

COUNTERFLOW

BY STEVE HUNTOON

Vogle, the Law of Holes, and Two Modest Proposals

The Vogtle nuclear project in Georgia is looking like an object lesson in the failure of regulation (and a vindication of competition).

What went wrong? Traditional regulatory policy is that new utility investment didn't get billed to utility customers unless and until it's actually in service and thus "used and useful" to utility customers.

But nuclear advocates argued that the lead time and risk of nuclear plants were so great that construction costs ought to be guaranteed, and in some cases charged to utility customers, long before the plants are completed.

This fundamentally and completely changed the investment calculus for utilities interested in nuclear plants, with the potential for enormous returns on billions of dollars. The key was to get legislators and/or regulators to go along.

Once they did, nuclear plant development became a no-lose proposition for the utility.

Selling Vogtle

Vogle is an example of the problem. If you go to Southern Co.'s Georgia Power website right now (at least when this column went to



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print), the utility tells you: "There are many great benefits to nuclear power: it's inexpensive..."¹

Inexpensive? Lazard's highly regarded "Levelized Cost of Energy Analysis" of different energy sources shows nuclear at about twice the cost of the major competitors: natural gas combined cycle, wind and utility-scale solar.²

Georgia Power also claims Vogtle is needed because of future electric demand: "By 2030, electrical demand is projected to increase 27% in the Southeast."³

Below is the Energy Information Administration's projection of Southeast electric demand through the year 2030.

Do you see the 27% increase? Me neither.

If Vogtle ever made sense, that ended years ago when it became evident that natural gas prices would stay relatively low, that load growth would slow, and that Vogtle costs would escalate.

How Competition is Different

Competitive businesses pull the plug all the time on investments that aren't working out (as NRG Energy did for its proposed nuclear plant in Texas in 2011 — six years go — at no cost to consumers). But utilities don't have a reason to pull the plug if they win either way.

This is the fundamental difference from competitive markets, where bad investments are investor burdens, not utility customer burdens.

The Georgia (Vogle) and South Carolina (V.C. Summer) utilities kept on spending billions of dollars that their customers are on the hook for.

The Westinghouse Electric bankruptcy ripped the veil off the likely cost of completing the projects. Since the "inexpensive" and "load growth" justifications for the plants have disappeared, pulling the plug is the obvious resolution.

But as seen in South Carolina with the Summer project cancellation, there can be political blowback against cutting losses because so much has been spent already.⁴

This ignores the law of holes: If you're in one, stop digging.

\$23.6 Billion in Excess Costs

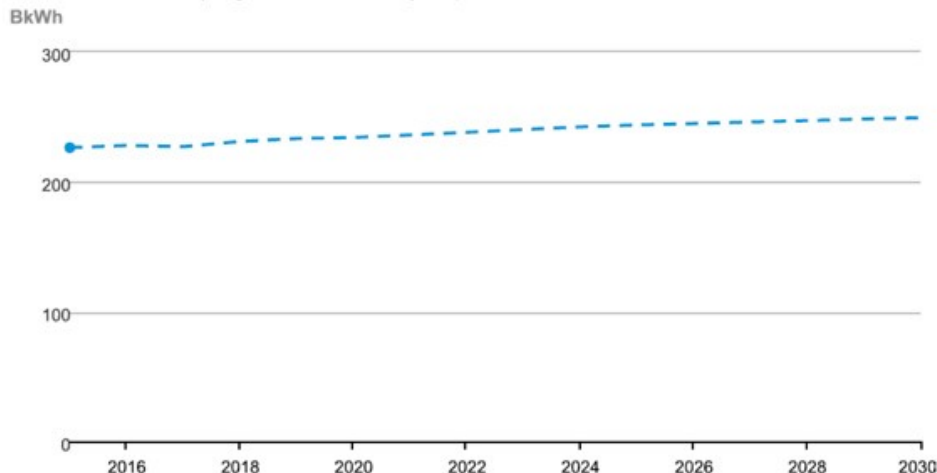
Sunk costs are sunk (maybe they never should have been sunk, but they're sunk now). So they shouldn't be considered in deciding whether to keep digging — either as a reason to keep digging or as a reason to stop. Only future costs should matter.

Here's how to look at the "go"- "no go" decision on Vogtle: We start with Georgia Power's forecasted project cost for its 45.7% share, \$12.17 billion,⁵ and subtract its project costs incurred to date (sunk costs), \$5.844 billion, for a net of \$6.326 billion in "cost to complete" from this point forward.⁶ Scale Georgia Power's cost to complete up for the other owners' shares to get the total project cost to complete, from this point forward, of \$13.842 billion.

Add \$700 million in income tax allowance for Georgia Power's return, to get \$14.542 billion.⁷

Subtract a \$745 million cancellation cost (avoided if Vogtle is not canceled) to get a \$13.797 billion cost to complete less avoided cancellation cost. Do not subtract the Toshiba parent guaranty payments, because they are owed regardless of whether the project is canceled or not.⁸

Case: Reference case | Region: SERC Reliability Corporation / Southeastern



SERC Reliability Corp. regional electricity demand | EIA

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With me so far? Net project cost to complete, from this point forward, is \$13.797 billion. Divided by 2,204 MW of net electrical output is \$6,260/kW.

With that we can use Lazard's LCOE analysis to get a levelized cost of energy for completing Vogtle. The \$6,260/kW cost to complete Vogtle is way above the low of \$5,400/kW in Lazard's nuclear capital cost range.

So being favorable to a case for completing Vogtle, we can take the low end of Lazard's nuclear LCOE range, \$97/MWh, and compare it to the midpoint of Lazard's natural gas combined cycle LCOE range, \$63/MWh, for an excess cost of Vogtle of \$34/MWh.

We can take that excess cost for Vogtle of \$34/MWh, times 8,760 hours, times Lazard's 90% capacity factor, times Vogtle 2,204 MW net capacity, times 40 years, and conclude that the cost to complete Vogtle, from this point forward, would impose excess costs of \$23.6 billion on Georgia consumers over the next 40 years.⁹

Non-Economic Justifications

With the economics of Vogtle long gone, non-economic justifications have emerged. For example, a Georgia Public Service Commissioner argued in an Aug. 18, 2017, *Wall Street Journal* [op-ed](#) that "nuclear reactors produce isotopes needed for medical imaging and cancer treatment."

The fact is that virtually all medical isotopes are produced in specialty reactors — not utility nuclear units.¹⁰ The existing Vogtle units have never produced medical isotopes, and there are no plans for new Vogtle units to do so.

Then there is the fuel diversity argument. But Georgia Power says that it has "A Diverse Portfolio" now.¹¹ With little load growth (as shown above), and major coal plant retirements behind it, Georgia Power can't possibly need Vogtle to maintain a diverse portfolio.

And as for nuclear having carbon-free emissions, if that is a major consideration,

wind and solar are about the half the LCOE under the Lazard analysis.

Two Modest Proposals

If the Vogtle owners and Georgia think nuclear power has unique and important value, here's a modest proposal. It is staggering in its simplicity: Exelon throws the Vogtle owners the keys to its Clinton and Quad Cities nuclear plants. The plug is pulled on Vogtle.

Think about it. Illinois consumers save \$2.35 billion they no longer have to pay to save Clinton and Quad Cities, which Exelon would have closed without the subsidies.

Georgia consumers avoid \$23.6 billion in excess costs they would bear by completing Vogtle.

Win-win.

Don't like that one? Here's another. Suspend Vogtle for 10 years. Georgia Power's consultant, Black & Veatch, estimated that would cost \$112 million,¹² which is a dirt cheap way to hold off making a possible huge mistake. Georgia Power said it rejects that option because Westinghouse's AP1000 design isn't being pursued anywhere else "in the United States," and therefore Westinghouse would not maintain the design and vendors would stop making components.

Assuming for the sake of argument that design and component capability would be forever lost by deferral if no AP1000 reactors were to exist anywhere, that just won't be the case. Four AP1000 reactors are being completed in China right now, and more AP1000 reactors are planned elsewhere in the world.¹³

They just don't make sense here.

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¹ <https://www.georgiapower.com/about-energy/energy-sources/home.cshtml>

² <https://www.lazard.com/media/438038/levelized-cost-of-energy-v100.pdf> (page 2). Lazard does not adjust for the capacity value of non-dispatchable intermittent resources like wind and solar. But the price difference between nuclear and wind/solar is so vast that even after adding some capacity cost, wind and solar would remain much cheaper than nuclear.

³ <https://www.georgiapower.com/about-energy/energy-sources/nuclear/overview.cshtml>

⁴ One Georgia Public Service Commissioner is quoted as saying: "I do want to see this project completed. I do not like to see failure." <http://www.ajc.com/business/georgia-power-told-its-homework-vogtle-uke-options/mnHqeJ7BdDza0U25xAxfBP/>. I would submit that failure is making a decision that is not in the interests of Georgia consumers.

⁵ Using Georgia Power's latest forecasted project cost is being favorable to a case for completing Vogtle, given the long history of underestimating project cost. The Vogtle owners recently selected Bechtel Corp. as the new construction contractor. It appears Bechtel has provided no cost or schedule guarantees.

⁶ These figures are from Table 1.1 of Georgia Power's Aug. 31, 2017, filing with the Georgia Public Service Commission in Docket No. 29849, except that financing costs to date of \$1.4 billion come from Southern's Form 10-Q for Q2 2017 (page 38). Financing costs must be included because capital isn't free. If financing costs are ignored, then among other things, two projects costing \$1 billion in capital — one which takes 12 years to construct (like Vogtle) and one which takes three years to construct (like a natural gas combined cycle plant) — would be treated as equivalent.

⁷ The *Atlanta Journal-Constitution* reports that Georgia Power's estimated financing costs, \$3.4 billion, do not include an income tax allowance; the newspaper estimates financing costs with income tax allowance of \$4.1 billion. <http://www.myajc.com/business/georgia-large-power-users-save-hundreds-millions-plant-vogtle-charges/HDUjkg5qjDx3GVotFclS9L/>. The income tax allowance is not applicable to the other Vogtle owners because they do not pay income taxes, so it is added to the total project cost to complete rather than scaled up for the other owners' shares.

⁸ "The guarantee obligations continue to exist in the event of cancellation." Southern's Form 10-Q for Q2 2017 (page 38).

⁹ Georgia Power presents completely different results in its recent filing with the Georgia PSC (referenced in a preceding footnote). But its numbers come out of a black box. And no analysis by a third-party economic consultancy is provided to inform or support the "go" decision of the Vogtle owners.

¹⁰ <http://www.nature.com/news/reactor-shutdown-threatens-world-s-medical-isotope-supply-1.20577>

¹¹ <https://www.georgiapower.com/about-energy/>

¹² Exhibit 6 of above-referenced Georgia Power's filing with the Georgia PSC.

¹³ <http://www.reuters.com/article/us-westinghouse-nuclear-idUSKCN11M1Q7>