Over Time, Over Budget: The History of Vogtle Units 3 and 4 and Considerations for Further Nuclear Deployment

We look at Georgia for this second case study in our series on equitable clean energy policy design. Cleo Schroer January 2024

Introduction

Poor implementation of otherwise well-intentioned clean energy policies can negatively impact communities. In California, for instance, the inefficient policy design of a rooftop solar incentive program resulted in inequitable price increases for low-income ratepayers.¹

In contrast, regulated utilities in the U.S. Southeast have implemented significantly fewer policies to support clean energy or the communities they serve. The nature of utility regulation in states like Georgia have important implications for the impacts on ratepayers of clean energy infrastructure projects, including nuclear energy projects.

A consequential 2007 decision by Georgia's Public Service Commission (PSC) approved the construction of two new nuclear reactors at Plant Vogtle to power the state's future electricity needs.² While these new reactors will provide 2,234 megawatts (MW) of clean energy to Georgia over the next 6–8 decades, the projects are over budget by \$17 billion due largely to project mismanagement. Vogtle's owners will recoup much of the new reactors' costs by charging ratepayers more for electricity. Compounding these implementation costs and challenges are procedural inequities within Georgia's electricity grid management. This report provides

¹ "Reverse Robin Hood: Clean Energy Policy Impacts on Energy Equity and Grid Reliability in California | Good Energy Collective," accessed July 26, 2023, http://www.goodenergycollective.org/policy/reverse-robin-hood-clean-energy-policy-impacts-on-energyequity-and-grid-reliability-in-california.

² "Timeline: How Georgia and South Carolina Nuclear Reactors Ran so Far off Course," AP News, May 25, 2023,

https://apnews.com/article/nuclear-power-georgia-vogtle-reactors-8fbf41a3e04c656002a6ee8203988fad.

several policy interventions to advance just outcomes for ratepayers in regulated utility markets.

Georgia's Energy System and Policymaking

Regulated Markets

Georgia is one of 31 states that retains a traditional, regulated power market. Utilities in regulated markets are generally vertically integrated, meaning they cover all electric power services for their customer, including generation, transmission, and distribution. These markets evolved in the early years of electricity because the production and distribution of electricity tend to be seen as a "natural monopoly": It makes little sense to build redundant transmission and distribution lines where they already exist. Vertically integrated utilities sell electricity directly to the customers.

In Georgia, the largest investor-owned utility is Georgia Power, which serves almost 3 million customers out of a population of 10.8 million across the state, of which around 2.3 million are residential households.³ The state has two other significant utilities: MEAG Power and Oglethorpe Power. MEAG Power is a nonprofit agency that works with public power communities across the state to generate and transmit electricity.⁴ Oglethorpe Power is also a nonprofit power supply cooperative, which specializes in generating power for electric membership corporations across the state.⁵

Regulated power markets have resulted in large investor-owned utilities, such as Georgia Power, with concentrated market power. This structure can create concerns about the overarching influence that these market players have on electricity markets in their service areas. State

³"By The Numbers," accessed August 31, 2023,

https://www.georgiapower.com/company/about-us/facts-and-financials.html. ⁴ "MEAG Power – MEAG Power Corporate Website," accessed September 6, 2023, https://www.meagpower.org/.

⁵ "About Us – Oglethorpe Power," accessed September 6, 2023, https://opc.com/about/.

public service commissions regulate vertically integrated utilities and their natural monopolies to prevent the price gouging of consumers. Georgia's PSC is the regulatory body for Georgia's electricity market. The PSC is tasked with ensuring that customers receive "safe, reliable, and reasonably priced electric services."⁶ The PSC's board makes regulatory decisions based on a majority vote of its five elected members. These members have exclusive power to determine rates and broad power over disputes and utility financing.⁷ As a result, decisions made by a relatively small set of elected officials around infrastructure projects have significant impacts on the people of Georgia.

In tandem, the Federal Energy Regulatory Commission (FERC) ensures consumers pay a fair rate for electricity.⁸ The cost of electricity is based on the energy producer's revenue requirement. The revenue guarantee and the rate base⁹ set by utilities' fixed cost of operation encourages investment in new energy projects. It helps ensure that energy generators stay in business. However, one of the drawbacks of this cost-of-service¹⁰ rate-making is that it incentivizes utilities to increase their operational costs to maximize profit. The result is one where investment decisions are made that would not have been supported in a free and competitive market, and the costs of those investment decisions are passed down to the rate-payer. This is partially why large nuclear power plants have succeeded in regulated markets, as they can pass on any costs to rate-payers while avoiding uncertainty in wholesale electricity prices.

The biggest such project in the state is the expansion of Plant Vogtle, which has cost tens of billions of dollars to complete but will provide the people of Georgia with clean energy for decades.

⁶ "Home | Georgia Public Commission," accessed August 31, 2023, https://psc.ga.gov/.

⁷ "Georgia: DSIRE," accessed August 31, 2023, https://programs.dsireusa.org/system/program/ga.

⁸ "About FERC | Federal Energy Regulatory Commission," accessed November 15, 2023, https://www.ferc.gov/what-ferc#.

⁹ "Rate base" refers to the net value of the asset base which a utility owns, which typically means the energy infrastructure that a utility owns, such as power plants or distribution equipment. A higher rate base implies higher allowable costs of electricity on ratepayers.

¹⁰ Cost-of-service rate-making refers to electricity pricing in which regulators determine a utility's costs and a reasonable rate of return, and use that information to set pricing for customers.

Clean Energy Policies in Place

Georgia's electricity system relies almost entirely on natural gas and nuclear energy, which together account for about 75% of the state's electricity use. The rest of Georgia's electricity comes from coal (15%) and renewables (around 12%).¹¹ The state's reliance on natural gas has grown threefold since 2010, and the share of electricity generated by nuclear energy is expected to increase in 2024 as the fourth Plant Vogtle unit comes online. Because Georgia Power has started to phase out many of its coal plants,¹² Georgia's energy-related carbon intensity is lower than the national average (10.9 metric tons per person, relative to the U.S. average of 15.7 metric tons per person).¹³

Georgia lacks many clean energy policies that are now standard in other states. It has no renewable energy portfolio standard or voluntary renewable energy target.¹⁴ Some limited energy standards exist for state government buildings and large facilities. The few state policies that directly incented clean energy have been short-lived. For example, in 2001, Georgia allowed net metering, a policy intended to incent solar panel construction on residential buildings.¹⁵ However, the Georgia PSC banned expansion of the program, capping it at 5,000 customers in 2019.¹⁶

With a few exceptions, most efficiency and climate standards in Georgia come from its utilities, which offer financial incentives to ratepayers, promoting climate-friendly policies, such as

¹¹ "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis," accessed August 31, 2023, https://www.eia.gov/state/analysis.php?sid=GA.

¹² "Georgia Power's Transformational Plan for State's Energy Future Approved, Helps Ensure Company Will Continue to Meet Needs of Customers and State," accessed August 31, 2023, https://www.georgiapower.com/company/news-center/2022-articles/georgia-power-transformational-plan -for-states-energy-future-approved-helps-ensure-company-will-continue-to-meet-needs-of-customers-an d-state.html.

¹³ "Energy-Related Carbon Dioxide Emissions per Capita in the United States in 2020, by State" (Statistica, October 2022),

https://www.statista.com/statistics/489494/major-us-state-energy-related-carbon-dioxide-emissions-per-c apita/.

¹⁴ "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis."

¹⁵ "Georgia Public Service Commission Fails to Expand Popular Rooftop Program – Partnership for Southern Equity," accessed August 31, 2023, https://psequity.org/psc-rooftop-program/.

¹⁶ "Georgia Public Service Commission Fails to Expand Popular Rooftop Program – Partnership for Southern Equity."

energy efficiency and electric vehicles. One such program — Georgia Power's Green Energy program — allowed customers to elect to purchase renewable energy. The Green Energy program ended in 2017, when Georgia Power launched the Simple Solar program, which allows it to purchase Renewable Energy Credits (RECs) on behalf of customers. However, the RECs are more limited than those of the prior program: They can only be generated from solar energy, and they cost participating customers 1 cent per kilowatt-hour (kWh) on top of their existing electricity costs.¹⁷

As Georgia lacks formal climate mechanisms in state policy around their electricity system, the decisions of the PSC and utilities significantly impact the future of emissions in the state. Georgia Power's coal plant phase-out, for example, will benefit the health of Georgians.

Plant Vogtle and Justice Shortfalls

Vogtle Units 3 and 4

The Alvin W. Vogtle Electric Generating Plant is a nuclear power plant along the Savannah River in Georgia. Utilities in Georgia originally built two nuclear units at the plant with a total generating capacity of 2,430 MW. Both units went into operation in the late 1980s and are still operating today.¹⁸ As Georgia's electricity demand increased, utilities and regulators in 2007 decided to build two more units using Westinghouse's AP1000 technology.¹⁹ Proponents of the AP1000 hail these new reactor designs to be among the safest, simplest, and easiest to operate reactors in the world, with reduced operational costs.²⁰ In 2019, the U.S. Department of Energy

¹⁷"Renewable Energy Programs," accessed August 31, 2023, https://psc.ga.gov/utilities/electric/green-power-pricing/.

¹⁸ "Plant Vogtle," accessed November 15, 2023, https://www.georgiapower.com/company/energy-industry/generating-plants/plant-vogtle.html.

¹⁹ "5 Things You Should Know About Plant Vogtle," Energy.gov, accessed October 5, 2023, https://www.energy.gov/ne/articles/5-things-you-should-know-about-plant-vogtle.

²⁰ Matthew L. Wald, "Atomic Power's Green Light or Red Flag," *The New York Times*, June 11, 2013, sec. Business,

https://www.nytimes.com/2013/06/12/business/energy-environment/nuclear-powers-future-may-hinge-on-georgia-project.html.

said Vogtle was a project that would "set the tone for what could be a nuclear resurgence in the United States," as Vogtle Units 3 and 4 mark the first new reactors built from start to finish in the U.S. in 40 years.²¹ Georgia Power, Oglethorpe Power, and MEAG Powershare the vast majority of ownership in the new units (45.7%, 30%, and 22.7%, respectively).²² Unit 3 entered commercial operation in July 2023, and Georgia Power expects that Unit 4 will begin producing electricity in early 2024.²³ After the two new units are both online, the plant will output 4,664 MWe of electricity, making Plant Vogtle the largest nuclear facility and largest power plant operating in the United States.²⁴

While the climate benefits are clear, the road to these benefits has been rocky. Construction on the new reactors ran seven years behind schedule and billions of dollars over budget. In 2017, the problems of cost overruns threw a titan of the American electric industry, Westinghouse, into bankruptcy after its then-parent company Toshiba Corp paid billions to walk away from the project.²⁵ Costs of the originally \$14 billion project ballooned to over \$35 billion.²⁶

Project management failures and other hurdles led to an untimely, costly overrun at Vogtle. A U.S. Department of Energy outlook report on advanced nuclear energy identified several root causes of Vogtle's struggles: construction starting on an incomplete design; too few details on project scheduling; supply chain delays; poor quality assurance and risk assessment; labor shortages, and more.²⁷ While some factors were out of the project team's control, such as the

²¹ "5 Things You Should Know About Plant Vogtle."

²² Drew Kann, "Georgia Power, PSC Staff Reach Deal on Final Vogtle Cost to Customers," *The Atlanta Journal-Constitution*, n.d., sec. News.

 ²³ "Plant Vogtle Unit 3 Enters Commercial Operations, Bringing Carbon-Free Nuclear Energy to Millions,"
Energy.gov, 3, accessed October 5, 2023, https://www.energy.gov/lpo/articles/plant-vogtle-unit-3-enters-commercial-operations-bringing-carbon-f
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²⁴ "Plant Vogtle."

²⁵ "Georgia Nuclear Rebirth Arrives 7 Years Late, \$17B over Cost," AP News, May 25, 2023, https://apnews.com/article/georgia-nuclear-power-plant-vogtle-rates-costs-75c7a413cda3935dd551be9115 e88a64.

²⁶ "Regulators Approve Deal to Pay for Georgia Power's New Nuclear Reactors," AP News, December 19, 2023,

https://apnews.com/article/georgia-nuclear-power-plant-vogtle-rates-costs-c333da2957cce7a937008347f34 87841.

²⁷ "Pathways to Commercial Liftoff: Advanced Nuclear," U.S. Department of Energy, March 2023, https://liftoff.energy.gov/wp-content/uploads/2023/05/20230320-Liftoff-Advanced-Nuclear-vPUB-0329-Upd ate.pdf.

COVID-19 pandemic, and some of the supply chain delivery issues, many of the cost overruns were avoidable.²⁸

Project Impact

While the project has been controversial due to the cost overruns, nearby Georgians have reaped several benefits due to the new construction. These units generated almost 9,000 jobs at their peak construction phase and will support 800 permanent, high-paying positions for local residents.²⁹ Plant Vogtle is also a win for climate goals: For a state that has historically failed to prioritize climate concerns in its policymaking, the new plant will reliably power over a million homes in Georgia for the next 60 to 80 years without emitting greenhouse gasses or other air pollutants.³⁰

Nevertheless, for ratepayers in Georgia, Vogtle's delays have been costly. The regulated electricity market structure allows utilities to pass many capital expenditures directly onto ratepayers; much of the project's costs are falling on the wallets of Georgia households. Georgia PSC staff have estimated that the average Georgia Power household will have already contributed \$1,000 towards the new units by the time Unit 4 enters commercial operation. Coinciding with Unit 3's commercial operation, Georgia Power ratepayers saw electricity bill costs increase by \$5 per month.³¹ In a recently announced deal between the PSC and Georgia Power, residents will see their electricity bills increase by an additional \$9 per month when Unit 4 begins commercial operation next year. These amount to a total burden of \$7.56 billion on Georgian ratepayers.³²

Issues in Energy Justice and Procedural Justice

²⁸ "Pathways to Commercial Liftoff: Advanced Nuclear."

²⁹ "5 Things You Should Know About Plant Vogtle."

³⁰ Zach Bright, "What Vogtle's Stumbling Finish Means for U.S. Nuclear Energy," E&E News by POLITICO, July 31, 2023,

https://www.eenews.net/articles/what-vogtles-stumbling-finish-means-for-u-s-nuclear-energy/.

³¹ Jeff Amy, "Georgia Power Customers Could See Monthly Bills Rise \$9 to Pay for the Vogtle Nuclear Plant," AP News, August 30, 2023,

https://apnews.com/article/georgia-power-vogtle-nuclear-plant-bills-rates-9b9481bc44f6a4c985ab7702a55 3e21e.

³² Jeff Amy.

The Georgia Public Service Commission struggles to ensure it protects the wallets of the people it serves and provides few options for public participation in the regulatory process. Its decisions may fail to reflect the needs of ratepayers.

The Vogtle project has posed justice concerns. A 2009 state law gave the PSC authority to allow the project owners to pass construction costs directly onto customers before the facility's completion.³³ This type of law is rare and often subject to criticism because it obliges households to finance projects before they benefit from the new infrastructure.³⁴ While Georgia lawmakers repealed this law in 2018 for future projects, the impact was real; by 2020, utilities in Georgia had already collected \$1.66 billion from residential customers for the Vogtle expansion.³⁵ Many of these fees reflected the delays and structural mistakes in the construction of the plant. To the credit of Georgia's Public Service Commission, the most recent deal surrounding price increases due to Vogtle would require investment in programs – albeit limited – to help lower electricity bills for senior citizens in low-income households and ease the burden for Georgia residents who get federal housing vouchers or disability payments.³⁶

The project's cost overruns are also concerning in the context of Georgia's electricity decision-making processes. Georgia's power system is systemically unresponsive to the needs and desires of its customers. In 2008, the state legislature defunded the Consumers' Utility Counsel (CUC), an independent body that represented citizens before the PSC.³⁷ Now, one of

³³"Georgia Nuclear Energy Financing Act," SB31 § (2009),

https://www.legis.ga.gov/api/legislation/document/20092010/87038.

³⁴ "Utility Agenda: Construction Work in Progress (CWIP) | Citizens Action Coalition," accessed December 12, 2023, https://www.citact.org/energy-policy/news/utility-agenda-construction-work-progress-cwip.

 ³⁵ "Ratepayer Robbery — The True Cost of Plant Vogtle," Georgia Conservation Voters, accessed December
12, 2023,

https://saportareport.com/wp-content/uploads/2021/12/GCV-Vogtle-Ratepayer-Robbery-Report-2.pdf.

³⁶ Jeff Amy, "Georgia Power Customers Could See Monthly Bills Rise \$9 to Pay for the Vogtle Nuclear Plant."

³⁷ "Consumer Energy," *Georgia Watch* (blog), October 15, 2014, https://georgiawatch.org/protect-yourself/energy-and-utilities/.

only four states in the country without a consumer advocacy counsel in its electricity regulatory body, Georgia's policymaking on Vogtle proceeded with little input from ratepayers.³⁸

Statewide elections across the nation are increasingly diluting representation of socioeconomically vulnerable groups.³⁹ A recent report published by the Brennan Center for Justice concluded that in Georgia, "electoral structures that impede minority representation persist across Georgia counties.⁴⁰" The elections of PSC representatives are no exception. Last year, the Georgia Secretary of State faced scrutiny for civil rights violations for its commissioner election procedures. Georgia's five commissioners are tasked with representing geographically distinct regions of the state. However, citizens elect these commissioners by state-wide vote. While only a third of Georgia residents are Black, one district, District 3, is majority Black. Yet the whole state gets to vote on the district's representative in the PSC, reducing the power of Black community members in elections. This process is changing: Responding to a lawsuit brought by voters from District 3, the U.S. Supreme Court ruled that the election structure in Georgia violated the Voting Rights Act and diminished the power of communities that do not align with the broader Georgia population.⁴¹ The Supreme Court halted elections for two commissioner seats last year as a result.

Reflection and Recommendations:

Georgia can take several steps to advance energy justice and procedural justice in the state and to hold utilities and their regulatory boards to higher standards of transparency, reliability, and community participation.

³⁸ Patty Durand, "Plant Vogtle: Not a Star, but a Tragedy for the People of Georgia," POWER Magazine, August accessed 31. 2023, https://www.powermag.com/blog/plant-vogtle-not-a-star-but-a-tragedy-for-the-people-of-georgia/. ³⁹ See "In an Old West Town, New Americans Fight for Representation," Washington Post, December 19, 2023, https://www.washingtonpost.com/politics/2023/12/19/kansas-election-lawsuit-dodge-city/. ⁴⁰"Local Lockout in Georgia | Brennan Center for Justice," September 14, 2021, https://www.brennancenter.org/our-work/research-reports/local-lockout-georgia. ⁴¹ Adam Liptak, "Supreme Court Temporarily Blocks Georgia Election Law Said to Harm Black Voters," The New York Times. August 19, 2022. sec. U.S., https://www.nytimes.com/2022/08/19/us/politics/supreme-court-black-voters-georgia.html.

The Georgia legislature should restore funding to the Consumer's Utility Counsel to grant formal, independent power to community members in decision-making on the grid.

As consumers in vertically integrated electricity markets often have no choice regarding their electricity provider, these markets tend to ignore consumer preferences in policymaking. In Georgia, refunding the Consumers' Utility Counsel (CUC) is one step to allow interested parties to have their voices heard in decision-making. Meaningful citizen participation in decision-making by means of a functioning CUC could act as another check on larger projects, allowing for oversight from community members who must shoulder cost burdens. States across the U.S. should adopt similar policies to ensure that consumers have mechanisms to have their voices heard.

* The Georgia Secretary of State should ensure that elections properly represent the interests of a broader coalition of citizens.

The U.S. Supreme Court has required that Georgia reform its PSC member election procedures. As the state implements this charge, it should uphold democratic governance and shift to single member districts for elections of the PSC.

Utilities should implement more meaningful mechanisms to ensure that low-income and minority residents are not excessively burdened with higher rates.

While high-income ratepayers may not feel the impact of the monthly \$20–25 rate increase from Plant Vogtle, the spike could make a world of difference for families living from paycheck to paycheck. Utilities such as Georgia Power could consider establishing a progressive energy tax that charges higher-income customers more for their electricity usage. The fees from this program could go to support the electricity bills of lower-income households.

Energy project managers should prioritize accountability to shareholders and community members.

Energy project developers must learn from the mistakes of the Vogtle expansion and keep as on-time and on-budget as possible in the completion of new energy facilities. The U.S. Department of Energy has identified multiple steps that nuclear project managers can take to do so, including more comprehensive project planning, more transparent accountability mechanisms, and workforce investment as prerequisites to breaking ground on new projects.⁴²

* Georgia's legislature should set a Clean Energy Standard.

Coastal storms, depleting water resources, and rising sea levels all threaten Georgia long-term.⁴³ A meaningful state commitment to clean energy generation, such as a Clean Energy Portfolio Standard, would help Georgia adapt to the impacts of climate change.

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⁴³ "What Climate Change Means for Georgia," U.S. Environmental Protection Agency, accessed October
13, 2023,

⁴² "Pathways to Commercial Liftoff: Advanced Nuclear."

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