

PUBLIC DISCLOSURE VERSION

STATE OF GEORGIA

BEFORE THE GEORGIA PUBLIC SERVICE COMMISSION

**In Re: Georgia Power Company's 2013)
Integrated Resource Plan and Application for)
Decertification of Plant Branch Units 3 and 4,) DOCKET NO. 36498
Plant McManus Units 1 and 2, Plant Kraft Units)
1-4, Plant Yates Units 1-5, Plant Boulevard Units)
2 and 3, and Plant Bowen Unit 6)**

**DIRECT TESTIMONY OF GEORGE W. EVANS
ON BEHALF OF
SOUTHERN ALLIANCE FOR CLEAN ENERGY**

May 10, 2013

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Southern Alliance for Clean Energy
GPSC Docket No. 36498

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1 **I. Introduction**

2 **Q. Please state your name, position and business address.**

3 A. My name is George W. Evans. I am the President of Evans Power Consulting, Inc., and
4 my business address is 358 Cross Creek Trail, Robbinsville, North Carolina 28771.

5 **Q. On whose behalf are you testifying in this proceeding?**

6 A. I am testifying on behalf of the Southern Alliance for Clean Energy (“SACE”).

7 **Q. Please summarize your qualifications and work experience.**

8 A. I received a Bachelor of Science in Applied Mathematics from the Georgia Institute of
9 Technology in 1974. In 1976, I received a Master of Science in Applied Mathematics,
10 also from the Georgia Institute of Technology. My area of concentration was probability
11 and statistics. In 1980, I joined Energy Management Associates, Inc. (“EMA”), the
12 company responsible for the development of the premier electric utility modeling tools,
13 PROMOD[®], PROSCREEN[®], PROVIEW[®] (now known as Strategist[®]) and
14 MAINPLAN[®]. While at EMA, I worked with some fifty (50) major electric utilities in
15 the United States and Canada in the application of these modeling tools for generation
16 expansion planning, the development of net power costs, fuel budgeting, the analysis of
17 power purchases and the development of optimal maintenance schedules for generating
18 units.

19 In 1989, I left EMA to join GDS Associates, Inc., a consulting firm located in Marietta,
20 Georgia. At GDS, I was a principal and the Manager of System Modeling. In this

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1 position, I was primarily responsible for performing analyses and presenting expert
2 testimony concerning integrated resource planning, the forecasting of system production
3 costs, developing estimates of the likelihood of service interruptions, developing
4 estimates of replacement power costs and related activities.

5 In August of 1997, I left GDS to join Slater Consulting as a Vice President. In December
6 of 2011, I left Slater Consulting and formed Evans Power Consulting, Inc. A copy of my
7 current resume is included as Exhibit SACE-GWE-1.

8 **Q. Have you testified previously as an expert witness?**

9 A. Yes, I have provided expert testimony on 42 previous occasions, before the public utility
10 commissions in Georgia, Pennsylvania, Michigan, Arkansas, South Dakota, Colorado,
11 Illinois, Mississippi, Alabama, Delaware, South Carolina, Utah and Oklahoma; before the
12 Federal Energy Regulatory Commission; and in state court and federal court.

13 **Q. Have you testified previously before this Commission?**

14 A. Yes, I presented expert testimony before the Georgia Public Service Commission (the
15 “Commission”) on eight previous occasions, in Dockets 4133-U and 4136-U, 4311-U,
16 4895-U, 5601-U and 5602-U, 4900-U, 6737-U, 24505-U and 31958.

17 **Q. Does your expert witness experience include Integrated Resource Planning (“IRP”)
18 and application of the Strategist model?**

19 A. Yes, it does. My testimony before the Commission in Dockets 4133-U, 4136-U, 4133-U,
20 4895-U, 5601-U, 5602-U, 4900-U, 6737-U and 24505-U all concerned Georgia Power

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1 Company's ("Georgia Power" or "the Company") applications for approval of IRPs or
2 the certification of supply-side resources under approved IRPs. My experience with
3 Georgia Power's IRPs and use of the Strategist model for the development of its IRPs
4 dates back to October 1992 – the first IRP docket filed before this Commission. In other
5 states, I have testified on eight occasions concerning IRP issues and the modeling utilized
6 for the development of IRPs. In addition, while with EMA in the 1980s, I was involved
7 in the application and development of the Strategist model.

8 **Q. Have you developed alternative IRPs for this Commission?**

9 A. Yes, I have. In prior Georgia Power IRP cases, I developed alternative IRPs (using
10 Strategist) that were subsequently approved by the Commission.

11 **Q. What is the purpose of your testimony?**

12 A. My testimony addresses the Unit Retirement Study performed by Georgia Power as a part
13 of the Company's 2013 Integrated Resource Plan and the Company's Decertification
14 Application, which is also a part of the IRP. In addition, I performed Strategist runs in
15 support of the testimony of SACE witness John D. Wilson.

16 **Q. Are you submitting exhibits along with your testimony?**

17 A. Yes, I am. Exhibits SACE-GWE-1 and SACE-GWE-2 are attached. Exhibits SACE-
18 GWE-3 and SACE-GWE-4 (which are designated as Trade Secret in their entirety) are
19 being provided on a compact disc due to their voluminous nature. I am also co-
20 sponsoring Exhibit SACE-JDW-3, which is presented in the testimony of Mr. Wilson.

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1 **II. Summary of Findings and Conclusions**

2 **Q. Please summarize your conclusions concerning the Company's Unit Retirement**
3 **Study and Decertification Application.**

4 A. My analysis has arrived at the following conclusions:

- 5 • The Company's decision to retire (or decertify) Plant Branch Units 3 and 4, Plant
6 McManus Units 1 and 2, Plant Yates Units 1 through 5, Plant Kraft Units 1 through 4,
7 and Plant Boulevard Units 2 and 3 is reasonable and should be approved by the
8 Commission.
- 9 • Certain aspects of the Company's Unit Retirement Study are flawed and biased in
10 favor of the continued operation of existing coal-fired power plants.
- 11 • The Company's proposed fuel switch at Plant Gaston Units 1 through 4 is not in the
12 best interests of ratepayers, and the purchase of capacity and energy that is being
13 supplied by these generating units should be replaced.
- 14 • In light of the Company's results regarding Plant McIntosh Unit 1, the Company
15 should be required to update its analysis of the future viability of McIntosh Unit 1
16 prior to any fuel conversion to Powder River Basin ("PRB") coal.

17

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1 **III. The Company's Decertification Request**

2 **Q. What is the basis for your contention that the Commission should approve the**
3 **Company's request to decertify certain generating units?**

4 A. In Docket No. 31958 (the Company's 2010 Rate Case), I testified that the Company
5 should retire generating units Kraft 1 through 4 and Yates 1 through 3 based on my
6 analysis utilizing the Strategist model and the Company's Strategist data and
7 assumptions.¹

8 In this case, I have reviewed the Company's Unit Retirement Study and, although I find
9 the analyses in the Unit Retirement Study to be flawed in several ways, the Company's
10 conclusions regarding each of the generating units proposed for decertification are sound
11 and reasonable. If the Company were to revisit its analyses, correcting the flaws I
12 describe, I believe the results would show an even more compelling case for decertifying
13 each of those units. These generating units are some of the Company's older and least
14 efficient generating units, and the likely costs of required environmental upgrades exceed
15 the expected benefits of continued operation. The Company has excess generating
16 capacity, even with the decertification of these generating units, and the decertifications
17 will provide significant savings to ratepayers.

18
19

¹ See Page 5, lines 15-16 in Mr. Evans' Direct Testimony in Georgia Power's 2010 Rate Case, GPSC Docket No. 31958.

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1 **Q. What do you recommend?**

2 A. I recommend that the Commission approve each of the Company's requests for
3 decertification of generating units.

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1 **IV. The Company's Unit Retirement Study**

2 **Q. What aspects of the Company's Unit Retirement Study do you find to be flawed and**
3 **to bias the analyses toward continued operation of the generating units?**

4 A. The following aspects of the Company's Unit Retirement Study are flawed and tend to
5 favor continued operation of the generating coal-fired units over retirement:

6 • The forecasts of the price of natural gas are biased high, reducing the economic
7 competitiveness of replacement units fired by natural gas.

8 • The forecasts of CO₂ prices are biased low, improving the competitiveness of existing
9 coal-fired generating units.

10 • Although there is consideration of risk in the natural gas price forecast and the
11 forecast of CO₂ prices, there is no consideration of risk in the cost of required
12 environmental upgrades on the existing generating units.

13 • The Company makes simplistic and unsupported assumptions regarding the types of
14 units that will replace units considered for retirement.

15 • The Company makes simplistic estimates of the future operating costs of both the
16 existing generating units and the potential replacements.

17 **Q. What is your concern with the Company's forecasts of natural gas prices?**

18 A. The Company utilizes a moderate, low and high natural gas price forecast. Given recent
19 natural gas prices and the success of fracking techniques to extract natural gas, the

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1 Company's high forecast appears to be unreasonable. It would be more appropriate to
2 use the Company's proposed low forecast as its moderate forecast, and to develop
3 another lower forecast, to be used for the low forecast.

4 **Q. What is your concern with the Company's forecasts of CO₂ Prices?**

5 A. The Company uses three CO₂ price forecasts – existing, moderate and substantial. The
6 existing forecast is no CO₂ price, that is, it assumes a zero CO₂ price in all future years.
7 With this as the lowest projection of CO₂ prices, it should be balanced with a more
8 aggressive CO₂ price for the high (substantial) forecast. For example, while the
9 Company utilizes a \$20 per metric ton carbon price as its high forecast, other utilities
10 have projected CO₂ at \$40 or \$50 per ton on the high end.² Without such a forecast, the
11 Company is not considering the full potential range of CO₂ prices.

12 **Q. How should the Company address risk in the cost of required environmental**
13 **upgrades?**

14 A. The estimated costs of environmental upgrades in the Unit Retirement Study are a
15 substantial part of the analyses, exceeding ██████████ in several cases. The
16 Company cannot know with certainty the costs required to perform the upgrades. To
17 account for this risk, the Company should evaluate a base, low and high estimate for the
18 cost of the environmental upgrades at each generating plant. Without this analysis, the

² See Ceres, *Practicing Risk-Aware Electricity Regulation: What Every State Regulator Needs to Know* (Apr. 2012), at page 55, showing Xcel Energy's \$40 per metric ton carbon price projection in its 2009 resource plan before the Colorado Public Utilities Commission. See also Ceres, *The 21st Century Electric Utility* (July 2010), at page 5, discussing National Grid's use of \$50 per ton for carbon in its planning.

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1 Company is not considering the potential for environmental upgrade costs that are
2 foreseeable but may be higher than currently anticipated.

3 **Q. How did the Company make simplistic assumptions concerning the replacement of**
4 **the existing generating units?**

5 A. In its analysis, the Company assumed that, for the most part, existing coal units would be
6 replaced by new combined cycle generating units and existing oil units would be replaced
7 by new combustion turbine (peaking) generating units. In the case of the Plant Gaston
8 units, the Company assumed the replacement units would be combustion turbines.

9 **Q. Why do you consider this to be a problem?**

10 A. Georgia Power plans to add new baseload generation in the form of nuclear generation in
11 the near future. Given this, the best replacement generation for an existing coal unit (or
12 group of units) may be a combustion turbine peaking unit rather than a combined cycle
13 facility. Many factors impact the selection of the best replacement option, including but
14 not limited to the existing generation mix at the time of replacement, the level of installed
15 energy efficiency measures, the relative cost of available fuels, and the relative costs of
16 alternative technologies. For a given group of units being considered for retirement, it is
17 likely that the best replacement units are some mix of generating types, rather than one
18 particular type of generation. Therefore, it is unreasonable to make a fixed assumption
19 about the type of generating units that would best replace existing generating units.

20

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1 **Q. What would you recommend?**

2 A. To select the best replacement generation for the units considered for retirement, the
3 Company should utilize the tool that it uses to make future resource selections, namely
4 Strategist. Using Strategist would also correct another flaw with the Company's Unit
5 Retirement Study – its unreasonably simplistic approach to forecasting future operating
6 costs.

7 **Q. How did the Company make simplistic estimates of future operating costs?**

8 A. The Company developed hourly system marginal costs (using the PROSYM model), and
9 forecasted the operating levels of both the existing generating unit and the replacement
10 generating unit using these static hourly system marginal costs. In a particular hour, if
11 the generating unit (either the existing generating unit or the replacement generating unit)
12 had operating costs lower than the system marginal cost, the Company assumed the unit
13 would operate. On the other hand, if the generating unit had operating costs higher than
14 the system marginal cost, the Company assumed the unit would not operate.

15 **Q. Does this present a problem?**

16 A. Yes, this is not the way that generating units are operated. In reality, in a given week or
17 on a given day, a group of generating units is selected to operate so that the system can
18 supply customer requirements and required operating reserves. The Company selects the
19 best mix of generating units to perform these functions, and schedules them to operate.
20 There is no known hourly system marginal cost against which units are measured for

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1 operation. Many other features of the generating units must also be accounted for in
2 making these decisions, such as minimum operating levels, ramping ability, minimum
3 required operating hours, ability to respond quickly to customer demands, and so forth.

4 **Q. What do you recommend?**

5 A. The Strategist model contains a system generation model which, although not fully
6 detailed, does a reasonable job of representing the actual operation of the Company's
7 generating system. If the Company would utilize Strategist in its Unit Retirement Study,
8 it would kill two birds with one stone – Strategist would select the best replacement units
9 for the units being studied for retirement, and would also provide much improved
10 estimates of future operating costs for both the retirement units and the replacement units.
11 As I demonstrate in the next section concerning the proposed fuel switch at Plant Gaston,
12 by failing to use Strategist for its Unit Retirement Study, the Company misses an
13 opportunity to incorporate more reasonable assumptions into its analysis, which could
14 create uncertainty as to whether its analysis leads to the best outcome for ratepayers.

15

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1 V. **The Company's Fuel Switch Request at Plant Gaston**

2 Q. **How did the Company analyze Plant Gaston Units 1-4 in its Unit Retirement Study?**

3 A. The Company owns 50% of Southern Electric Generating Company ("SEGCo"), which
4 in turn owns the coal-fired generating units one through four at Plant Gaston in Alabama.
5 As a part of the Unit Retirement Study, the Company performed an analysis, from the
6 Southern Company System point of view, of the viability of the continued operation of
7 these generating units (Gaston Units 1-4).

8 Q. **What did the Company conclude?**

9 A. The Company concluded that the best option for Gaston Units 1-4 is to convert the units
10 to burn natural gas (rather than coal), install certain environmental upgrades and continue
11 operation of the generating units.

12 Q. **What problems do you see with the Company's analysis and conclusion?**

13 A. The main problem with the Company's analysis, in addition to the study flaws I
14 discussed previously, is that the Company has assumed that the converted generating
15 units can operate through the year 2042, by which time the units will have operated for
16 over 80 years. According to the Company, Gaston Units 1 and 2 began operation in
17 1960, Gaston 3 in 1961 and Gaston 4 in 1962.³

18

³ See the table entitled "Base Case Existing & Committed Generating Unit Data Georgia Power Company" on page 7 of the Resource Ledger contained in the Mix Study in Technical Appendix Volume 1 of the Company's filing.

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1 **Q. Do generating units generally operate for 80 years?**

2 A. No, they do not. The Company assumes, in its filing in this case, that new coal-fired
3 generating units will have a ■ year life,⁴ and that new gas-fired peaking units will have a
4 ■ year life.⁵ In addition, I understand that during the evidentiary hearing on the
5 Company's direct case, a Company witness testified that he is not aware of the Company
6 ever having a coal-fired unit that operated for even 78 years.

7 **Q. How will the Company's proposed switch to natural gas impact the operating lives**
8 **of these units?**

9 A. The Company's proposal would change these generating units to peaking operation.
10 Burning natural gas with a boiler that was designed to burn coal will cause the operating
11 costs of the units to be higher than gas-fired combined cycle generating units and higher
12 than most gas-fired peaking units on the Southern Company system. So these proposed
13 gas-fired generating units will likely operate in only a few hours of the year, and be
14 required to start and stop much more frequently than any coal-fired generating units.
15 That is, these proposed re-fired units would be required to operate in a manner for which
16 the original units were not designed, placing unusual stresses on the units, and likely
17 shortening the operating lives of the units.

18

⁴ See page 28 of the 2013 Integrated Resource Plan Generation Technology Data Book in Technical Appendix Volume 1 of the Company's filing.

⁵ See page 154 of the 2013 Integrated Resource Plan Generation Technology Data Book in Technical Appendix Volume 1 of the Company's filing.

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1 **Q. Did the Company take this into account in its analysis?**

2 A. No, it did not. The Company simply assumed that the re-fired generating units would
3 operate for a total lifetime of over 80 years, but did not provide a basis for this
4 assumption.

5 **Q. Have you performed your own analysis of Plant Gaston Units 1-4?**

6 A. Yes, I have.

7 **Q. What method and information did you use in your analysis?**

8 A. I utilized the Strategist model, using the Company's Strategist modeling data, the
9 Company's assumptions concerning the costs to switch the units to natural gas, and the
10 Company's assumptions for the costs of environmental upgrades on the units, but
11 assumed that the proposed re-fired generating units would have total operating lives of 60
12 years, rather than over 80 years.

13 **Q. How did you arrive at your assumption of a 60-year life for the re-fired Gaston**
14 **units?**

15 A. The units have already operated for over 50 years. An additional 10 years is not beyond
16 the range of reasonableness, but anything more than that would be difficult to achieve
17 given the greater operational costs and added stress on the units resulting from the fuel
18 switch, as I described previously. A 60-year life span is more reasonable for planning
19 purposes than an 80-year life span.

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1 **Q. What do you conclude from your analysis?**

2 A. The result of my analysis is shown in Exhibit SACE-GWE-2, and Exhibit SACE-GWE-3
3 contains the Strategist data used to perform my analysis. Rather than providing a benefit,
4 Georgia Power's continued use of Gaston Units 1-4 would cost ratepayers an additional
5 \$ [REDACTED] over the next 35 years, compared to the alternative of removing Gaston
6 Units 1-4 from the Georgia Power system.

7 **Q. Does the Company's analysis confirm your results?**

8 A. Yes, it does. As a part of its analysis, the Company determines the "break-even" year,
9 that is, the year in which the benefits of continued operations as gas-fired generating
10 units overcome the capital expenditure required to switch fuels and satisfy environmental
11 requirements. For Gaston Units 1-4, the break-even year in the Company's analysis is
12 [REDACTED], by which time the Gaston Units 1-4 would have been operating for over [REDACTED] years.

13 **Q. What do you recommend?**

14 A. Based on my analysis and the Company's break-even analysis, I recommend that the
15 Commission reject the Company's request to invest in fuel switching at Plant Gaston
16 Units 1-4. These units should instead be decertified, or otherwise removed from the
17 Georgia Power system.

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1 **VI. Plant McIntosh Unit 1**

2 **Q. What is your concern with the Company's conclusion with respect to Plant**
3 **McIntosh Unit 1?**

4 A. The Company has concluded that the best option for the McIntosh 1 generating unit is to
5 switch the unit to PRB coal, add environmental controls, and continue operations as a
6 coal-fired generating unit. However, as shown on page 18 of the Company's Unit
7 Retirement Study, the results of the Company's analysis are not clear-cut. In two of the
8 nine cases analyzed by the Company, the results of the analysis favor replacement of
9 McIntosh with new generation, and in three of the cases, the dollar amounts favoring
10 continued operation of McIntosh 1 are not substantial.

11 **Q. Are the costs of continued operation well known at this time?**

12 A. No, they are not. Until the Company negotiates a contract for PRB coal for McIntosh 1, a
13 contract for transportation of PRB coal to the plant, and contracts to perform the plant
14 modifications required to burn PRB coal and to satisfy environmental requirements, the
15 costs of continued operations cannot be estimated with much precision. Changes to the
16 Company's current assumed costs in any of these areas could swing the analysis to favor
17 the retirement of McIntosh 1. In addition, the Company has stated in its filings and
18 testimony that the proposed fuel switch is contingent upon a successful test burn and
19 subsequent feasibility study in 2013. The results of the test burn and feasibility study
20 could change the Company's current assumed costs in a manner that favors retirement of
21 McIntosh 1.

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1 **Q. What do you recommend?**

2 A. Before making a final decision on the proposed fuel switch, the Commission should
3 require that the Company report on the results of its test burn and feasibility study and
4 any changed cost assumptions that result from it. In addition, the Commission should
5 require the Company to perform an updated analysis of the viability of continued
6 McIntosh 1 operations as a coal-fired generating unit once the Company has negotiated
7 contract terms and costs for coal, coal transportation and the required plant modifications.
8 At that point, the Commission can be better assured that the decision concerning
9 McIntosh 1, whether it is retirement or continued operations, is in the best interest of
10 ratepayers.

11

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1 **VII. Support of Other SACE Testimony**

2 **Q. How have you supported other SACE witnesses in this case?**

3 A. I performed a series of Strategist studies at the request of SACE witness Mr. John
4 Wilson. The Strategist data used to perform these studies are contained in Exhibit
5 SACE-GWE-4 and the results of these studies are summarized in Exhibit SACE-JDW-3,
6 which I am co-sponsoring. The same data are also used in Exhibits SACE-JDW-2, 5, 7,
7 and 8.

8 **Q. Please briefly describe the Strategist studies you performed.**

9 A. The Strategist studies were based on the Company's Strategist data and assumptions,
10 with certain modifications. The modifications included the removal of Plant Gaston
11 Units 1-4, the addition of solar generation, the modification and revision of Demand-Side
12 Management programs, and various combinations of these modifications. Mr. Wilson
13 discusses the modifications in more detail in his testimony.

14 **Q. Does this conclude your testimony?**

15 A. Yes.