

Plant Vogtle Decision Point: Time to Chart a Different Course

Already delayed by at least three years and billions over budget, the Plant Vogtle nuclear expansion may have been dealt a fatal blow when the contractor, Westinghouse, declared bankruptcy in late March. Now Georgia Power customers face the very real prospect that the two new nuclear units, which they are already paying for, may never be completed. If the project does proceed, the Westinghouse bankruptcy is likely to add significantly to the budget and to prompt additional delays.

The decision about whether, and under what circumstances, to proceed is incredibly significant because it will hit customers where it counts: in the pocketbook. At this critical juncture, an objective assessment is in order. To provide such an assessment, the Southern Environmental Law Center and Vote Solar, two groups that have not previously taken positions against the Vogtle expansion, retained the Greenlink Group. We asked Greenlink's Georgia Tech-trained PhDs to review where we are, how we got here, and the potential implications of halting construction in favor of less risky, more affordable alternatives.

Greenlink's conclusion: we don't need the Vogtle units, and to the extent there are future energy needs, customers would be better served by more modest, incremental investments in energy efficiency and solar. The following graphs and accompanying text show how they reached their conclusion. Our intent is to help readers form a clear-eyed assessment of the current situation and the best path forward.

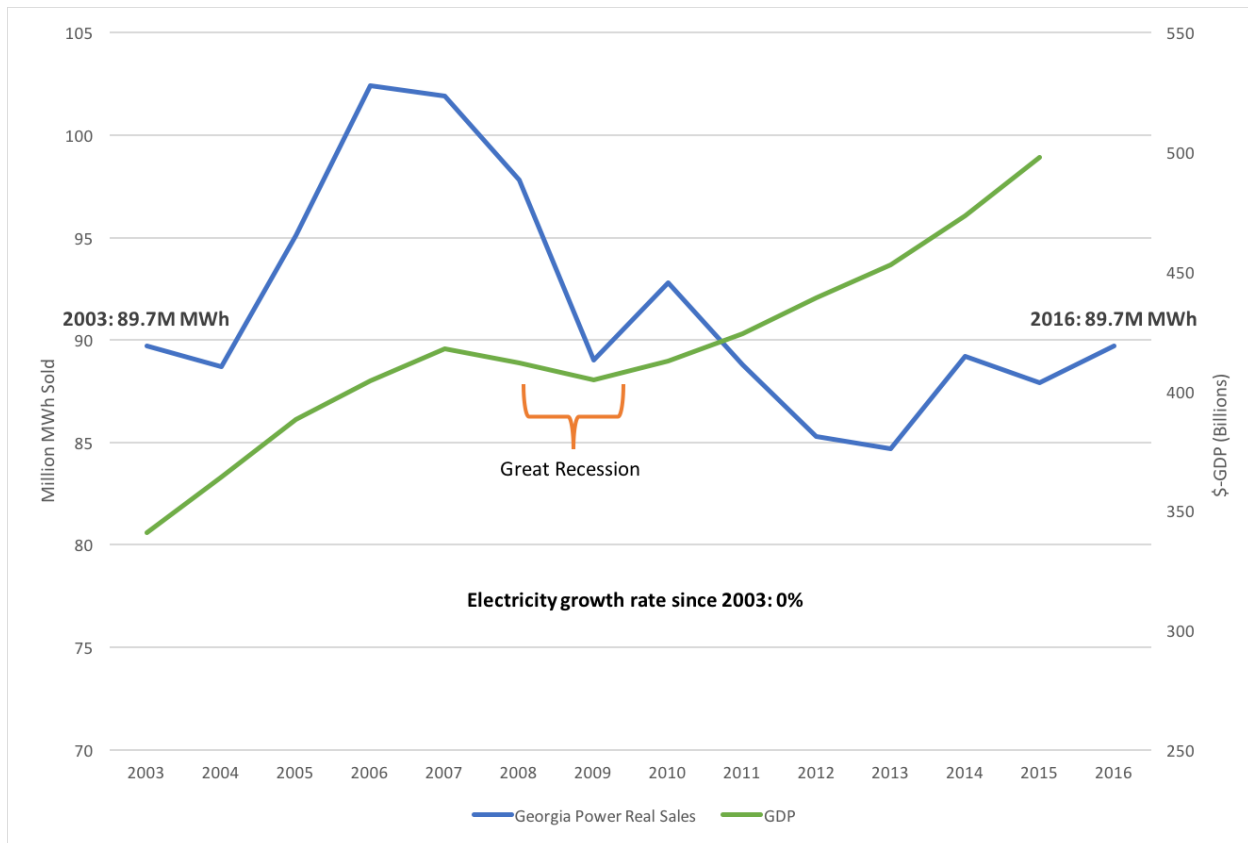
That was then ... this is now

The Georgia Public Service Commission approved construction of the two new Vogtle units in 2009. At the time, Georgia Power had recently experienced some of its highest electric demand ever (the high watermark occurred in 2006) and projected that strong demand growth would continue.¹ In fact, demand dropped precipitously leading up to and including the Great Recession. In the years since, electricity demand has remained essentially flat even as Georgia's economy has grown by 3.8% per year, as the following graph shows.² The reason: energy efficiency. We have become better at producing more with less energy.³

¹ Georgia Power Company. 2008. "Application for the Certification of Vogtle Generating Units 3 and 4 and Upgraded Integrated Resource Plan." Docket 27800-U. Available from the Georgia Public Service Commission.

² Data from: US Bureau of Economic Analysis. 2017. "Regional Economic Accounts; Georgia." Retrieved from: <https://www.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1>. Growth rate calculated by Greenlink Group.

³ This trend is not unique to Georgia. See: US Energy Information Administration. 2017. "2017 Annual Energy Outlook." Additionally, Bloomberg New Energy Finance and the Business Council for Sustainable Energy show the same, with US GDP up 12% and US energy consumption down 3.6% since 2007. <http://www.bcse.org/sustainableenergyfactbook/#>



In short, the “new normal” for Georgia’s electricity picture is extremely low – essentially flat – electricity demand growth. In fact, as the above graph shows, Georgia Power’s electricity sales in 2016 were the same as in 2003, despite Georgia Power’s projection – in 2008 – that it would need to increase system capacity by more than 4% per year through 2016 to meet expected demand.⁴ Those projections did not come to pass, and some analysts expect low growth to continue. For example, the federal Energy Information Administration (EIA) projects growth rates for Southern Company of only about 0.7% per year through 2030.⁵ Georgia Power’s current load projections are not publicly available, but it is unlikely in light of recent experience that they predict the same robust growth as when the new Vogtle units were originally approved.

At the revised growth rates, the Vogtle units are not needed to provide baseload power

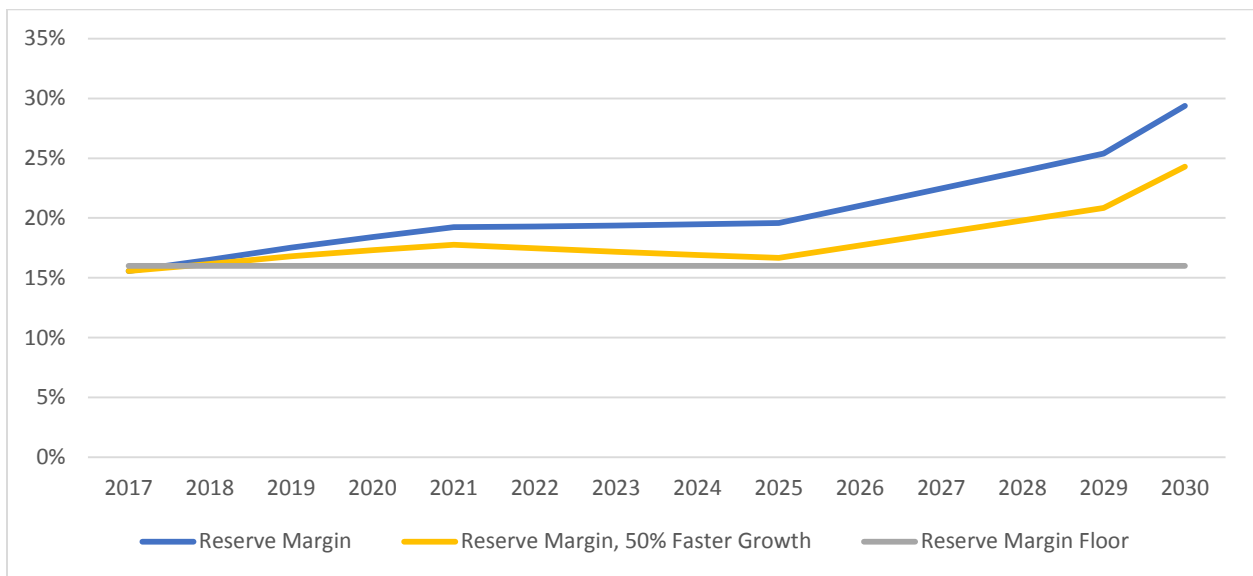
Each year Georgia Power needs enough electric capacity on its system to meet expected demand plus a margin of safety, known as the reserve margin. Georgia Power’s current reserve margin is around 16

⁴ See 1.

⁵ US Energy Information Administration. 2017. “2017 Annual Energy Outlook.”

percent.⁶ With slackening demand, Greenlink projects Georgia Power will remain comfortably above its reserve margin through 2030 even if the Vogtle units are not built.

However, predictions about the future are just that. While we may be reasonably certain that this year won't differ dramatically from last year, uncertainty increases the further out we try to go. Prudent planning is about trying to make the best decision possible in the face of long-term uncertainty. Thus, it is fair to ask: what if future demand growth is unexpectedly higher, giving rise to a capacity need? As noted previously, Georgia Power's current load projections are not publicly available; they may well project higher growth than EIA. Greenlink incorporated that concern by producing two reserve margin forecasts: one that matches EIA's growth projections, and a second, where growth is 50% higher. In neither case are the new Vogtle units needed to stay above the reserve margin floor, i.e. what's needed for a cost-effective and reliable system, as the following graph illustrates:



Other changes since 2008: the competition gets real

The analysis supporting the new Vogtle units in 2008 was premised on assumptions about the cost of alternatives like natural gas and renewables. The prices of both have declined markedly since 2008. Meanwhile the cheapest means (by far) of "supplying" energy is by avoiding energy waste. Energy efficiency now costs only around 1 cent per kWh of saved energy, making it the cheapest means of

⁶ Georgia Public Service Commission. 2016. "Docket 40161 40162 Stipulation."

“meeting” new demand -- by avoiding it in the first place.⁷ Utility-scale solar is also now significantly cheaper than the Vogtle construction.⁸

	Levelized Cost of Electricity (¢/kWh)
Energy Efficiency	1.1
Utility-Scale Solar	5.6
New Nuclear at Vogtle	8.3-10.3

In short, if a future energy need arises, new nuclear is not, and will not be, the most cost-effective alternative. The increasing cost competitiveness of alternatives to nuclear is a significant new development, as Georgia’s Commissioners have acknowledged.⁹

Natural gas is frequently cited as an alternative means of providing baseload power – power that is generally always and needed to meet minimum, ever-present demand. Some observers have suggested it would be more cost-effective to build natural gas units at Vogtle instead of completing the nuclear units. But Greenlink’s analysis shows that we don’t need additional baseload power in any year through 2030.¹⁰ Georgia Power will have more than enough capacity to meet its reserve margin. As a result, replacing the new nuclear with natural gas capacity would risk over-shooting demand and saddling customers with the costs of power plants they don’t need.

A question of scale

Greenlink’s analysis shows that completing the Vogtle units will result in significant excess capacity. This is one of the principal risks associated with large “lumpy” capital additions like new nuclear units, which take years to license, design and complete – years during which underlying assumptions can and will change, as recent experience has shown.

In contrast, energy efficiency measures and solar resources can be deployed more quickly and can be sized to fit near term increases in demand without producing significant excess capacity. For example, over the last three years (the amount of time that the Vogtle units are now delayed), Georgia has added 1,030 megawatts of solar energy to the grid.¹¹ Those installations are now complete and providing

⁷ Many studies have shown this. For an example, see: <http://aceee.org/blog/2016/01/yes-saving-energy-cheaper-making>. For a literature review of the topic, see: Brown, Marilyn and Yu Wang. 2013. “Estimating the Energy-Efficiency Potential in the Eastern Interconnection.” Oak Ridge National Laboratory. Available at: <https://info.ornl.gov/sites/publications/Files/Pub40408.pdf>

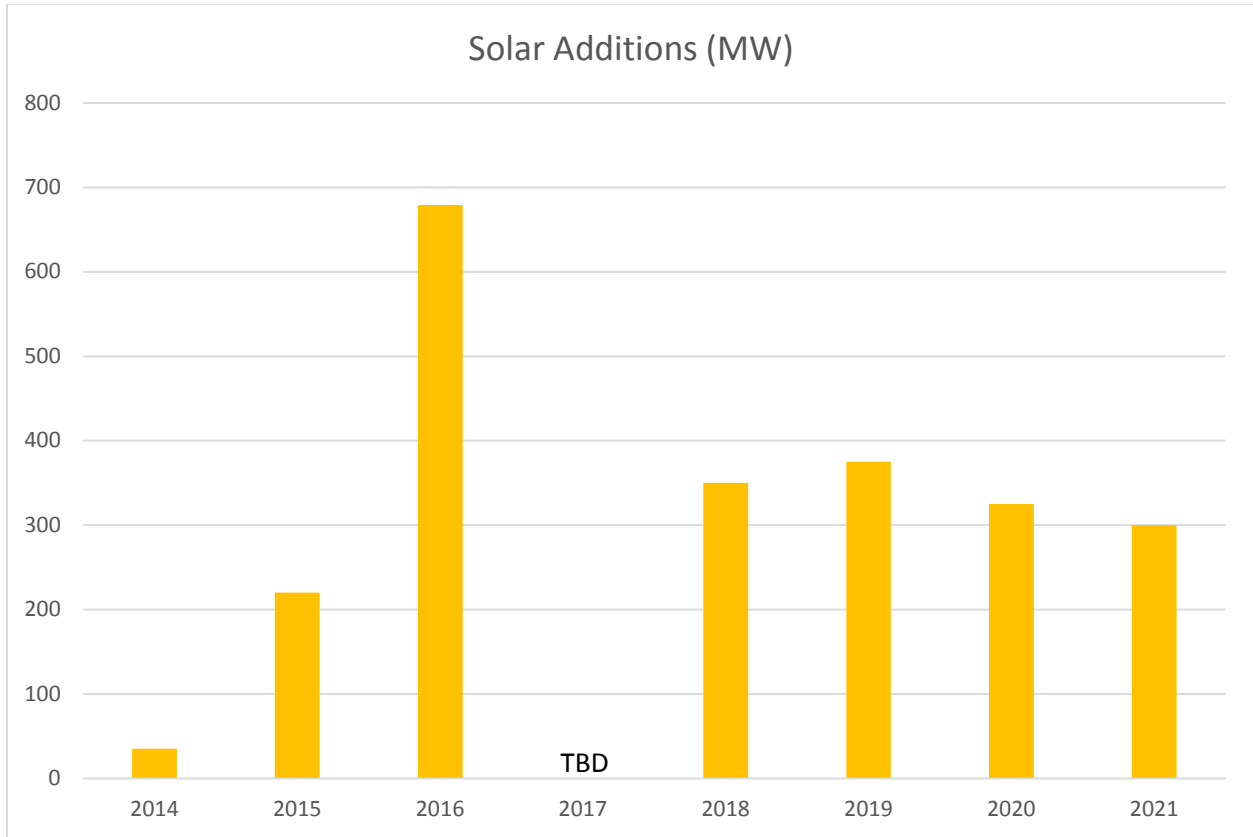
⁸ Greenlink’s calculations. Data inputs collected from Georgia Power Company, US EIA Form 861, and US EIA’s 2016 Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants. Available at: <https://www.eia.gov/analysis/studies/powerplants/capitalcost/>

⁹ Molly Samuel, *Contractor Bankruptcy Could Be Trouble For Georgia Power*, WABE 90.1, Mar. 24, 2017, <http://news.wabe.org/post/contractor-bankruptcy-could-be-trouble-georgia-power>.

¹⁰ The reserve margin increases in 2026-2030 due to proposed natural gas plants Georgia Power incorporated into the 2016 Integrated Resource Plan.

¹¹ Data taken from GeorgiaEnergyData.org

power (and savings to Georgia Power customers). Over the next four years, before the Vogtle units may even be completed, Georgia will add another 1350 MWs of clean solar energy.¹²



These solar additions are among the reasons that we can now do without the new Vogtle units. Similar future additions, along with ongoing investments in efficiency, can take care of any future capacity needs at lower cost than completing the Vogtle units.

What could \$30 million (Vogtle’s monthly construction bill) buy?

Each month, \$30 million in financing costs alone are added to Plant Vogtle’s running tab.¹³ Those costs are likely to increase in the wake of the Westinghouse bankruptcy.

Investing just one month of Vogtle’s running costs into efficiency programs would yield upwards of \$250 million in customer savings over the next decade.¹⁴

With just one year of the current Vogtle costs we could add more than 320 MW of new solar to the grid, resources that could be online and generating carbon-free electricity in just two years.¹⁵

¹² See 6.

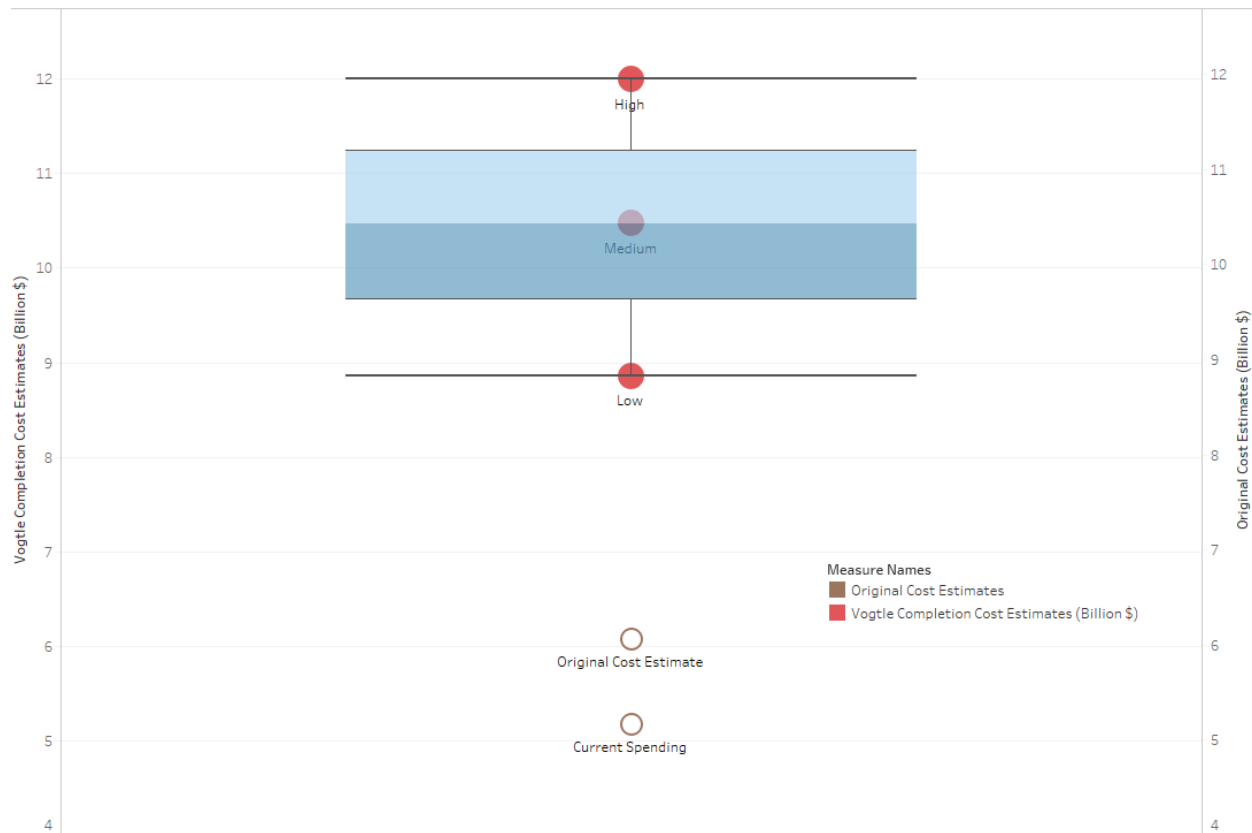
¹³ Georgia Power Company. 2017. “Sixteenth Semi-annual Vogtle Construction Monitoring Report.” Georgia Public Service Commission, Docket 29849.

¹⁴ Greenlink’s calculations, based on Georgia Power reports to the Georgia Public Service Commission, showing \$0.0128/kWh-saved through existing efficiency programs in 2016, then compared to the cost of purchasing the same quantity of energy at current rates.

We are where we are. The question is where do we go from here?

The Vogtle units were originally projected to cost Georgia Power \$6.1 billion. Late last year Georgia Public Service Commission staff put current cost overruns north of \$3 billion.¹⁶ Now with the Westinghouse bankruptcy those costs are likely to increase, with no clear end in sight. Southern Company is currently seeking \$3.7 billion in guarantees from Westinghouse's parent company, Toshiba.¹⁷ But Southern CEO Tom Fanning recently acknowledged that even that amount (on top of the \$5.4 billion that Georgia Power already has pre-authorization to recover from customers) may be insufficient to complete the units.^{18, 19}

Vogtle Costs



¹⁵ Assuming \$1.12/W for utility solar costs.

¹⁶ *13th Vogtle Construction Monitoring*, Georgia Public Service Commission Docket No. 29849, Hearing Transcript (Dec. 10, 2015), (Witness Phil Hayet testifying on behalf of the Georgia PSC Public Interest Advocacy (PIA) staff stating that the current cost of Vogtle was \$9.516 billion, with the inclusion of a 46 percent tax gross up on the financing costs.

¹⁷ Russell Gold, *Southern Seeks \$3.7 Billion from Toshiba for Georgia Nuclear Plant*, Wall Street Journal, May 3, 2017, <https://www.wsj.com/articles/southern-seeks-3-7-billion-from-toshiba-for-georgia-nuclear-plant-1493829606>.

¹⁸ *Id.*

¹⁹ Each of the cited numbers are specific to Georgia Power's 47% stake in the new nuclear units. The full cost for all participants in the project is significantly higher, perhaps more than double.

Already the project is adding approximately \$100 per year to the average customer's bill.²⁰ And those costs are just for the financing of the project; if and when the units are completed and put into service, customers will pay significantly more as capital costs are put into rates.²¹ In this way, the Vogtle expansion is a current and future source of very real upward pressure on customer bills. The only question is how much more.

The better path for customers

The foregoing analysis is focused simply on what makes the most economic sense for customers in light of changed circumstances – a motivation ostensibly shared by Georgia Power. The reality is this: while Plant Vogtle has and will continue to exert significant upward pressure on customer bills, investments in solar and energy efficiency do the opposite. In fact, Georgia Power's recent solar investments under the Commission's leadership are projected to save customers several hundred million dollars over the next few decades.²² Efficiency investments have the same effect by lowering overall system costs.

The bottom line is that Plant Vogtle has priced itself out of the market. At this stage it is no longer the most cost-effective way of delivering low-carbon energy to Georgia's grid. Customers are better served by foregoing the project and devoting even a fraction of the ongoing costs toward additional investments in energy efficiency and solar.

²⁰ Greenlink's calculation, based on Georgia Power Standard Service (Residential Service Schedule R-22: https://www.georgiapower.com/docs/rates-schedules/residential-rates/2.10_R.pdf) and reported average usage in the Georgia Power 2016 Annual Report: <https://www.georgiapower.com/docs/about-us/GPC-2016-AnnualReport.pdf>. See "Selected Data" on p.83.

²¹ See 12.

²² *Georgia Power Company's Application for Certification of the 2015 and 2016 Advanced Solar Initiative Prime Power Purchase Agreements and Request for Approval of the 2015 Advanced Solar Initiative Power Purchase Agreements*, Georgia Public Service Commission Docket No. 38877, Hearing Transcript (Dec. 2, 2014), at 50 (Georgia Power Witness Leach stating that net savings to customers from the ASI-Prime solar projects would "reach several hundred million dollars."). (Witness Leach) "Well, I think it's safe to say, for this many megawatts over a 30-year period, 25 to 30-year period, it's going to reach several hundred million dollars."