assess which proposals offered the most value to customers. The Company's in-depth evaluation included, without limitation, the effects of the various beneficial use proposals on closure plans, project timelines, project costs, project sequencing, and project infrastructure requirements. The results of the assessment indicated that not all proposals were expected to add value to customers; however, some proposals did show the potential for overall net benefits. In the third quarter of 2021, the Company initiated negotiations with top bidders. Georgia Power is continuing to negotiate with vendors and expects to complete the RFP process in 2022 and incorporate beneficial use into the closure plans at certain facilities.

Based upon the information received through the RFP, for certain facilities, there is an opportunity to incorporate ash beneficial use throughout the multi-year closure timeframe

4.4 Strategy and Schedule

The environmental compliance strategy and schedule continue to evolve, even as state and federal requirements are being proposed and finalized. The 2022 Georgia Power environmental compliance strategy and schedule, resulting from the 2021 strategy review process, for all media are provided in Figure 4.4-1. The Company will continue to review each schedule and update as applicable throughout implementation of this complex and multifaceted strategy.

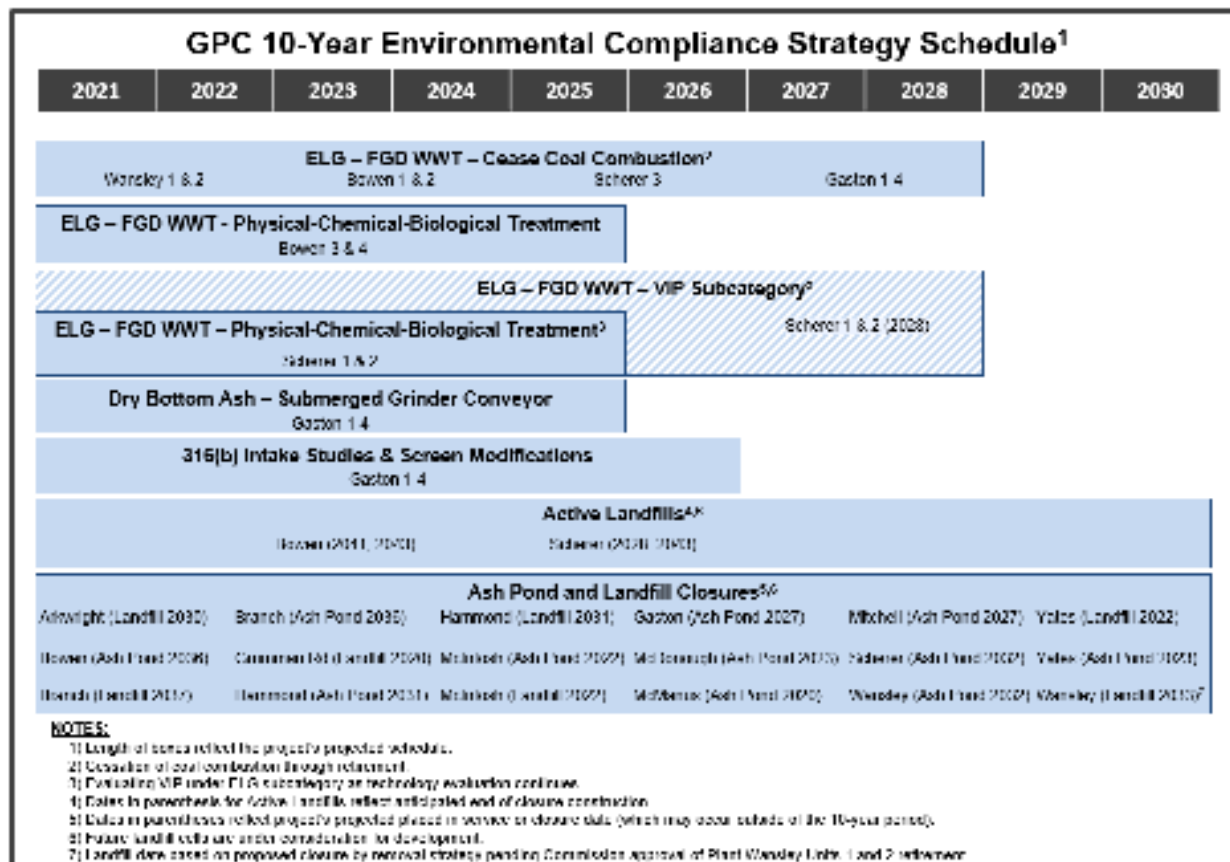


Figure 4.4-1 2021 Environmental Compliance Strategy Schedule

4.5 Financial Summary

Georgia Power's annual totals were \$34 million, \$72 million, and \$291 million for 2021, 2020, and 2019 respectively. In Georgia Power's Annual Report on Form 10-K for the year ended December 31, 2020, Georgia Power projected that base level capital expenditures to comply with existing statutes and regulations will be a total of approximately \$450 million from 2021 through 2025, with annual totals of approximately \$34 million, \$42 million, \$164 million, \$151 million, and \$59 million for 2021, 2022, 2023, 2024 and 2025, respectively³. The environmental compliance capital, CCR ARO, and O&M costs are recovered through the Environmental Compliance Cost Recovery ("ECCR") tariff, established in the Georgia PSC's final order in Docket 25060-U.

The Company's compliance strategy, including potential unit retirement and replacement decisions, and future environmental capital expenditures will be affected by the final requirements of any new or revised environmental statutes and regulations that are enacted, including the proposed environmental legislation and regulations described; the

³ Values reflect 2019 approved environmental compliance strategy and do not reflect Plant Wansley closure by removal values. Please see Selected Supporting Information in Technical Appendix Volume 2 for updated estimates for Plant Wansley.

cost, availability, and existing inventory of emissions allowances; and the Company's fuel mix. Additional information regarding the Company's capital and O&M expenditures can be found in the ECCR table provided in Selected Supporting Information section of Technical Appendix Volume 1.

4.5.1 CCR Asset Retirement Obligations

The Company is required to adhere to Accounting Standards Codification ("ASC") 410-20 (formerly Financial Accounting Standard No. 143 and Financial Accounting Standards Board ("FASB") Interpretation No. 47) which requires the Company to record the legal obligation associated with the retirement of a long-lived asset. In accordance with ASC 410-20, the Company records the estimated closure and post closure care costs of CCR ash ponds and landfills under the federal and state CCR Rules.

The Company will continue to comply with all applicable state and federal regulatory requirements and is continually seeking to implement appropriate beneficial uses of CCR. As provided in the April 2022 Selected Supporting Information section of Technical Appendix Volume 1, the updated CCR ARO table provides cost estimates for implementing the strategy described in Section 4.3, including a closure by removal strategy for Plant Wansley pending Commission approval of retirements of Wansley Units 1 and 2. As a program, if approved, the Company anticipates that the increase in estimated cost associated with a closure by removal strategy at Plant Wansley is more than offset by reductions in the program's management reserve and an escalation decrease – subject to changes in market rates – from the revised cash flows. The Company will continue providing semi-annual progress and cost data updates to the Commission under Docket No. 43083.

As outlined in the Company's CCR ARO Program Semi-Annual Program Status Report, the current forecasted spend for the CCR ARO program is the best estimate Georgia Power has at this time for this long-term compliance program spanning over approximately the next 60 years into the future. The Company's cost estimates are based on various assumptions related to closure and post-closure costs, timing of future cash outlays, inflation and discount rates, and the methods for complying with closure requirements. Georgia Power will continue to update its cost estimates and ARO liabilities periodically as additional information related to these assumptions becomes available including, but not limited to, regulatory and legislative changes, permitting requirements, design completion, construction bids and progress, contract finalization, post closure requirements, and/or other external factors. Additionally, if the Commission approves the retirement of Plant Wansley Units 1 & 2, the Company will continue to develop detailed design and engineering inputs for the closure by removal of the Wansley Ash Pond and seek optimization of that strategy with input from third party professionals. New information through these processes will be incorporated into future CCR ARO estimate revisions as appropriate.

ECS-APPENDIX A**ACRONYMS/ABBREVIATIONS AND TERMINOLOGY**

ABUC	Ash Beneficial Use Center
ACE	Affordable Clean Energy
ACI	Activated Carbon Injection
ACM	Advanced Closure Methods
ALK	Alkali Sorbent Injection
ANPRM	Advanced Notice of Proposed Rulemaking
ARO	Asset Retirement Obligation
ASC	Accounting Standards Codification
BAT	Best Available Technology
BATW	Bottom Ash Transport Water
CAA	Clean Air Act
CAAA	Clean Air Act Amendments (of 1990)
CAIR	Clean Air Interstate Rule
CCR	Coal Combustion Residuals
CPP	Clean Power Plan
CCS	Carbon Capture & Sequestration
CCOFA	Close Coupled Overfire Air
CFR	Code of Federal Regulations
CFS	Concentric Firing System
CO	Carbon Monoxide

CO₂	Carbon Dioxide
COHPAC	Compact Hybrid Particulate Collector
COP	Conference of Parties
CMP	Meeting of the Parties to the Kyoto Protocol
CPP	Clean Power Plan
CSAPR	Cross State Air Pollution Rule
CWA	Clean Water Act
CWWS	Cylindrical Wedge Wire Screens
DNR	Department of Natural Resources
DOE	Department of Energy
DSI	Dry Sorbent Injection
ECCR	Environmental Compliance Cost Recovery
ECS	Environmental Compliance Strategy
EJ	Environmental Justice
ELG	Effluent Limitations Guidelines
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPD	Georgia Environmental Protection Division
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
FASB	Financial Accounting Standards Board
FGD	Flue Gas Desulfurization

GHG	Greenhouse Gas
HAP	Hazardous Air Pollutant
HDPE	High-Density Polyethylene
HFC	Hydrofluorocarbon
HLRW	High-Level Radioactive Waste
HTL	Heat Transfer Loop
IRP	Integrated Resource Plan
LLRW	Low Level Radioactive Waste
LNB	Low-NO _x Burner
LNCFS	Low-NO _x Concentric Firing System
LNCFS I	LNCFS + CCOFA
LNCFS II	LNCFS + SOFA
LNCFS III	LNCFS + CCOFA + SOFA
LVW	Low Volume Waste
MACT	Maximum Achievable Control Technology
MATS	Mercury and Air Toxics Standards
MRCS	Mercury Re-emission Control System
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NDC	Nationally Determined Contribution
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants

NMFS	National Marine Fisheries Service
NOPP	Notice of Planned Participation
NO₂	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
NSR	New Source Review
NWP	Nationwide Permits
NWPR	Navigable Waters Protection Rule
OFA	Overfire Air
O&M	Operating and Maintenance
OMB	Office of Management and Budget
PJFF	Pulse Jet Fabric Filter
PM	Particulate Matter
PM_{2.5}	Particulate Matter less than 2.5 micrometers in size
PRB	Powder River Basin Coal
PSC	Georgia Public Service Commission
PSD	Prevention of Significant Deterioration
PSES	Pretreatment Standards for Existing Sources
R&D	Research and Development
RFP	Request for Proposals
RCRA	Resource Conservation and Recovery Act

RMDC	Remote Mechanical Drag Chain
RTR	Risk and Technology Review
SCR	Selective Catalytic Reduction
SC-GHG	Social Cost of Greenhouse Gases
SGC	Submerged Grinding Conveyor
SIP	State Implementation Plan
SNCR	Selective Non-Catalytic Reduction
SO₂	Sulfur Dioxide
SSM	Startup, Shutdown, Malfunction
TWS	Traveling Water Screens
UNFCCC	United Nations Framework Convention on Climate Change
URS	Unit Retirement Study
USFWS	U.S. Fish and Wildlife Service
USWAG	Utility Solid Waste Activities Group
VIP	Voluntary Incentive Program
VOC	Volatile Organic Compound
WIIN Act	Water Infrastructure Improvements for the Nation Act
WOTUS	Waters of the U.S.
WRC	Water Research Center
WRCC	Water Research and Conservation Center

ECS-APPENDIX B
ENVIRONMENTAL CONTROL ALTERNATIVES**INDEX**

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ENVIRONMENTAL CONTROL ALTERNATIVES

I. Selective Catalytic Reduction (“SCR”)

SCR technology involves the catalytic reaction of ammonia, which is injected into the flue gas, with NO_x to produce molecular nitrogen (N₂) and water vapor. These reactions take place across multiple layers of catalyst in the SCR reactor and generally result in a NO_x reduction capability of 85 to 90 percent depending upon the particular application. Theoretically, the NO_x and ammonia react in the presence of SCR catalysts. However, side reactions that produce undesirable byproducts can occur between ammonia and sulfur trioxide (SO₃) in the flue gas.

The SCR operating temperature ranges from 550 to 750°F. As a result, the SCR system normally is located in a high-dust configuration between the boiler economizer flue gas outlet and the air preheater flue gas inlet where the above temperature range normally occurs. Prior to entering the reactor, ammonia is injected into the flue gas at a sufficient distance upstream of the reactor to provide for adequate mixing of the ammonia and flue gas. The quantity of ammonia injected is adjusted to maintain the desired NO_x reduction level (within design limits). NO_x emissions are reduced in direct proportion to the quantity of ammonia injected up to an ammonia-to-NO_x ratio of approximately 0.80. Above this value (and as the activity of the catalyst declines with age), some of the ammonia can escape the SCR reactor as ammonia slip. This ammonia can react with small quantities of SO₃ present in the flue gas to form ammonium bisulfate, which can foul and/or increase the corrosion potential for downstream equipment.

II. Selective Noncatalytic Reduction (“SNCR”)

SNCR employs chemical injection of ammonia or urea directly into the boiler at a flue gas temperature between 1,600 and 2,100°F. In this temperature range, which is typically near the top of the boiler close to the furnace exit or in the convective pass, the reagent reacts with NO_x to form nitrogen and water without the use of a catalyst to promote the reaction.

As with SCR, the ammonia slip constraint imposes a limit on the maximum amount of NO_x that can be removed with the SNCR process. Because the process is so temperature sensitive, the ability to follow boiler load becomes important when constrained by ammonia slip limits. Advanced SNCR systems use retractable injection lances that improve load-following control for the process. These lances use a “jet curtain” to provide better cross-sectional coverage and rotation of the lance allows for better response to process signals such as boiler load or furnace temperature.

Application of SNCR to utility-scale boilers is highly site specific. Generally, SNCR is capable of 15- to 40-percent NO_x removal, consistent with a 5-parts per million (ppm) ammonia slip constraint. Removal levels above 40 to 50 percent are difficult to achieve

due to the high ammonia slip that is produced, the stringent requirements placed on the distributions for injected reagents, and the narrow temperature window required for the reaction.

One particular benefit of SNCR as compared to SCR is that capital cost is limited due to the absence of catalyst and the associated reactor vessel. However, potentially much higher ammonia slip levels cause increased downstream problems. In addition, the difficulty in meeting temperature and distribution requirements makes implementation of the technology difficult on many boilers, especially on a large-scale boiler (typically greater than 300 MW). SNCR systems also generally require more reducing agent for a given NO_x reduction than do SCR systems since part of the reducing agent can be oxidized at the higher injection temperature, representing an initial loss of reagent. Furthermore, the oxidation product is often NO_x, requiring additional reagent (ammonia) to remove the NO_x formed via oxidation.

III. Fuel Switch to Natural Gas

Existing coal plants can be partially or completely converted to burn natural gas instead of coal. Since natural gas contains very little sulfur, sulfur oxide emissions can be reduced to a level that is below that produced by flue gas desulfurization. Natural gas does not have constituents that remain after combustion to create ash, unlike coal where the natural minerals are transformed in the coal combustion process. Trace metals, which are present in coal, are largely absent from natural gas and so they are not emitted from natural gas combustion.

Nitrogen oxides or NO_x results from both fuel chemistry and from the air used in combustion. Therefore, a natural gas conversion does not automatically eliminate emissions of nitrogen oxides. The level of NO_x in such a conversion is determined by the boiler design plus the presence and design of low NO_x firing systems (see the next section). Well designed and operated low NO_x firing systems on coal boilers can produce similar NO_x emissions to those seen in natural gas conversions.

Natural gas steam electric boilers are not subject to the MATS Rule, which also allows up to an annual 10% heat input from coal. Thus, a coal boiler which is switched to natural gas could still use coal as a backup fuel and not be subject to MATS requirements.

The choice of switching a coal boiler to natural gas is complex, with many factors to be considered. The location of natural gas pipelines, the availability of natural gas in either summer or winter, the energy diversity of the generating fleet, the other environmental regulations surrounding coal ash and water treatment, and local ambient air attainment status all have to be considered. Switching a coal unit to natural gas can produce lower emissions and – if natural gas prices remain low – produce affordable electricity for customers.

IV. Low-NO_x Burners and Overfire Air

Low-NO_x Burner (“LNB”) is a generic term for a burner designed to combust the fuel while reducing the amount of NO_x that is formed. Since there are several different firing arrangements for oil- and coal-fired boilers, there are several different types of LNBs.

NO_x is formed during combustion from either the nitrogen in the fuel or the air. NO_x formed from nitrogen in air requires high-flame temperatures and because of this, is usually referred to as thermal NO_x. Some fuels, particularly coal and oil, contain small amounts (2 percent or less) of nitrogen as a chemical constituent. When these fuels are burned, this fuel nitrogen can be oxidized in the flame-producing NO_x, which is referred to as fuel NO_x. Thus, coal and oil can form NO_x from the thermal NO_x and the fuel NO_x mechanisms, but the fuel-nitrogen pathway is by far the predominant one. Since natural gas contains no fuel nitrogen, thermal NO_x *only* is formed, explaining why natural gas flames have much lower NO_x levels than coal.

LNBs for coal and heavy oil are designed to reduce NO_x by allowing the fuel nitrogen to be released from the fuel in a region with low-oxygen concentration. Most of the fuel nitrogen can then react to molecular nitrogen (N₂, the main constituent of air). High temperatures are needed to extract most of the nitrogen from the fuel and low-oxygen concentrations are also necessary to prevent the fuel nitrogen from being oxidized. This approach is known as air staging because a portion of the combustion air must be introduced later in the combustion process to form this low-oxygen reduction zone. Wall-fired LNBs achieve this end by an aerodynamic trick in each burner’s flame while, in a tangentially fired furnace, a portion of the secondary air is diverted above the flame (i.e. OFA), producing a low-oxygen zone in the entire lower furnace.

LNBs for wall-fired units are typically dual-register burners. By using two separate registers for the secondary air, some of the secondary air is used to initiate and stabilize the flame (with inner-register air), while most of the secondary air is directed by the outer register to bypass the initial flame and then mix with the flame after the fuel nitrogen is released and converted to N₂. Different manufacturers use different hardware implementations for this process, but the general technical concept is much the same. Most also use some means of ensuring the flame stays attached to the tip of the burner. A stable, attached flame is a lower NO_x producer than either an unstable flame or a detached flame.

LNBs for tangentially fired boilers serve to assist in NO_x reduction by supporting the air staging used for the major NO_x reduction technique. There are different manufacturing designs for low NO_x burners for these plants that control the mixing and direction of the combustion air relative to the coal-air mixture injected into the furnace. Most tangentially-fired boilers rely heavily on OFA in addition to low NO_x burners.

OFA is a very effective method to reduce NO_x emissions. In fact, the most general approach to lowering NO_x produced in oil or coal combustion is to create a main flame

zone that is deficient in oxygen and is known as a reducing atmosphere. If the temperature can be held high in this reducing zone, the majority of the fuel nitrogen can be driven from the fuel. Since little oxygen would be present, this fuel nitrogen then reacts to form N_2 , which is the main constituent of air. OFA is the air that is added to finish the combustion process started in the combustion zone. In a vertical flow typical of boilers, the reducing zone is the main combustion zone. OFA is added above this flame zone, thus the name “overfire” air.

Up to approximately 30 percent of the total air needed for combustion may be supplied as OFA. As the amount of OFA increases, the NO_x emissions of the combustion process decrease, up to a point. Any further increase in the amount of OFA above this point will cause the NO_x emissions to increase. The practical limitations on the amount of OFA that can be used are:

- Stability of the main flame
- Corrosion of the metal steam tubes
- Production of carbon monoxide
- Increases in the amount of unburned carbon that escapes the furnace and is collected with the fly ash

OFA is a part of most of the tangentially fired NO_x control systems described.

V. Powder River Basin (“PRB”) Coal

PRB coal is a subbituminous coal mined primarily from seams in the PRB located in Wyoming and Montana in the western United States. Reasons for broadening the use of PRB coal include favorable economics and the added benefits of lower fuel-bound nitrogen and sulfur components that enhance the ability of generating units to minimize NO_x , as well as SO_2 emissions. Additional NO_x reductions are realized because of the lower combustion flame temperature brought about by the higher moisture content in PRB coal. With this increase in moisture content come lower heat contents (heating values), suppression of mill outlet temperatures below design minimums, possible loss of generation due to unit-load deratings, and potential increased forced outage rates during the peak season. Increased heat rate and higher operating and maintenance costs are also usually associated with a switch to PRB coal from bituminous coal. Compacting the stockout piles and increased housekeeping around transfer points are considerations to alleviate potential problems with self-heating of the higher-reactivity PRB coal. Soot blower maintenance and increased boiler inspection may be required to maintain/sustain boiler operation. ESP capacity may also be affected, and additional fields or flue gas conditioning may be required to adequately collect the PRB fly ash. The impact on SCR catalyst activity of elevated levels of alkali earth metals in PRB fly ash is also a consideration, but has been seen as a controllable factor.

VI. Flue Gas Desulfurization (“FGD”)

Flue gas from coal- and oil-fired boilers will contain sulfur oxides produced from any sulfur in the fuel. FGD is any process that removes these sulfur oxides, primarily SO₂ with a small amount of SO₃. These sulfur oxides (SO_x), can range from 0.3 percent of the flue gas by volume down to several hundred parts per million. The two main types of processes are characterized by either wet- or dry-process chemistry.

As implied by the category, wet processes collect the SO_x by treating the flue gas with a water-based solution or slurry. One typical design the utility industry uses is a spray tower module where the flue gas flows up the tower and a series of nozzles spray an alkaline solution into the flue gas. The common chemical used in wet FGDs is limestone and the solids produced by modern designs are predominantly calcium sulfate, or gypsum. This gypsum can either be sold as a pre-cursor to wallboard, used in cement or concrete, or used for agricultural purposes or be disposed of in a landfill. The wet processes are very efficient and remove 80 to 99 percent of the SO₂ in flue gas with 95 percent removal typical.

Dry processes inject an alkaline slurry into the flue gas stream in a spray dryer followed by a particulate control device. The spray dryer is a unit where the hot flue gases are contacted with the wet alkaline spray that absorbs the SO₂. The hot flue gas evaporates the water and leaves a dry residue that can then be captured with the fly ash, typically in a baghouse. ESPs are normally not used behind a spray dryer because of the high resistivity of the calcium residues that are added to the fly ash. The residue also contains a mixture of calcium sulfite/sulfate, along with the fly ash from the fuel. This waste is not suitable for other uses and must be disposed of in a landfill. Historically, dry scrubbing is considered to typically remove 75 to 90 percent of the SO₂ in flue gas.

VII. Dry Sorbent Injection (“DSI”)

Dry sorbent injection is a technology that can help reduce acid gas emissions. DSI systems remove HCl and other acid gases through two basic steps. In step one, a powdered sorbent is injected into the flue gas where it reacts with the HCl. The sorbents most commonly associated with DSI are trona (sodium sesquicarbonate, a naturally occurring mineral mined in Wyoming), sodium bicarbonate, and hydrated lime.

For step two, the compound is removed by a downstream PM control device such as an ESP or a baghouse. Baghouses are generally more effective (when combined with DSI) than ESPs, with respect to overall HCl reduction. For modeling purposes, EPA estimates a DSI system with a baghouse is expected to achieve 90% removal of HCl, while a DSI system with an ESP only achieves 60% removal, although actual performance will vary by individual plant.

DSI systems generally do not require significant capital expenses but may rely on significant quantities of sorbent to operate effectively, which increases the operating

costs. Waste disposal for DSI may also be a significant variable cost, while the waste products from an FGD system can be sold as feedstock for industrial processes. In addition, DSI's potential effectiveness is limited to certain types of plants. Because of the amount of sorbent needed, DSI will likely be implemented most often at plants that are 300 megawatts or less and burn low-sulfur coal.

DSI systems can also significantly reduce SO₂ emissions through the same process as HCl removal.

VIII. Baghouses

Baghouses are filter devices that remove solid particles from flue gas streams by passing the gases through a fabric, and thus collecting the particles. While baghouses can either operate as a standalone control device or in conjunction with other particulate capture devices, all of Georgia Power's baghouses are located downstream of the plant's electrostatic precipitators. This configuration – a baghouse located downstream of an existing ESP – was patented by EPRI and is known as a Compact Hybrid Particulate Collector ("COHPAC").

The basic COHPAC concept is to place a pulse-jet fabric filter ("PJFF") downstream of an existing ESP to serve as a "polishing" or performance-upgrading unit. The flue gas enters the PJFF and passes through the fabric where the fly ash particles are filtered from the gas. The particles are collected on the outside of the fabric and the resulting dust layer is cleaned from the bags by air pulses (and thus, the nomenclature: pulse-jet fabric filters). Since the ESP removes a significant amount of the particles from the gas stream the flue gas reaching the baghouse has a significantly reduced dust load. The residual electrical charge from particle charging in the ESP and low-dust loading enables the COHPAC PJFF to operate at an air-to-cloth ratio (A/C) in the 6 to 12 range. (A/C is a ratio of the amount of gas to the amount of fabric present.) A typical full-scale PJFF without an upstream ESP must operate at A/C ratios of 4 or below, allowing the physical size of a COHPAC PJFF to be up to one-fourth the size of a normal PJFF, which reduces the cost significantly.

IX. Activated Carbon Injection ("ACI") and Alkali Sorbent Injection ("ALK")

ACI for mercury control involves the addition of powdered activated carbon to flue gas streams where it adsorbs vapor phase mercury. This powdered material is made by "cooking" low rank coals with steam and temperature to activate the surface, generating a highly reactive product that acts like a chemical sponge. Once injected into the flue gas, the activated carbon (and adsorbed mercury) must be collected in a particulate collection device. The applications of this technology are either (1) ahead of an ESP or (2) downstream of an existing ESP but upstream of a high ratio (COHPAC) baghouse.

The first configuration mentioned above has been tested under various conditions with wide ranging results depending on contact time, fuel type, ESP size, and process

conditions. Typically, due to rapid removal of the carbon in the ESP and limited contact time with the flue gas, these applications typically achieve lower removal of mercury than carbon into baghouses. Injecting activated carbon upstream of an ESP remains useful as needed for mercury control to complement the passive co-benefits of SCR and FGD.

The second application, injection into a COHPAC baghouse, is an EPRI patented technology known as TOXECON™. This process attempts to limit the co-mingling of fly ash and activated carbon by collecting a high fraction of fly ash in the ESP before injecting the activated carbon. Furthermore, because the activated carbon is collected on bag surfaces (where it can stay from several minutes to hours), the TOXECON™ process can typically achieve much higher removal rates than ESP injection (up to 90 percent), again depending on fuel type and process conditions. The primary drawback to this process is the added financial requirement in building a COHPAC baghouse, which significantly affects the overall cost of mercury removal.

In either application, the mercury removal effectiveness of ACI can be enhanced when burning coals with higher sulfur content (e.g. non-PRB coals) by employing ALK, typically hydrated lime injection, ahead of the ACI. Typically, the hydrated lime used for ALK is less expensive than the activated carbon, so the use of ACI plus ALK is a more economical process than ACI alone for a given mercury capture target.

X. Mercury Re-emission Controls System (“MRCS”)

Wet FGDs are effective at removing oxidized mercury. However, as the captured mercury may remain in a dissolved form in the FGD slurry in the vessel, the FGD may from time to time re-emit the mercury that was captured from the flue gas. This can cause increased levels of mercury emissions out of the stack. The addition of additives into the FGD slurry can help prevent the occurrence of mercury re-emission by encouraging the mercury dissolved in the slurry to precipitate into a solid. Typically, additives injected into the FGD slurry to address mercury re-emission are less expensive than the activated carbon injected upstream of the ESP or baghouse for mercury control; therefore, if mercury re-emission is observed in a given FGD, an installed MRCS can be a cost-effective means of removing mercury in the FGD.

XI. Containment and Control Technologies for Ash Storage Areas

Several technologies are available to control and close ash storage areas. The most common technologies include liners, caps, slurry walls, sheet pile walls, grouting, and *in situ* solidification and stabilization. A brief description of each technology is provided below.

Closure Footprint Reduction

Ash ponds closed in place may involve consolidating ash into a smaller footprint. This will likely reduce the extent of groundwater impacts and the area requiring long term O&M associated with maintaining the closed facility.

Liners

A liner is a layer of impermeable or low-permeability material placed at the bottom of ash storage facilities, which prevents ash leachate from entering soil and groundwater. Liners can be constructed of compacted natural material (such as clay), synthetic materials (such as High-Density Polyethylene ("HDPE")), or composite materials (combination of synthetic and natural materials). Regulations require liners under new ash storage areas.

Caps

A cap is a layer of impermeable or low-permeability material placed on top of ash storage areas, to prevent surface water infiltration and resulting leachate. As with liners, caps can be constructed of natural materials (for example, compacted clay), synthetic materials (HDPE), or composite materials. Capping may be used in conjunction with liners, slurry walls, or other proven engineering methods to effectively encapsulate a material in place.

Slurry Walls

Slurry walls are subsurface walls constructed in trenches that are designed and installed to a pre-determined depth based on site conditions and project objectives. The trench is filled with a slurry of materials that forms an impermeable barrier to prevent/minimize the migration of groundwater within the area. Slurry materials can include various mixtures of soil, bentonite clay, and/or cement.

Sheet Pile Walls

Sheet piling includes interlocking wood, concrete, or steel sectors driven into the ground or forced into pre-dug trenches, usually to the top of a relatively impermeable layer (for example, clay or bedrock). As with slurry walls, sheet pile walls form an impermeable barrier to prevent/minimize the migration of groundwater. Steel sheet pilings are the most reliable and most commonly used. Sheet piling is often used as a temporary measure of containment while dewatering or excavation, or while other containment is constructed.

Grout Curtains

A grout curtain is a method of sealing gaps in subsurface geology by injection of grout to fill voids in fractured rock, or to consolidate soil by filling the pore space. The grout material may be a Portland cement mix or any fluid material that hardens, such as a resin or sodium silicate. The grout material is injected as a pressurized fluid through holes drilled into the ground, generally in rows. Under ideal conditions, the injected fluids harden to create a relatively impermeable barrier, similar to a wall, in the subsurface.

In situ Solidification/Stabilization

Solidification/stabilization describes the technique of solidifying soil or waste material (e.g., a sludge), to reduce the potential for groundwater interaction. Solidification refers to the addition of a binder to produce a solid. Stabilization refers to the addition of a chemical agent to convert the soil or waste material to a more chemically stable form. Some additives, such as Portland cement, produce both physical and chemical changes.

Large augers or equipment with rotary blades are typically used to mix the additives with contaminated soil or waste material.

XII. Cooling Water Intake Screen Technology

Inclined traveling water screens (“TWS”) and cylindrical wedge wire screens (“CWWS”) will generally be the preferred water screen technologies. Both screens will allow debris handling and the design is also adaptable to minimize impingement and entrainment. Screen wash systems for the TWS and airburst systems for the CWWS can maintain screen cleanliness to an acceptable level. If needed, continuous fish and debris handling systems can also be designed to work with the TWS. As needed, fish-return technologies are also available.

XIII. Water Cooling Technologies

Cooling water systems are generally placed into two categories: either wet systems, which use water as the cooling medium, or dry systems that utilize air. Wet cooling systems withdraw water to absorb heat via indirect contact with steam in a condenser. These wet cooling systems are divided into two types, based on the manner in which the cooling water is used: once-through and closed-cycle systems with cooling towers or ponds. Unlike once-through systems that continuously draw fresh cold water from a large water source, closed cycle systems recirculate the same cooling water in a continuous loop through the condenser, with only very small amounts of water being withdrawn from a source to replace the water that is lost due to evaporation, drift, and blowdown in the cooling tower.

Because of the relative simplicity, the capital and operating costs for once-through systems are less than those for closed-cycle systems with a cooling tower. Once-through systems can also include helper cooling towers to reduce thermal load at the water discharge point, but these systems do not reduce water withdrawals. Closed-cycle cooling water systems reduce water withdrawals about 95%. Because of this, use of a closed-cycle system with a cooling tower is one potential method of minimizing impingement and entrainment. However, consumptive use of water is increased from use of cooling towers and approximately 75% of the cooling water withdrawn is not returned to source but is lost to the atmosphere via evaporation.

Dry cooling systems transfer heat to the atmosphere without the use of water. Steam leaving the turbine is piped to an air-cooled, finned-tube condenser. Dry cooling has an adverse effect on power plant efficiency, requires a large area of land, and is more expensive than wet cooling. A hybrid system incorporates elements of both wet and dry cooling systems in an attempt to maximize the benefits of each. Few large-scale applications of hybrid systems exist in the United States and the cost is commensurate with that of dry cooling. Neither a dry nor a hybrid cooling system is considered an economically or technically viable option for retrofit of an existing generating unit in the Southeast.

XIV. Water Research and Conservation Center

Originally developed in 2012 through collaboration with EPRI and Southern Company, the WRC at Georgia Power's Plant Bowen provided a venue for technology evaluations to address water use, withdrawal, consumption, treatment, and recycling throughout the power generation process. The WRC has generated new information regarding current and future regulatory compliance issues related to water withdrawal, use, and discharge restrictions. Testing at the WRC successfully informed technology strategies for achieving cost-effective environmental compliance, and several technologies have been implemented throughout the energy industry and across the Southern Company fleet.

Due to the success of the WRC, Southern Company and EPRI developed the state-of-the-art WRCC at Georgia Power's Plant McDonough. This research center provides the infrastructure needed to test and identify the most promising water technologies. To better manage and conserve water across our thermoelectric power generation sites, the WRCC at Plant McDonough promotes advancements in power plant cooling systems leading to reduced freshwater withdrawal and consumption as well as improved plant efficiency while optimizing total cost and energy generation.

XV. Ash Handling Methods

The ELG and federal and Georgia CCR rules affect coal ash handling and disposal methods at most Georgia Power units. In order to comply with the federal and Georgia CCR rules and ELG Rule requirements, Georgia Power is closing all ash ponds and stopped stop sluicing coal ash in 2019. Significant construction has been completed at each generating plant to modify coal ash handling systems, such as pneumatic dry ash handling equipment, remote submerged chain conveyors and ash coolers. These systems are utilized in conjunction with additional storage silos and collection systems to facilitate disposal or reuse options.

XVI. Landfills

As additional ash storage is needed beyond the useful life of existing landfills or as the federal and Georgia CCR rules have required ash ponds to be closed before their useful life is spent, landfill disposal is the alternative for long-term ash disposal. This technology has been implemented for ash and gypsum at several Georgia Power facilities. This requires regulatory permitting, hydrogeologic/geologic studies, and large amounts of available property. In addition, a leachate collection and pumping system would be installed to manage any landfill leachate collected and groundwater monitoring.

XVII. Wastewater Treatment

The ELG Rule requires additional treatment of the wastewater discharged from FGD systems to remove from the water certain trace metals that the FGD removed from the

flue gas. Most of the metals may be treated to the anticipated limits by relatively conventional physical and chemical treatment, such as flocculation, coagulation, precipitation and filtration. However, the selenium limits in the ELG Reconsideration rule are very low and are based upon biological treatment systems that have not widely been used and demonstrated nationally. These systems continue to be tested, researched and evaluated to ensure any potential installations are technically supported for a specific facility.

In addition to the biological treatment options, the membrane-based treatment is being researched for feasibility in FGD wastewater treatment. In this approach, FGD return water use is maximized and FGD wastewater discharge is minimized. The chloride purge stream is processed through an advanced membrane process to produce a clean permeate stream and a small brine concentrate stream. The concentrate is managed either through third party disposal, ash conditioning and landfill on-site or off-site, or paste processing and landfill on-site.

LVW is another category of waste stream that has required new treatment systems due to the closure of ash ponds. LVW was historically collected from many sources throughout the plant and conveyed to the ash pond for co-treatment with ash transport water. The new site-specific treatment facilities include physical-chemical treatment systems, utilizing lined settling basins, tanks, clarifiers, pH adjustment, and associated pumps, piping and equipment.

ECS-APPENDIX C**HIGH-LEVEL AND LOW-LEVEL RADIOACTIVE WASTE STORAGE
PLANTS HATCH AND VOGTLE**

Georgia Power's affiliate, Southern Nuclear Operating Company ("Southern Nuclear") safely operates and maintains Plants Hatch and Vogtle in accordance with industry standards and regulatory requirements. Southern Nuclear is dedicated to maintaining the highest standards for safely handling radioactive waste to protect the public, the environment, and its workers.

High-Level Radioactive Waste ("HLRW" - spent fuel)**Dry Cask Storage:**

Plant Hatch and Plant Vogtle currently store spent fuel in underwater spent fuel pools and some above ground in dry casks on concrete pads known as Independent Spent Fuel Storage Installations until such time that the federal government licenses and builds a permanent disposal facility capable of accepting this waste.

These above ground dry casks are engineered to assist in cooling the spent fuel bundles while providing adequate shielding for the protection of plant employees as well as the surrounding community and environment.

Low-Level Radioactive Waste ("LLRW" - trash, tools, scrap, filtering media, irradiated hardware, etc.)

Similar to the nuclear power industry, over 95 percent of the LLRW generated by Plant Hatch and Plant Vogtle continues to be buried at the Energy Solutions burial site in Clive, Utah.

Plant Hatch and Plant Vogtle send waste that cannot be disposed of directly at Energy Solutions', Clive, Utah facility either to, Energy Solutions for additional processing or to the Waste Control Specialist, Andrew County, Texas facility for disposal. Plant Hatch and Plant Vogtle may store this waste on the site where it was generated inside concrete shields on a concrete pad until it can be further processed for disposal at Clive, Utah or shipped to Andrew County, Texas for disposal. Plant Hatch does not have any on-site storage capability for LLRW and Vogtle does not have any LLRW stored on site. All low-level radioactive waste that was stored in the environmental shields at Vogtle has been shipped for disposal. Hatch ships all waste promptly after generation and packaging.

Southern Nuclear in conjunction with the nuclear industry is always working towards reducing the generation of radioactive waste.