

A Strong Case for Completing Vogtle + Caveats About More Nuclear

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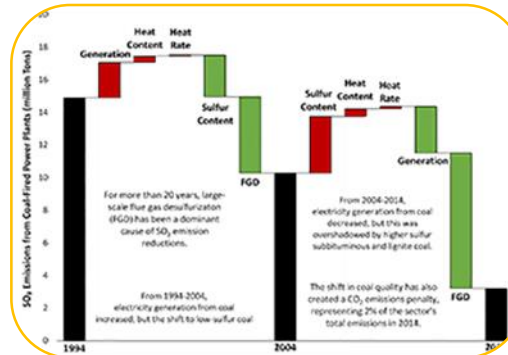
GT Climate and Energy Policy Lab



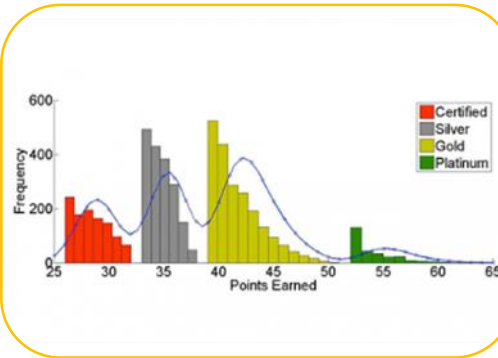
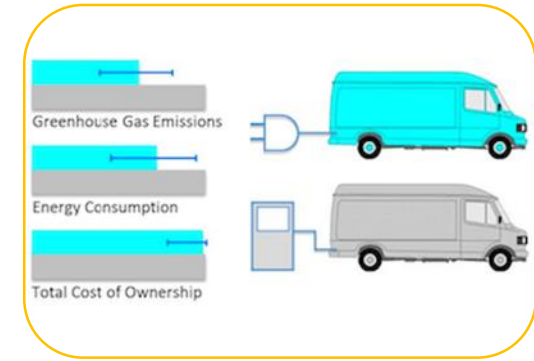
The Low-Income Energy Burdens



U.S. SO₂ Emissions: Shifting Factors



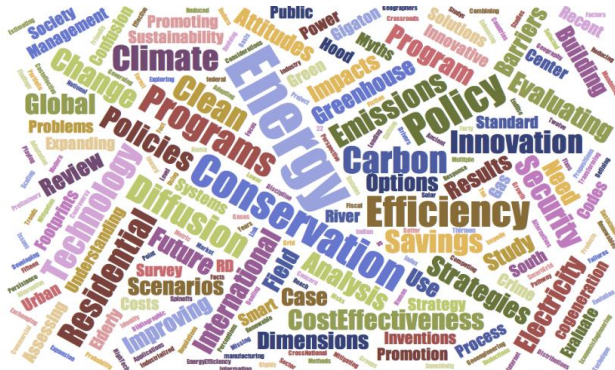
Electric Urban Delivery Trucks



Point Distribution for New LEED Construction



The Emergence of Smart-Grid Policies



The Risk of Mega Projects

- Mega projects are always risky.
- The stakes riding on the new nuclear reactors at Plant Vogtle couldn't be higher.
- With the cancellation of VC Summer's nuclear construction project in South Carolina, Georgia's plant Vogtle is now the only nuclear plant under construction in the U.S.



Photo of Vogtle Unit 3 in December 2017

The Shifting Cost of Resources & Technologies

Since 2007 natural gas prices have plummeted as a result of hydraulic fracking and horizontal drilling.

The cost of wind and solar power continue to drop, and eliminating the wasteful ways we use electricity is a vast and cheap energy resource.

So, if the original decision to expand nuclear was made today, Georgians would not be debating two new units at plant Vogtle.

But with about half of the project already completed, the “go” decision now is clear...the project should be finished. It is a cost-competitive option, and it will add significant reliable baseload generation.

Consider the Tennessee Valley Authority

When I was appointed by the President to TVA's Board of Directors in 2010, the fate of TVA's partially-finished second reactor at Watts Bar in Tennessee was uncertain.

The goal of reliable and affordable electricity (along with environmental stewardship and economic development) dictated TVA's decision to complete, and in December 2016, the Watts Bar 2 reactor began commercial operation.

Today, 40% of TVA's electricity is generated by its nuclear fleet, its rates remain low, and its CO₂ emissions are half what they were in 2005.

Watts Bar 2 is the first nuclear reactor completed in the U.S. since 1996.

Tax Extenders Make Plant Vogtle More Affordable

In January 2018, the Bipartisan Budget Act of 2018 was signed into law.

Nestled within it is some good news for advocates of low-carbon energy solutions ... a collection of energy tax extenders and incentives for:

- solar water heating,
- geothermal heat pumps,
- fuel cells,
- small wind energy,
- combined heat and power systems, and
- energy-efficient new buildings, and lots more.

Tax Extenders Will Make Plant Vogtle More Affordable

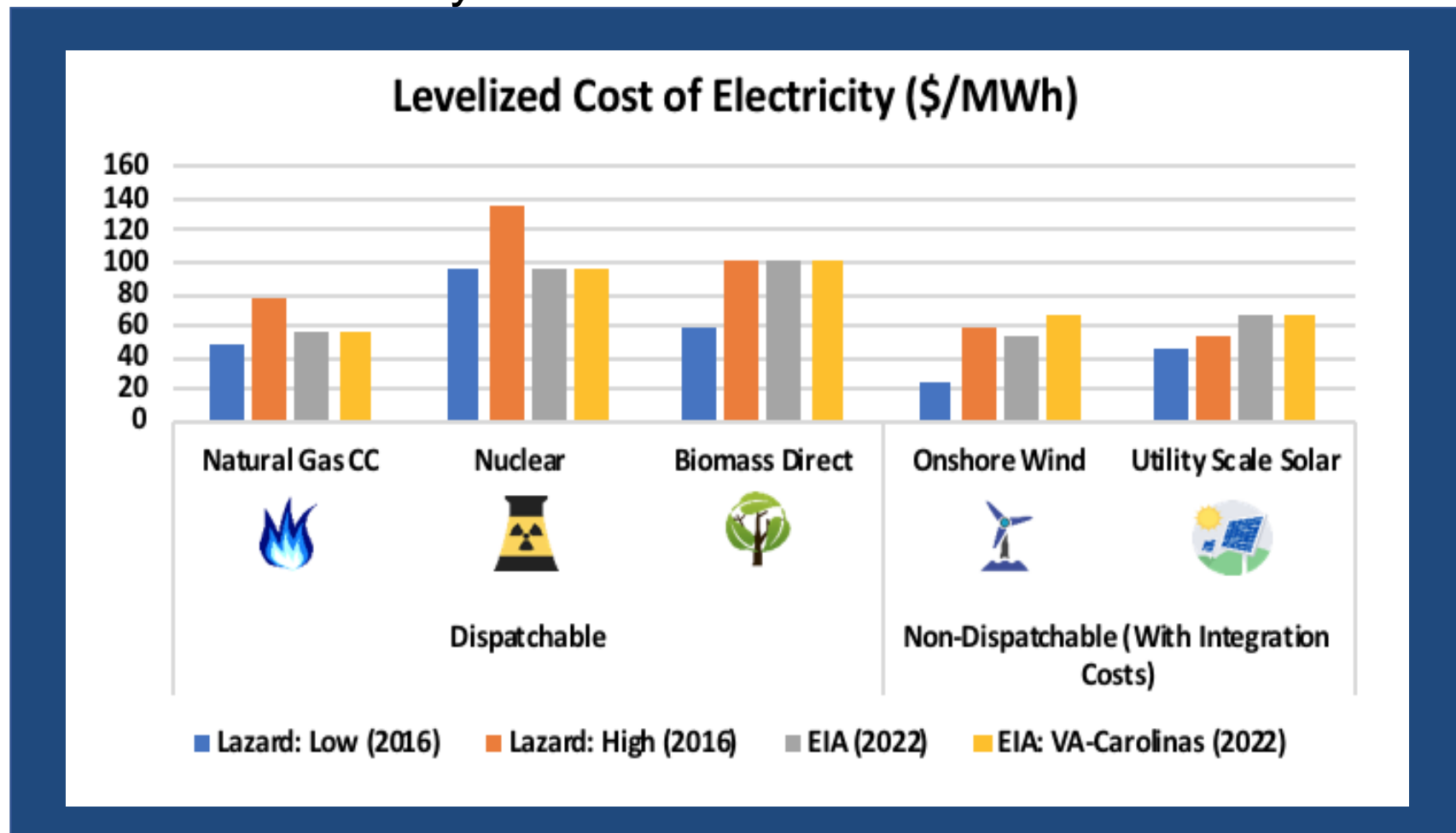
Particularly key to Georgia, the Bipartisan Budget Act also extends \$0.018/kWh production tax credits for new nuclear power.

With this Act, the deadline for completion of new nuclear units to qualify for the tax credits has been eliminated for up to 6,000 MW of new nuclear capacity.

Southern Company will be able to qualify for an estimated \$2 billion in incentives for the Vogtle Plant. Oglethorpe Power Corporation, the Municipal Electric Authority of Georgia, and the City of Dalton will also benefit.

What are the Alternatives?

If Vogtle units 3 and 4 were not completed, new natural gas units would likely fill most of the void.



Source: Marilyn Brown et al. 2018. "The Economics of Four Virginia Biomass Plants." School of Public Policy, Georgia Institute of Technology, Working Paper 93,
<https://cepl.gatech.edu/sites/default/files/attachments/Biomass Economics-Working Paper %2393.pdf>

Other Issues: (1) Nuclear Security

Watts Bar 2 is the first nuclear reactor completed in the U.S. since 1996.

In the Northeast and Midwest, conditions in wholesale competitive markets have been responsible for the early retirement of several U.S. nuclear reactors.

In contrast, China completed five new reactors in 2016, and it has 20 more reactors under construction.

The U.S. needs a viable domestic nuclear industry to retain its critical role in nuclear nonproliferation and security.

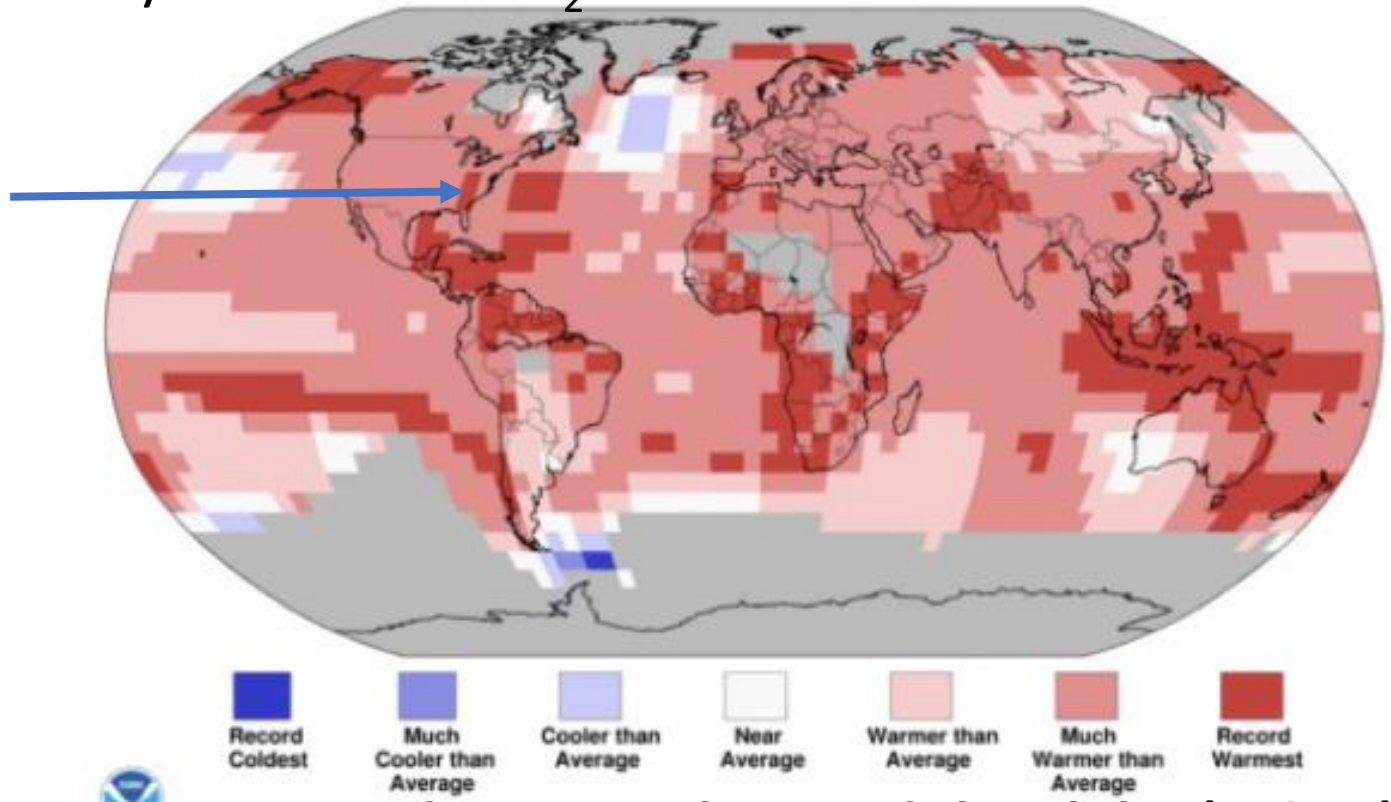
Other Issues: (2) Climate Change

The accelerating pace of climate also favors completion of Vogtle over natural gas—16 of the last 17 years have been the hottest on record.

The link to CO₂ emissions is undeniable, and the power sector is responsible for nearly 40% of U.S. CO₂ emissions.

**The Southeast
Is no longer an
anomaly!**

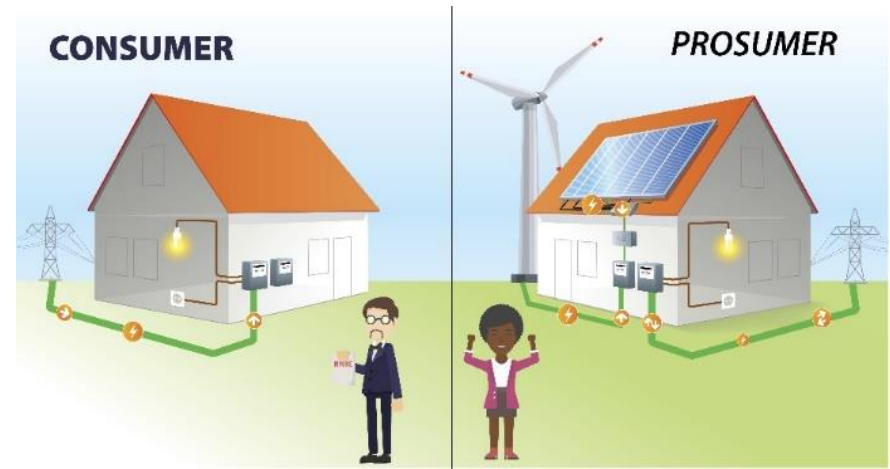
http://www.silive.com/news/2018/01/2017_second_warmest_year_on_re.html



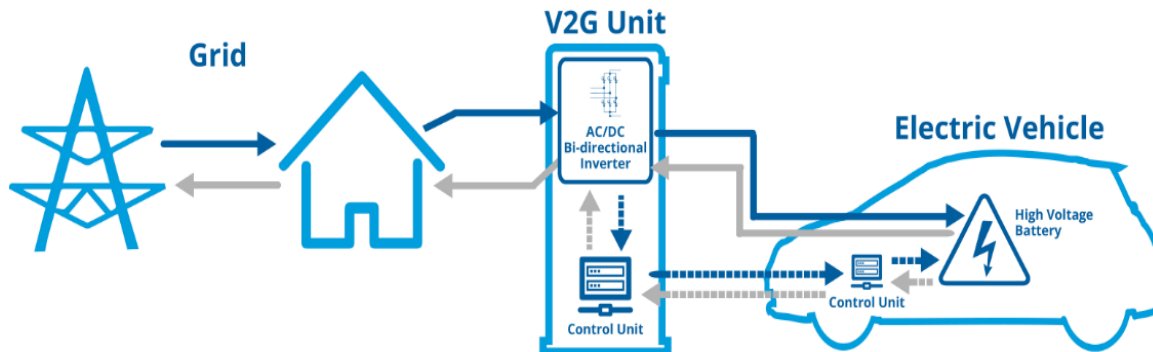
2016 temperatures compared to normal around the globe (NOAA)

A Peak into the Future: Distributed Resources & “Prosumers”

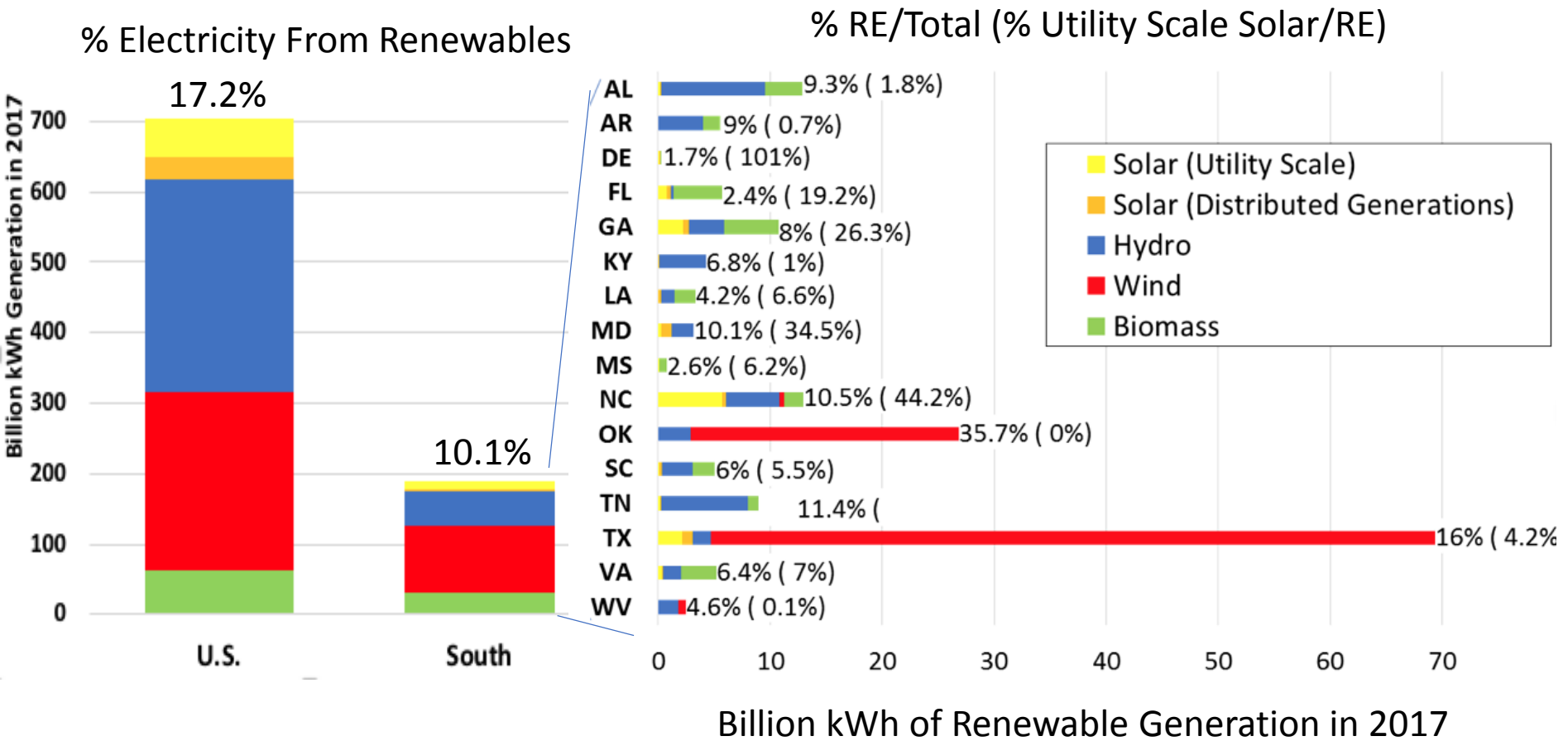
- Consumers are becoming producers as well as consumers – “Prosumers”
 - Facilitated by the falling cost of solar panels
 - Home battery systems are on the move
 - Many more EV models are available + a growing charging infrastructure



Grid-integrated vehicles could become another form of “prosumerism”



Solar is On the Move: Meeting 10% of Georgia's Electricity Generation



Data sources: U.S. Energy Information Administration, [Electric Power Monthly](https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_01_a), Table 1.1A, 1.2C-E, 6.2B.

https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_01_a

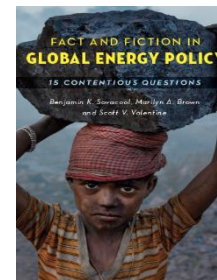
State level data is also available at <https://www.eia.gov/electricity/data/state/>

For More Information — and some late night reading??

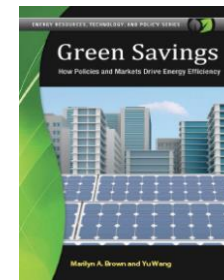
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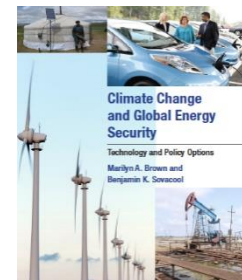
Climate and Energy Policy Lab:
www.cepl.gatech.edu



2016



2015



2013

SATURDAY OPINION

GUEST COLUMN

A strong case for completing Plant Vogtle

By Marilyn A. Brown

Mega-projects are always risky, and the stakes riding on the new nuclear reactors at Plant Vogtle couldn't be higher.

With the cancellation of VC Summer's nuclear construction project in South Carolina on July 31, Georgia's plant Vogtle is now the only nuclear plant under construction in the U.S.

Since about 2007 natural gas prices have plummeted as a result of "fracking." The cost of wind and solar power has also declined remarkably, and eliminating the wasteful ways we use electricity continues to be a vast and cheap energy resource. So, if the original decision to build two new reactors were made today, Georgians would not be debating two new units at plant Vogtle. But with so much construction already accomplished and with Georgia Power's \$4.5 billion estimated cost-to-complete, the "go" decision now is clear: the project should be finished. It is the least-cost option, and it will add significant reliable baseload generation.

When I was appointed to the Tennessee Valley Authority's Board of Directors in 2010, the fate of TVA's partially finished second reactor at Watts Bar in Tennessee was uncertain. The goal of reliable and affordable electricity (along with environmental stewardship and economic development) dictated TVA's



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decision to complete, and late last year, the Watts Bar 2 reactor began commercial operation. Today, 40 percent of TVA's electricity is generated by its nuclear fleet, its rates remain low, and its CO2 emissions are half what they were in 2005.

Watts Bar 2 is the first nuclear reactor completed in the U.S. since 1996. In the Northeast and Midwest, conditions in wholesale competitive markets have been responsible for the early retirement of several U.S. nuclear reactors. In contrast, China completed five new reactors in 2016, and it has 20 more reactors under construction. The U.S. needs a viable domestic nuclear industry to retain its critical role in nuclear nonproliferation and security.

The accelerating pace of global warming also favors completion of the Vogtle plant – 16 of the last 17 years have been the hottest on record. The link to CO2 emissions is undeniable, and the power sector is responsible for about 40 percent



One of the two new cooling towers under construction at Plant Vogtle is shown in 2015 in the foreground of two existing towers. The construction of two new nuclear plants at Plant Vogtle has fallen years behind schedule. Georgia's Plant Vogtle is now the only nuclear plant under construction in the U.S. www.sandiegoblade.com

Georgia has the chance to significantly expand its carbon-free nuclear capacity.

of U.S. CO2 emissions. If Vogtle units 3 and 4 are not completed, new natural gas units will likely fill most of the void.

Instead, Georgia has the chance to significantly expand its carbon-free nuclear capacity. Looking to the future, as renewable energy and storage devices become increasingly competitive, elec-

tricity fueled by the sun will likely replace both our coal plants as well as our gas-guzzling cars.

Marilyn A. Brown is the Brook Byers Professor of Sustainable Systems in the School of Public Policy at the Georgia Institute of Technology. The views expressed are solely those of the author.



Expansion at Plant Vogtle will add enough new nuclear energy to power 500,000 homes. In this 2014 view, one of the two new cooling towers is seen in the background. [MATT COOPER/MATT COOPER.COM](http://www.mattcooper.com)

The Cost of Alternatives

	Levelized Cost of Electricity (\$/MWh)				
	Dispatchable			Non-Dispatchable (With Integration Costs)	
<u>Nation</u>	Natural Gas CC	Nuclear	Biomass Direct	Onshore Wind	Utility-Scale Solar
<u>Lazard: Low (2016)</u>	48	97	60	24	46
<u>Lazard: High (2016)</u>	78	136	101	58	54
<u>EIA (2022)</u>	57	96	102	54	68
<u>EIA: VA-Car. (2022)</u>	57	96	101	66	67

Source: Marilyn Brown et al. 2017. "The Economics of Four Virginia Biomass Plants." School of Public Policy, Georgia Institute of Technology, Working Paper 93,
[https://cepl.gatech.edu/sites/default/files/attachments/Biomass Economics-Working Paper %2393.pdf](https://cepl.gatech.edu/sites/default/files/attachments/Biomass_Economics-Working_Paper_%2393.pdf)