BEFORE THE GEORGIA PUBLIC SERVICE COMMISSION
STATE OF GEORGIA

In Re: Review of Proposed Revisions and Verification of Expenditures
Pursuant to Georgia Power Company’s Certificate of Public Convenience and Necessity for Plant Vogtle Units 3 and 4, Twelfth Semi-annual Construction Monitoring Report

Docket No. 29849

DIRECT TESTIMONY AND EXHIBITS OF GLENN CARROLL ON BEHALF OF NUCLEAR WATCH SOUTH

I. INTRODUCTION

Q. Please state your name, profession, and business location.
A. My name is Glenn Carroll. I am coordinator of Nuclear Watch South. My business address is P.O. Box 8574, Atlanta, Georgia 31106.

Q. Ms. Carroll, please summarize your educational and professional experience.
A. I have a Bachelors Degree in Visual Art from Georgia State University. I am a self-employed artist and began volunteering with Georgians Against Nuclear Energy (now called Nuclear Watch South) in 1987. In 2000, I became part-time paid coordinator of Nuclear Watch South. My resume is attached as Exhibit #1. During my tenure with Nuclear Watch South, I have conducted several legal interventions before the Nuclear Regulatory Commission in NRC licensing proceedings, including opposition to a Vogtle 1 NRC license amendment request in 1991. I have appeared before the Georgia Public Service Commission multiple times as a public witness. In 2013, I led Nuclear Watch South’s intervention on this docket in the 8th Vogtle Construction Monitoring Review (VCMR).
Q. Have you previously appeared before the Georgia PSC regarding Vogtle 3 & 4?
A. Yes. I have appeared as a public witness in the Vogtle 3 & 4 hearings on several occasions and conducted cross-examination on two occasions. This is my first appearance on the Vogtle 3 & 4 docket #29849 as an expert witness.

Q. What qualifies you to testify as an expert in this case?
A. The evidence I present is basic information that is available and understandable by regular people, therefore does not require specialized expertise.

Q. On whose behalf are you testifying in the 12th Semi-Annual Vogtle Construction Review?
A. Consumer advocacy group Nuclear Watch South.

Q. What are the issues in this case?
A. First, whether there is any necessity to expand electric generating capacity by continuing construction of Georgia Power’s Vogtle 3 & 4 reactors in accordance with O.C.G.A. § 46-3A-7(b). Second, whether the Commission should mothball current Vogtle expansion as more beneficial to Georgia ratepayers than completing unneeded power plants. Third, if the PSC does not mothball Vogtle 3&4 whether it should order additional studies to assess the current economic benefits of continuing Vogtle 3 & 4 construction.

Q. What is the purpose of your testimony?
A. To support the Commission in its public service and mission to protect Georgia Power ratepayers and to exercise its authority to decertify unneeded power projects by showing why Plant Vogtle expansion is not needed.

Q. What information sources do you rely upon in your testimony?
A. Georgia Power data obtained from Georgia Power 2004-2014 annual reports.
II. ROLE OF THE PUBLIC SERVICE COMMISSION

Q. What is the role of the Georgia PSC in regulating the Vogtle expansion project?
A. According to Georgia Public Service Commission’s website: “The mission of the Georgia Public Service Commission is to exercise its authority and influence to ensure that consumers receive safe, reliable and reasonably priced telecommunications, electric and natural gas services from financially viable and technically competent companies.”

Georgia Code O.C.G.A. § 46-3A-6 “Reexamination of a certificate of public convenience and necessity; modification or revocation” states:

Upon application of a utility or upon its own motion, the commission may reexamine any certificate granted under this chapter to determine whether new forecasts of future requirements require the modification of the construction, purchase, sale, or expenditure for a certificated capacity resource. If upon such reexamination the commission finds that the certificated capacity resource is no longer needed or that any additional certificated capacity resource is needed to assure a reliable supply of electric power and energy for the utility’s Georgia retail customers, the commission may modify or revoke the certificate. If the utility cancels, abandons, or increases some or all of the capacity resource as a result of such modification or revocation of the certificate, it may recover through any rate-making vehicle over a reasonable period of time, absent fraud, concealment, failure to disclose a material fact, imprudence, or criminal misconduct, the amount of its investment in such capacity resource, along with the cost of carrying the unamortized portion of that investment, net of actual salvage value, to the extent such investment is verified as made pursuant to the certificate. The commission shall disallow such investment and costs resulting from fraud, concealment, failure to disclose a material fact, imprudence, or criminal misconduct. [emphasis added]
As shown below, Vogtle 3&4 are not needed and the Commission should immediately move to exercise the responsibility and authority vested in it by Georgia O.C.G.A. § 46-3A-6 to modify Vogtle certification in order to achieve cold shutdown of the Vogtle 3 & 4 construction site.

III. VOGTLE 3 & 4 ARE NOT NEEDED

Q. Please explain the chart titled: Georgia Power Key Financial & Operating Data (Exhibit #2)
A. The chart consists of eleven (11) years of data from the period 2004-2014. The chart is compiled by Steven C. Prenovitz using data obtained from Georgia Power annual reports.

Q. What are the key points from the chart in assessing Georgia Power’s need for Vogtle reactors 3&4 capacity?
A. The key points are:
Line 2 shows volume sales (in Kwh) are flat for the 10-year period 2004-2014
Line 5 shows capacity utilization has declined from 72% to 58% for the period.
(Exhibit #2)

Q. Does Georgia need the additional capacity from reactors 3&4?
A. No. In the 8th Vogtle Construction Monitoring Review (2013) Mr. Prenovitz’ direct testimony stated:

[In] Georgia Power’s first Vogtle expansion certification filing in 2009, the company forecast the need for an additional 8,000 MW of capacity from 2008-2018. [Prenovitz 2009 testimony, Exhibit 5, p.3] That is a 4.1% annual growth in capacity, which should be driven by its load forecasts. Since Georgia Power forecast a 4.1% annual growth rate in capacity, it is conservative to assume both a 3% load and a 2% load growth rate. [emphasis added]
As line 2 shows, Georgia Power’s 4.1% forecast in annual growth has not materialized. In historical fact, we find that the past 10 years have seen only a 0.2% growth in Georgia Power’s retail market and -0.4% reduction in its wholesale market. In volume sales terms, 2014’s net sales of 172,920 kwh-M is lower than 2004’s total volume of 175,009 kwh-M, down almost 1% for the 10-year period.

We are more than halfway through the period used by Georgia Power’s 2008-2018 forecast. The historical contrast between 2008-2014 figures, a six-year span, no longer support Georgia Power’s current certificated need. Georgia Power’s sales volume has fallen off appreciably from 2008’s 182,060 kwh-M total retail and retail/wholesale to 2014’s total of 172,920 kwh-M, down .98% for the six-year period.

Indeed, Georgia Power is testifying in the current proceeding that Vogtle 3&4 will not be on-line until 2020, two years beyond the 2018 need claimed in Georgia Power’s expansion certificate, which highlights the fact that Georgia Power does not need to new power supply and further supports immediate action by the PSC to modify Georgia Power’s Vogtle expansion certificate to mothball construction of Vogtle 3&4.

Q. Is Georgia Power fully using its existing capacity?
A. As the Georgia Power Key Financial and Operating Data Chart (exhibit 2) highlights in line 5, Georgia Power’s capacity utilization factor declined from 72% to 58% in the period 2004-2014. In the years 2008-2014, capacity utilization declined from 70% to 58%.

Q. What is the significance to the PSC of these figures?
A. Georgia Power forecasts were for 4.1% annual growth in capacity, but in the key six-year period that coincides with the Vogtle expansion (2008-2014), capacity growth was only 1.09% for the whole six-year period. Because Georgia Power’s capacity utilization factor declined from 70% to 58% in the same period, it is clear that expanding Vogtle’s capacity is not needed.
Q. Is there anything else the PSC should consider in weighing forecasts against historical data?

A. Yes. Southern Company’s disclaimer about the reliability of its forecasts, *Cautionary Note Regarding Forward-Looking Statements*, is posted on its website and included in all of its press releases. It is instructive for the PSC as well, stating, in part:

> Forward-looking information includes, among other things, statements concerning the schedule of completion of construction projects, job creation and projections and benefits to customers. *Southern Company and Georgia Power Company caution that there are certain factors that could 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 Southern Company and Georgia Power Company; accordingly, there can be no assurance that such suggested results will be realized. [excerpt, emphasis added]

The complete lengthy corporate disclaimer iterates a comprehensive list of potential factors which would negatively affect the outcome of company forecasts, including all of the current experience with Vogtle 3 & 4 construction delays and the changing business climate of energy production. For example here is a small sampling of the foreseeable problems in the disclaimer: *shortages and inconsistent quality of equipment, materials, and labor, contractor or supplier delay, non-performance under construction or other agreements*. See the full text of Southern Company's forecast disclaimer at: [http://www.southerncompany.com/what-doing/energy-innovation/nuclear-energy/pdfs/Vogtle-Units-3-and-4-FactSheet.pdf](http://www.southerncompany.com/what-doing/energy-innovation/nuclear-energy/pdfs/Vogtle-Units-3-and-4-FactSheet.pdf)

Southern Company’s forecast disclaimer underscores the need for the PSC to weigh company forecasts with actual company performance data as well as several other
external economic and social factors influencing the ongoing necessity of the Vogtle expansion project.

IV. CHEAPER TO CANCEL CONSTRUCTION OF VOGTLE 3&4 THAN TO COMPLETE

Q. Would it be cheaper for consumers to finish Plant Vogtle 3&4 or to cancel construction?

A. It would be cheaper to cancel construction given that Plant Vogtle 3&4 are not needed. Georgia Power testified in the current 12th VCMR that Vogtle expansion is 24 to 25% finished. Georgia Power and its partners have spent almost $6 billion on Vogtle so far (and as has been well publicized, are $2 billion over budget and three years behind schedule). The cost of the completed project is roughly $18 billion at present. Although the cost to cancel the construction project is unknown, it is highly unlikely it would exceed the $12 billion left to be spent on the unneeded, outmoded nuclear power plants under construction today.

Georgia Power is well protected from financial risk, whether it completes, or cancels construction of Vogtle, by its investment strategy of using public ratepayer and taxpayer money, that is, CWIP-Construction Work in Progress taxes and U.S. Department of Energy loan guarantees. Georgia Power is further protected by generous automatic profits, and Georgia Code O.C.G.A. § 46-3A-6 which allows Georgia Power to recover the cost of shutting down the unneeded nuclear plants at Vogtle 3&4 in rates.

The mission of the Georgia PSC to ensure “safe, reliable, and reasonably priced ... electricity” compels the PSC to cancel the unnecessary project before more ratepayer money is risked on an unneeded nuclear megaproject. The potential savings to Georgia ratepayers will be billions of dollars compared to the $12 billion price tag to complete construction of the unneeded nuclear reactors.
V. GEORGIA POWER COST-BENEFIT ANALYSIS LEAVES IMPORTANT QUESTIONS UNANSWERED, MORE ANALYSIS REQUIRED

Q. Is additional analysis needed to evaluate the economic benefit of completing Vogtle 3 & 4?
A. Yes. Georgia Power regularly submits analysis comparing completing Vogtle to canceling Vogtle and beginning a combined-cycle natural gas facility. In updating its analysis to account for delays and cost overruns, the company has failed to account for three significant factors affecting the current construction commitment:
1) The actual cost to cancel construction
2) Economic benefit of Vogtle as a 40-year investment as companion analysis to 60-year benefit currently claimed by Georgia Power
3) Compare the cost of Vogtle 3&4 to meeting revised power demand forecast with distributed wind and solar generation

Q. What is the public benefit of knowing the cost to cancel construction of Vogtle 3&4?
A. The Georgia PSC cannot make an informed decision or protect the public interest concerning cancelling or continuing Vogtle construction without knowing actual figures of the cost to cancel the construction project at Plant Vogtle. Cost to complete vs. cost to cancel data is important to fulfill the purpose of these periodic Vogtle construction reviews, especially in the rapidly shifting business climate in which these “only-of-a-kind” reactors are being built in Georgia. This information should be researched and reported by either the PSC Staff or by Georgia Power (or both). Only by knowing these figures can the PSC make an informed decision about the wisdom of its continued investment of Georgia ratepayer money in Georgia Power’s nuclear project.

Q. Why should Vogtle be considered as a 40-year investment?
A. Vogtle is licensed by the U.S. Nuclear Regulatory Commission (NRC) for 40 years under 10 C.F.R. § 54.17. Vogtle's license will date from the day it enters into
commercial service (currently projected to 2020). Although Georgia Power consistently assesses the economic benefit of its Vogtle project to consumers based on its value as a 60-year investment, 10 C.F.R. § 54.17(c) states: “An application for a renewed license may not be submitted to the Commission earlier than 20 years before the expiration of the operating license or combined license currently in effect.”

Georgia Power has defended its 60-year investment basis by reference to the NRC’s history of approving all reactor license extension applications for an additional 20 years. While this may be the case, the oldest currently operating reactor in the U.S. was commissioned in 1969 and has only operated 45 years at the present time. Many reactors have received 20-year license extensions but were forced to shut because it was no longer economical to upgrade and/or operate the old reactors in the modern-day energy market.

Since Georgia Power cannot even apply for a license extension to Vogtle 3 or 4 before at least 2040, that is, 20 years after it begins operation, the assumption that the plants will be operational for 60 years is hypothetical and unsupported by fact. More realistic analysis of the economic benefits to Georgia Power’s customers will be based on Vogtle’s actual NRC license and a 40-year operating life.

The Commission should therefore demand that Georgia Power supply a 40-year economic benefit analysis as companion analysis to the current 60-year analysis.

**Q. Why should the cost and benefit of Vogtle be compared to new solar and wind generation instead of a combined cycle natural gas plant?**

A. Many changes have affected the market place since Georgia Power undertook to certify and construct two additional reactors at Plant Vogtle. First, as already noted, is the reduced volume of Georgia Power's sales since 2008 (a national trend boding ill for Georgia Power's wholesale sales prospects). Secondly, the much hyped "Nuclear Renaissance" which Georgia Power leads, has evaporated, exposing the Georgia project
to an inadequate supply chain and reduced industry cover for "first-of-a-kind" .... now "only-of-a-kind" risky nuclear projects.

Since 2008, the energy market has changed rapidly with unprecedented increase of solar and wind to the electric grid. Falling prices and revolutionary strides in energy storage coupled with grid computerization and decentralization are transforming utility business models. Solar and wind are cheaper and faster to deploy than nuclear. The PSC should help Georgia Power recalibrate its business model to meet current business conditions.

Finally, in 2014, the U.S. Environmental Protection Agency (EPA) began a rulemaking to address carbon buildup in the Earth's atmosphere which has been the topic of much discussion by both Georgia Power and the Georgia PSC. The benefits to nuclear utilities in meeting the new EPA regulations is still under review. How the 6% credit for nuclear power in the draft EPA rule applies to Vogtle 3&4 is unclear, subject to revision, and of marginal benefit at best in Georgia Power's enormous portfolio. Solar and wind portfolios, however, carry clear benefits for utilities, consumers, and the environment under the proposed new rule. As an added benefit, solar and wind sidestep altogether the vagaries of the "volatile fuel market" and, unlike, natural gas, carry no carbon penalty.

Indeed, Georgia is making its mark in expanding both solar and wind sources in Georgia Power's portfolio, and the Georgia PSC has been at the forefront of the accomplishment.

Georgia Power's pattern of analyzing Vogtle against a combine-cycle natural gas plant has fallen out of step with present day options. In 2015 the relevant marketplace comparison is to compare the benefit of completing Vogtle 3&4 reactors to the cost to cancel Vogtle and supply new market demand with wind and solar power instead.
VI. CONCLUSIONS & RECOMMENDATIONS

Q. Please summarize your conclusions & recommendations for the Commission.

A. Conclusions

- The Georgia Public Service Commission's (PSC) mission is to "exercise its authority and influence to ensure that consumers receive safe, reliable and reasonably priced ... electric service."
- The PSC has the authority to cancel Vogtle 3&4 reactors at any time if the certified capacity is no longer needed.
- Georgia Power annual report data reveals that the company is overbuilt in a shrinking, shifting market and no longer needs the power from Vogtle 3&4.
- The Commission should mothball Vogtle 3 & 4 since it no longer meets the public necessity test. In the absence of company or staff data, it must be assumed it would be cheaper to cancel construction at Vogtle than to spend an additional $12 billion of Georgia ratepayers' forced investment in an unneeded Georgia Power project. Therefore, cancelling Plant Vogtle is in the public interest and fulfills the PSC's mission to ensure reasonably priced electric service.
- If the PSC does not mothball construction at Plant Vogtle immediately, it should require further information to justify continued construction of two unneeded reactors.

Recommendations

- The total costs to cancel or defer construction of Vogtle 3&4 reactors should be compiled and reported by either Georgia Power and/or the PSC Staff.
- Based on NRC licensing rules, Georgia Power should produce realistic economic benefit analysis of Vogtle as a 40-year investment as companion analysis for its hypothetical 60-year benefits.
• The energy market has changed at the same time that EPA climate rules are coming to bear. Comparisons of Vogtle expansion to a combined cycle natural gas facility are outdated. The cost to complete, and also the cost to not complete, Vogtle 3&4 should be compared to the cost of meeting Georgia Power revised energy forecasts with distributed solar and wind generation.

Q. Ms. Carroll, does this conclude your testimony?
A. Yes.
PROFESSIONAL
Nuclear Watch South (formerly GANE-Georgians Against Nuclear Energy), coordinator, 2000-present.
Glenn Carroll Graphics, freelance design studio, 1987-present.

EDUCATION
Georgia State University, Bachelor of Visual Arts, cum laude, 1982.
Vera Jernigan Green Memorial Art Award for Painting, 1981-1982.

HONORS and ACHIEVEMENTS
Environment
Nipponzan Myohoji Atlanta Dojo, Corrigan Peacemaker Award, 2015. Presented to Glenn Carroll and Nuclear Watch South.
Legal opposition to MOX plutonium fuel factory construction at Savannah River Site before the Nuclear Regulatory Commission, resulted in upgraded security and seismic standards, 2000-2015.
Georgia WAND (Women's Action for New Directions), Environmental Activist Award, 2011.
Georgia Environmental Council Special Achievement Award, 1996.
Board of Directors, Campaign for a Prosperous Georgia, 1987-1990.
Art
Silver August Turner Memorial Award, Decatur Arts Alliance Visual Arts Exhibition, 1998.
Merit Award, Festival 94, Dalton, Georgia Creative Arts Guild, 1994.
Merit Award, Festival 92, Dalton, Georgia Creative Arts Guild, 1992.
Purchase Award, Jubilee for the Arts, Marietta, 1986.
Art Editor of The Review, Georgia State University art and literature magazine, 1981-1982.
Conceived and curated Review Show, multi-media student art show, Urban Life, Georgia State, 1982.

SOLO EXHIBITIONS
2000. 10 Years of Work for the Earth, The Final Touch Gallery, Decatur, Georgia.
1999. Ghost Medicine, The Lay Institute of Faith and Life, Columbia Theological Seminary, Decatur, Georgia.
1998. Vacation in Creation, Seven Stages, Atlanta, Georgia.
1994. Time Distance Shielding, Richards Gallery, Georgia Tech Theatre for the Arts, Atlanta, Georgia.
1993. Show for the End of Time, Callanwole Fine Arts Center, Atlanta, Georgia.
SELECTED GROUP EXHIBITIONS
2013. 100 @ 100 Juried Alumni Art Exhibit, Ernest G. Welch School of Art & Design, Georgia State University, Atlanta, Georgia.
2001. K(now)l(edge), Emory University School of Law, Atlanta, Georgia (with Tom Ferguson and Ruth Laxson).
1998. Decatur Arts Alliance Visual Arts Exhibition, Dana Fine Arts, Agnes Scott College, Decatur, Georgia. Silver Award.
1997. Festival 97, Creative Arts Guild, Dalton, Georgia.
1993. Best of the Best, Dogwood Festival Fine Art Show, Atlanta, Georgia.
1990. The Earth Factory Show, Atlanta, Georgia.

SELECTED REVIEWS and MEDIA REFERENCES
Decatur Woman’s Battle Cry is ‘No Nukes, Y’all’ by Andrew Caulthen, The Champion FreePress, 9/5/14 (photo).
Federal Government Backs $6.5 Billion Loan for Plant Vogtle by Glenn Carroll, Atlanta Progressive News, 2/20/14.
Older Activists, Younger Crowd Team to Fight Nukes by Melanie S. Welte, AP wire service, 2010 (photos).
Anti-Nuclear Activists Mobilize to Oppose Obama-Funded Construction of Georgia Nuke Plants Interview with Amy Goodman, Democracy Now! 2/24/10
This Is the Time to Reject Nuclear Arms by Glenn Carroll, Atlanta Journal & Constitution, 3/3/08.
We Don’t Need More Bombs; Plutonium Is Too Dangerous by Glenn Carroll, Augusta Chronicle, 7/5/03.
Local Artist Finds Muse in Atomic Activism by Bret Duchen, The DeKalb Neighbor, 1/26/00 (photos). Decatur Artist Blends Spirituality, Environmentalism into Her Work by Hervey Paen, Atlanta Journal-Constitution, 1/20/00 (feature photo).
Viewing Crises at the Millennium, art review by Jerry Cullum, Atlanta Journal-Constitution, 1/14/00 (photo).
Use More Caution with Nuclear Waste by Glenn Carroll, Atlanta Journal-Constitution, 10/10/99 (photos).
Ghost Medicine by Christina Kline, feature photo and story, Atlanta Press, 3/19/99.
Ghost Medicine by Christina Kline, feature photo and story, Atlanta Press, 3/19/99.
Tech Decides Not to Restart Reactor by Charles Seabrook, Atlanta Journal-Constitution, 7/10/99.
Tech Reactor Down, Not Out by Greg Land, Creative Loafing, 12/9/95.
Forget the Flowers . . . Carroll’s Subject is Crenshaw by Tom Moore, The Mountain Mirror, February 1994.
Artist Uses Paper Works and Imagery as Activism, review by Jerry Cullum, Atlanta Journal-Constitution, 10/1/93.
Decatur Resident Aims to Educate Public through Art by Marnie Dwiggins, The DeKalb Neighbor, 9/8/93.
### GA Power -- Key Financial & Operating Data

#### 2004 -- 2014

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<tr>
<th>Year</th>
<th>Revenue ($M)</th>
<th>Volume (Kwh-M) - Retail</th>
<th>Volume (Kwh-M) - Ret&amp;Whol</th>
<th>Price -- total Retail (Kwh-cts)</th>
<th>Price -- total Ret&amp;Whol (cts)</th>
<th>Price -- Residential (cents)</th>
<th>Capacity (MW)</th>
<th>Capacity Utilization (%)</th>
<th>Net Plant in Service ($M)</th>
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<td>10.22</td>
<td>15,995</td>
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<td>10.44</td>
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<td>64%</td>
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<td>12.35</td>
<td>17,984</td>
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**Annual growth rates for Cost of Fuel --over 8 year period, beginning in 2006**

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<thead>
<tr>
<th>Year</th>
<th>Cost of Fuel (cents-Kwh)</th>
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<tbody>
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<td>Coal</td>
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<td>Nuclear</td>
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<td>Gas</td>
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**8. Cost KW (embedded) -$**

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<td>$1,090</td>
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**9. Vogtle 3&4 Cost KW ($-est) (Budget $14.1 B, $14.9 B)**

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<th>Vogtle Cost KW</th>
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<tr>
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<td>2009</td>
<td>?</td>
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**Residential rates: Excludes impact of-- CWIP, Environmental, & Municipal fees**

**Annual growth rates for Cost of Fuel --over 8 year period, beginning in 2006**