**BEFORE THE GEORGIA PUBLIC SERVICE COMMISSION**

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| **In the Matters of Georgia Power Company's Application for Approval of its 2010 Integrated Resource Plan** | **)**<br>**)**<br>**)** | **DOCKET NO. 31081** |

# DIRECT TESTIMONY OF JOHN D. WILSON

# ON BEHALF OF

# SOUTHERN ALLIANCE FOR CLEAN ENERGY

## MAY 7, 2010

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## I. Background

**Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.**

A. My name is John D. Wilson. I am Director of Research for Southern Alliance for Clean Energy ("SACE"), and my business address is 1810 16th Street, NW, 3rd Floor, Washington, DC 20009.

**Q. PLEASE STATE BRIEFLY YOUR EDUCATION, BACKGROUND AND EXPERIENCE.**

A. I graduated from Rice University in 1990 with a Bachelor of Arts degree in physics and history. I received a Masters in Public Policy Degree from the John F. Kennedy School of Government at Harvard University in 1992 with an emphasis in energy and environmental policy and economic and analytic methods. Since 1992, I have worked in the private, non-profit and public sectors on a wide range of public policy issues, usually related to energy, environmental and planning topics.

I became the Director of Research for SACE in 2007. I am the senior staff member responsible for our energy efficiency program advocacy, as well as being responsible for work in other program areas.

I have testified before the North Carolina Utilities Commission (Dockets E-7 Sub 831 and E-100 Sub 124) and before the South Carolina Public Service Commission (Dockets 2007-358-E and 2009-226-E). I have testified and presented before the Florida Public Service Commission (including Dockets 080407 – 080413) and presented to the Board of the Tennessee Valley Authority regarding energy efficiency and renewable energy.

I have also testified or presented before the legislatures of Florida, North Carolina and Texas, the Texas Natural Resource Conservation Commission, and the U.S. Environmental Protection Agency on numerous occasions. I have participated in North Carolina Climate Action Plan Advisory Group and the South Carolina Climate, Energy & Commerce Advisory Committee as an alternate for Dr. Stephen A. Smith, Executive Director of SACE. I have also served as a member of various technical work groups dealing with energy supply and efficiency issues. I have served on numerous state and local government advisory committees dealing with environmental regulation and local planning issues in Texas. I have been an invited speaker to a wide variety of academic,

industry and government conferences on a number of energy, environmental and planning related topics.

A copy of my resume is attached as Exhibit JDW-IRP-1.

**Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?**

A. I am testifying on behalf of SACE.

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

A. The purpose of my testimony is to present to the Georgia Public Service Commission (the "Commission") my evaluation of the Integrated Resource Plan ("IRP" or "resource plan") filed by Georgia Power Company. Specifically, I will review whether the DSM programs, particularly energy efficiency programs, selected in the IRP and proposed by Georgia Power in its Application for the Certification of Demand Side Management Programs ("DSM programs application") are accurately described and established at a level which are likely to satisfy future energy service demands in the most economic and reliable manner.

**Q. WHAT IS THE BASIS FOR YOUR TESTIMONY?**

A. In preparing my testimony, I evaluated the resource plan, DSM program application and testimony of Georgia Power, as well as responses to data requests. I also reviewed some documents from prior dockets and material from the DSM working group. I also relied upon documents and analysis related to the financial incentives for energy efficiency programs approved by other state utility regulators, and on nationally-recognized reports and studies that reflect best practices or common understanding of industry leaders.

**Q. WHAT IS THE PURPOSE OF ELECTRIC UTILITY RESOURCE PLANNING?**

A. As recognized in Commission Rule 515-3-04-.02(25), integrated resource planning is a utility process "in which an integrated combination of demand-side and supply-side resources is selected to satisfy future energy service demands in the most economic and reliable manner while balancing the interests of utility customers, utility shareholders and society-at large. In IRP, all resources reasonably available to reliably meet future energy service demands are considered by the utility on a fair and consistent basis." My testimony will focus on several of the resource options which the utility is specifically

directed to consider, including (d) cogeneration, (e) energy efficiency, (f) energy management, and (g) alternative fuels (substitution of non-electric fuels by customers[1]).

**Q. WHAT ARE YOUR OVERALL CONCLUSIONS?**

A. Georgia Power selected the wrong energy efficiency program alternative. Its analysis of demand-side resource alternatives begins with flawed calculations, proceeds without use of best planning practices, and then abruptly, perhaps carelessly, disregards its own findings in reaching the wrong recommendation.

Today's Georgia Power is a utility whose achievement in energy efficiency might be labeled "little-to-no current savings" by the US Department of Energy. If this resource plan is approved by the Commission, then tomorrow's Georgia Power will also deserve to be labeled "little-to-no current savings." The US Department of Energy wants to help states like Georgia "become leaders in reducing electricity consumption."

Georgia does not need to wait for the federal government to help. The Georgia Public Service Commission can act in this proceeding to move forward and make a difference for the customers of Georgia Power, the state's economy and, dare I say, perhaps the global environment.

Energy efficiency programs will result in lower electric bills and lower electric rates if properly implemented. Georgia Power disagrees; but, as my testimony demonstrates, their case is based on flawed analysis, as well as the use of methods and assumptions that result in an undervaluation of energy efficiency. Careful consideration of the opportunity to invest in energy efficiency will lead to a constant conclusion, "the most cost effective and least risky resource . . . is improved efficiency of electricity use."

An aggressive level of energy efficiency programs is essential to providing Georgia Power customers with the most economic and reliable electric service for the next decade and beyond for many reasons.

We can begin with rates. A recent study by researchers at the Georgia Institute of Technology and Duke University found that anticipated "***electricity rate increases would be moderated***" by such an investment.

[1] Alternative fuels is not defined, but this definition is suggested by Rule 515-3-4-.03(2)(c)3.

Furthermore, the study also forecasts that such an investment across the South could ***increase employment of Georgians by a net 32,200 jobs in 2020***, even after accounting for the forecast retirement of 10 GW of older power plants across the South by 2030 and also avoiding the need to construct 49 GW of new power plants. By 2020, household energy bill savings could be $340 per year, and businesses could save tens of thousands of dollars. Using nationally-recognized economic models, the Georgia Tech-Duke study suggests Georgia's economy would benefit from $2.1 billion in lower electric costs than it would under business as usual.

Business is usual is a fair description of Georgia Power's recommendations. True, there are several new programs with some thoughtful design features. True, proposing energy efficiency programs that are likely to produce measureable results is a new day for Georgia Power. But Georgia Power's plan and its recommendations do not put a high priority on energy efficiency as a resource, and the Commission should not be content to accept Georgia Power's recommendations.

Even if the Georgia Tech – Duke study is wrong about the direction that energy efficiency will push rates, highly regarded research and actual historical data demonstrate that aggressive energy efficiency results in, at most, slight increases in rates that are more than balanced out by the overall cost savings to customers. Many states with relatively low electric rates might well be labeled "leaders in reducing energy consumption" by the US Department of Energy.

Georgia Power claims that to do more than its minimal recommendations would drive electric rates up. But its evidence is flawed.

- To begin with, the selection of the base case energy efficiency alternative is carelessly flawed. Georgia Power's own data, as presented in its filed DSM programs application, shows that the "legislative case" outperforms the recommended "base case" on every cost-effectiveness test. And if considered under the same assumptions about fuel cost and federal legislative requirements, the "legislative case" performs even better. Even if the following concerns are ignored, Georgia Power is recommending less than half of the energy efficiency resources that its own analysis suggests would be cost effective, ***putting downward pressure on rates.***

- In its DSM programs application, Georgia Power has miscalculated the costs and benefits of energy efficiency programs. Avoided costs are improperly applied to energy efficiency measures, cost-effectiveness formulas appear flawed, there are careless errors, and assumptions about cost trends are unjustified and contrary to research regarding economy of scale effects.
- In its IRP financial review, its findings appear to improperly mix Georgia Power territory data with Southern electric system regional data in the revenue impact calculations. We requested corrected data from Georgia Power but have not received it at the time of filing this testimony.
- Georgia Power uses resource planning methods that undervalue energy efficiency by using assumptions related to capacity planning and cost allocation that do not realistically reflect how Georgia Power manages, or should manage, its resources.
- The cost-effectiveness evaluation model used by Georgia Power incorrectly presumes that lost base rate revenues will occur for the entire life of an energy efficiency measure; more realistically, Georgia Power will adjust its capital expansion plan after several years to align it with past and ongoing energy efficiency programs. For example, the installation of an energy efficient heat pump in 2011 is estimated to have a measure life of 25 years. It is simply unreasonable to suggest that in the year 2035, Georgia Power will collect an inadequate amount of revenue to meet the revenue requirement associated with rates. It is this practice that appears to cause rate impact measure test evaluations to suggest that otherwise cost-effective energy efficiency measures would place an upward pressure on rates.

Based on these findings, I recommend that the analysis be revised, conclusions be revisited, and further opportunity for review be provided.

This resource plan should not be approved. The recommended base case level of investment is likely to result in a less economic and reliable combination of demand and supply-side resources, particularly in the long term, than either of the alternatives considered. At a minimum, the "legislative case" should inform the decision of the Commission in the DSM programs certification decision, and Georgia Power should be

directed to rely upon its "legislative case" energy efficiency alternative for future resource planning purposes.

My recommendation, considering the wide body of evidence I present in my testimony, is that the Commission endorse an aggressive energy efficiency program, similar to the one studied by Georgia Power at the recommendation of the DSM Working Group, as the most economic and reliable demand-side resource strategy.

**Q. PLEASE DESCRIBE THE INTEGRATED RESOURCE PLANNING REQUIREMENTS IN GEORGIA RELATED TO ENERGY EFFICIENCY.**

A. Under O.C.G.A. § 46-3A-2, the Commission is required to determine whether Georgia Power's resource plan is adequate with respect to several factors. Regarding energy efficiency, an adequate plan would include "substantially accurate data and an adequate method of forecasting" of proposed demand-side programs, specifically including consideration of "present and projected" energy efficiency measures. It would also adequately demonstrate "the economic, environmental, and other benefits to the state and to customers of the utility" of energy efficiency.

Commission policy regarding integrated resource planning is set out generally in Commission Rule 515-3-4-.05(1)(a), which requires that the plan be "based on the most economic and reliable combination of potential demand and supply-side resources." The rule defers the relative weighting of cost-minimization, rate minimization and the maximization of societal benefit to "current Commission policy."

Specific direction implementing this statute is provided in Commission Rule 515-3-4-.03. Section (2)(c) directs the utility to identify and describe the impact on peak demand and energy usage of energy efficiency resources, including utility demand-side programs previously implemented, existing government-sponsored or mandated programs, and other relevant resources other than newly proposed demand-side programs. Efficiency considerations may also be among the factors considered in the forecasting methodology as directed in Section (3)(a). If efficiency considerations are considered to be a "major assumption," then Section (4)(a) requires sensitivity analysis to such assumptions and estimates.

Further direction is provided in Commission Rule 515-3-4.04. Section (1)(a) requires that existing demand-side resources and other demand-side capacity options be

assessed. Section (1)(d) requires that the "Future Potential of Existing Resources" be assessed, but additional resources are only required to be considered if they appear to be cost-effective. A specific process is described in Section (4); however, the Commission waived Commission Rule 515-3-4-.04(4) and approved an alternative "Top-Down Approach" requested by Georgia Power.

## II. Overview of Energy Efficiency Benefits and Role in Resource Planning

**Q. PLEASE DESCRIBE THE BENEFITS OF ENERGY EFFICIENCY PROGRAMS.**

A. Utility energy efficiency programs are the least-cost energy resource from a system perspective. Unlike supply-side resources, addressing system needs with energy efficiency resources provide net utility bill reductions to consumers.

Evidence suggests that aggressive energy efficiency programs will result in lower electric rates if properly implemented. Georgia Power disagrees; but, as my testimony demonstrates, their case is based on flawed analysis, as well as the use of methods and assumptions that result in an undervaluation of energy efficiency.

Anticipated "***electricity rate increases would be moderated,***" according to the Georgia Tech/Duke study, due to the nine energy efficiency programs and policies studied.[2] The study also forecasts that implementation of these nine efficiency policies across the South could ***increase employment of Georgians by a net 32,200 jobs in 2020*** and increase Georgia's Gross State Product by $70 million (a small fraction of the overall Georgia economy). Energy efficiency results in more jobs, even after accounting for the forecast retirement of 10 GW of older power plants across the South by 2030 and also avoiding the need to construct 49 GW of new power plants.

The customer savings, increased employment and avoided power plant construction occur because energy efficiency saves both energy and reduces the peak demand that drives the need for power plant capacity. The *National Action Plan for Energy Efficiency* ("NAPEE"),[3] a consensus report of leading regulatory, utility and

[2] Brown, M. A. et al., "Energy Efficiency in the South," published by Southeast Energy Efficiency Alliance, April 2010.

[3] *National Action Plan for Energy Efficiency,* US Department of Energy and Environmental Protection Agency (July 2006).

advocacy experts, advises that the benefits of energy efficiency also include environmental quality improvements (particularly air quality, water supply and reductions in greenhouse gas emissions), energy market price reductions (e.g., lower wholesale costs of natural gas), lower portfolio risk (a hedging or insurance value against price spikes), local and in-state economic development and jobs, and low-income population assistance.

A recent report summarizes the benefits of energy efficiency well:

> Energy efficiency offers a vast, low-cost energy resource for the U.S. economy – but only if the nation can craft a comprehensive and innovative approach to unlock it . . . If executed at scale, a holistic approach would yield gross energy savings worth more than $1.2 trillion, well above the $520 billion needed through 2020 for upfront investment in efficiency measures . . . Such a program is estimated to reduce end-use energy consumption in 2020 by 9.1 quadrillion BTUs, roughly 23 percent of projected demand, potential abating up to 1.1 gigatons of greenhouse gases annually.[4]

Each of these numbers tells a rich story in itself. Saving the national economy $1.2 trillion frees up capital and gives greater budget flexibility to ratepayers. If we fail to pursue available savings aggressively, we will instead build expensive, unnecessary power plants. Efficiency also helps reduce the impact of energy price spikes on the bottom line or family budget – a tool that helps prevent account defaults and even business closures.

Spending $520 billion to achieve those savings will also create jobs. Today, nearly 2 million jobs are "supported by efficiency-related investments," according to a study by the American Council for an Energy-Efficient Economy ("ACEEE").[5]

The prospect of using cost-effective energy efficiency measures to cut electricity demand by 23 percent represents a transformative opportunity. Those states and utilities

[4] McKinsey & Company, *Unlocking Energy Efficiency in the U.S. Economy*, July 2009.

[5] Ehrhardt-Martinez, K. and J.A. Laitner, "The Size of the U.S. Energy Efficiency Market," American Council for an Energy-Efficient Economy, Report E083, May 2008.

leading the country with strong programs are experiencing fundamental shifts in load growth and characteristics.[6]

Finally, energy efficiency's potential to abate up to 1.1 gigatons of greenhouse gases annually will allow utilities and their customers to avoid the very significant cost of compliance with impending greenhouse gas regulations, as well as contribute towards the reduction of future contributions to global climate change. Georgia has not developed a comprehensive greenhouse gas mitigation plan, but three neighboring Southeastern states have done so. For example, the North Carolina Climate Action Plan Advisory Group found that energy efficiency programs at a "top ten states" investment level would reduce North Carolina greenhouse gas emissions by 12 million metric tons in 2020, accounting for roughly 10% of all potential mitigation measure savings in the state.[7]

For Georgia, the opportunity to save energy and benefit the economy is substantial. According to a recent study by researchers at Georgia Institute of Technology and Duke University ("Georgia Tech/Duke"), the implementation of nine energy policies "offer the potential to reduce Georgia's energy consumption by approximately 12% of the energy consumed by the State in 2007 … Georgia's energy consumption could drop to below its 2010 levels by 2030."[8]

Total savings in 2020 would amount to $2.1 billion in lower electricity costs for Georgia consumers, compared to the base case. Considering all energy savings (principally electricity and natural gas), the savings are estimated at an average $340 per household, commercial business savings of $63,100, and industrial facility savings of $48,000 in 2020.

[6] Kushler, M., et al., "Meeting Aggressive New State Goals for Utility-Sector Energy Efficiency: Examining Key Factors Associated with High Savings," American Council for an Energy-Efficient Economy, Report U091, March 2009.

[7] North Carolina Climate Action Plan Advisory Group, "Recommended Mitigation Options for Controlling Greenhouse Gas Emissions," North Carolina Department of Environment and Natural Resources, October 2008.

[8] Brown, M. et al., "Energy Efficiency in the South," published by Southeast Energy Efficiency Alliance, April 21, 2010; Georgia-specific data are from "State Profiles of Energy Efficiency Opportunities in the South: Georgia," Appendix G, April 13, 2010.

**Q. IS THERE WIDESPREAD EVIDENCE THAT ENERGY EFFICIENCY REDUCES CUSTOMER ELECTRICITY BILLS?**

A. Yes. A frequent, but misplaced, criticism about energy efficiency programs is that they have an adverse effect on some or even all customers. In fact, historical evidence and utility rate simulations show precisely the opposite – that customer energy bills are reduced over the long term by aggressive energy efficiency programs.

The benefits to a typical customer can be substantial, even if customers do not fully participate in the programs offered by utilities. As illustrated in Exhibit JDW-IRP-2, Duke Energy Carolinas demonstrated that a typical customer would pay an annual rider of about $20.83 (an average $1.74 per month) for its energy efficiency programs. Duke is offering several programs to residential customers, and the exhibit illustrates that a customer participating in any of its three most accessible programs would more than recover the annual rider in bill savings. A customer who participates in all three programs could reduce annual bills by $182.27, for a net annual savings of $161.44 ($13.45 per month).

The Duke exhibit illustrates two bill impacts of energy efficiency programs – the cost to operate the program, and the benefit to participants. The third bill impact of energy efficiency programs is the most difficult to quantify – the degree to which energy efficiency programs delay or avoid power plant construction and result in lower operating costs for the system as a whole. Several studies explore all three bill impacts using economic modeling techniques.

***These studies find that customer savings occur even though rates may increase slightly, even at aggressive levels of energy efficiency.*** A recent study by Lawrence Berkeley National Laboratory ("LBNL") demonstrates this result.[9] In Exhibit JDW-IRP-3, I have summarized LBNL's findings relating rate increases of less than ½ cent per kilowatt hour to ***net customer bill savings of up to 6%***.

Actual data from state program impacts also demonstrate that energy efficiency programs do not automatically drive rates upward. While it is difficult (or impossible) to quantitatively determine the historical impact of energy efficiency on customer bills

[9] Cappers et al., "Financial Analysis of Incentive Mechanisms to Promote Energy Efficiency: Case Study of a Prototypical Southwest Utility," LBNL-1598E, March 2009.

separate from other costs, analysis of states with aggressive energy efficiency programs demonstrates that rates can be held to a relatively moderate level. This is illustrated in Exhibit JDW-IRP-4, a comparison of rate and energy efficiency trends of Iowa to Georgia.

**Q. HOW DOES GEORGIA COMPARE TO OTHER STATES ON ENERGY EFFICIENCY?**

A. Georgia trails far behind the top-performing states, as illustrated in Exhibit JDW-IRP-5. According to "The 2009 State Energy Efficiency Scorecard," Georgia ranks 44th overall on energy efficiency and 38th on its utility and public benefits programs and policies. In 2007, Georgia's annual savings from energy efficiency programs were 43rd in the country, less than 0.01% of retail sales.[10] To put this in perspective, LBNL estimated that energy efficiency programs resulted in savings equivalent to 0.34% of total national retail electricity sales in 2008, an average dragged down due to about half of the states (including Georgia) reporting insignificant energy savings.[11]

Even within the Southern Company system, Georgia Power has reported lower energy efficiency impacts than its sister retail operating companies. Georgia can and should do better.

**Q. ARE STATES WITH LEADING ENERGY EFFICIENCY PROGRAMS THOSE WITH HIGH ELECTRIC RATES?**

A. No, several states with electricity rates comparable to, even lower than, Georgia has demonstrated much higher rates of energy savings. This is illustrated in Exhibit JDW-IRP-6, which presents a comparison of average state electricity rates to annual energy savings reported by energy efficiency programs. Low electricity rates are simply ***not*** a barrier to investment in energy efficiency.

An ACEEE report reached the same conclusion: although the relationship between higher rates and higher energy efficiency savings is "intuitively logical," the actual "magnitude of the relationship is slight."[12] While low rates are not a barrier to

[10] American Council for an Energy-Efficient Economy (ACEEE), "The 2009 State Energy Efficiency Scorecard," Report Number E097, October 2009.

[11] Barbose, G., C. Goldman and J. Schlegel, "The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S.," Lawrence Berkeley National Laboratory, LBNL-2258E, October 2009.

[12] Kushler (2009).

achieving leading levels of energy efficiency program impacts, Exhibit JDW-IRP-7 describes a number of well-recognized barriers that must be addressed through sound policies and best practice program design.

**Q. WHAT IS NEEDED TO PROVIDE THE BENEFITS OF ENERGY EFFICIENCY TO CUSTOMERS IN GEORGIA?**

A. The NAPEE report, a widely accepted strategy to take action on energy efficiency, makes the following five recommendations:

1. Recognize energy efficiency as a high-priority energy resource.
2. Make a strong, long-term commitment to implement cost-effective energy efficiency as a resource.
3. Broadly communicate the benefits of and opportunities for energy efficiency.
4. Promote sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective.
5. Modify policies to align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy efficiency investments.

The NAPEE report identified two challenges to incorporating energy efficiency into resource planning: "determining the value of energy efficiency in the resource planning," and "setting energy efficiency targets and allocating budgets, which are guided by resource planning, as well as regulatory and policy decisions."

**Q. IS GEORGIA POWER EFFECTIVELY IMPLEMENTING THE NAPEE RECOMMENDATIONS AND DEMONSTRATING NATIONAL LEADERSHIP?**

A. No, Georgia Power's resource plan and DSM programs application do not demonstrate a "strong, long-term commitment to implementing cost-effective energy efficiency as a resource." These NAPEE recommendations are echoed in the Energy Independence and Security Act of 2007. I do not agree with Georgia Power that it meets EISA Standard 16. Georgia Power must improve its resource planning practices to fulfill the NAPEE recommendations and meet EISA Standard 16.

Statewide data show that Georgia has demonstrated insignificant energy savings compared with national leaders. Its leading utility, Georgia Power, does not even view its level of energy savings as relevant to the question of whether it is putting a high priority

on energy efficiency as a resource.[13] In that respect, it is out of step with the US Department of Energy.

The US DOE "is seeking a major increase in energy efficiency at the state level." US DOE is offering state utility regulators financial assistance to "help states with little or no savings from energy efficiency programs to become leaders in reducing electricity consumption by providing [public utility commissions] the assistance to develop an energy efficiency goal … of at least 1 percent."[14]

In its offer to provide funding, US DOE offers a "definition of states with little-to-no current savings from energy efficiency programs."

1. States that have achieved less than 0.5 percent savings relative to electricity sales based on 2007 data; or
2. States that have invested less than one percent of total electricity or gas revenues on energy efficiency; or
3. A state that meets either threshold using data from 2008 or 2009.

Georgia Power, and the State of Georgia, fall well, well below these thresholds, which is evidence that Georgia Power has not actually recognized "energy efficiency as a high-priority energy resource." And if the Commission approves the energy efficiency resource plan put forward by Georgia Power, Georgia will still be a state with "little-to-no current savings from energy efficiency programs" for the foreseeable future.

On a more positive note, Georgia Power's application for the "additional sum," a financial incentive for energy efficiency, is conceptually consistent with the NAPEE recommendations to "promote sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective" and to "align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy

[13] Georgia Power, in its response to data request STF-GDS-3-6, March 22, 2010, claims that its "energy planning process establishes energy efficiency as a priority resource by including energy efficiency impacts in the Company's energy and demand forecasts prior to the supply-side planning process." While including energy efficiency in the resource planning process is a step towards establishing it as a priority resource, my testimony demonstrates that Georgia Power is not "properly valuing and balancing the benefits" of energy efficiency as NAPEE recommends.

[14] US Department of Energy, "Stimulating Energy Efficiency Action from State Public Utility Commissions," Financial Funding Assistance Announcement DE-FOA-0000266, April 26, 2010.

efficiency investments."[15] I discuss this topic more extensively in my testimony regarding the DSM programs application.

**Q. HOW SHOULD THE BENEFITS OF ENERGY EFFICIENCY BE REFLECTED IN RESOURCE PLANNING?**

A. Utilities and states use a variety of methods to ensure that the benefits of energy efficiency are reflected in the resource planning process. As the NAPEE report points out, there are "no standard approaches on how to appropriately quantify and incorporate [the] benefits [of energy efficiency] into utility resource planning." One challenge to standardization is that some planners consider only the simplest energy- and capacity-related benefits of energy efficiency, while others consider a wider range of benefits, such as those summarized from the NAPEE report earlier in my testimony.

The role of energy efficiency in a utility resource plan is often quantified through either a performance targets or a program budget.

Georgia rules call for program budgets to be established in a certification proceeding that has historically been conducted in coordination with its least-cost integrated resource planning process. The adequacy of program budgets is also given further consideration in supply-side certification proceedings.

NAPEE discusses several alternatives to use of a resource planning process to establish energy efficiency targets or budgets, including public goods funding budgets, market-based resource allocation, and resource loading order considerations.

Some states use public benefits-funded charges to deliver energy efficiency, through either a utility or, more often, a third party administrator. Changes in funding levels are the primary drivers of program impact, and the forecast impacts of this spending are reflected in the resource plans of utilities as an input.

Where energy efficiency is evaluated as a market resource rather than using a cost-effectiveness test approach, the range of factors that may bear on the investment decision can be quite different than the factors considered in a resource planning process. This can be quite literal, in the sense that the deregulated New England region includes demand-side resources in an annual capacity "market." A market-resource approach to

[15] SACE has previously endorsed Duke Energy Carolinas' cost and incentive rate structure and suggested an alternative rate structure for Progress Energy Carolinas in both North and South Carolina. The response discussed later in my testimony is consistent with the positions we took in those proceedings.

energy efficiency requires a rigorous evaluation, measurement and verification process.[16] Or it may be a portfolio modeling exercise, such as that used in the Pacific Northwest, in which supply-and-demand-side resources compete with each other in an optimization model that both allocates and schedules resources to reduce both energy cost and energy price risk.[17]

Placing energy efficiency programs first in the "loading order" is another alternative. California's principal energy agencies adopted a loading order in the *2003 Energy Action Plan* as a foundation for policies and decisions. The "loading order calls for (1) decreasing electricity consumption by increasing energy efficiency and conservation, (2) reducing demand during peak periods through demand response and (3) meeting new generation needs first with renewable and distributed generation and then with clean fossil-fueled generation." This approach has turned out to be quite successful due to strong regulatory oversight.

Georgia does not have a "loading order" in the sense used in California. Rather, Commission Rule 515-3-4-.07(2) requires Georgia Power to describe how a proposed new power plant is consistent with the current IRP and RFP process, and include a cost-benefit analysis for all capacity resource options in the current IRP. Although not directly mentioned in the rule, energy efficiency programs would be considered a capacity resource. Thus it is in resource planning process that energy efficiency is considered as an alternative. For this reason, it is critical for Georgia to ensure that a comprehensive analysis of energy efficiency resource opportunities is a foundation for a least cost strategy to provide reliable electric utility service.

The diversity of policies that are used to reflect the benefits of energy efficiency in resource planning is a result of the substantial differences between demand-side and supply-side energy efficiency resources, as described in Exhibit JDW-IRP-7.

[16] ISO New England Inc., "ISO New England Manual for Measurement and Verification of Demand Reduction Value from Demand Resources Manual M-MVDR," October 1, 2007.

[17] Northwest Power and Conservation Council, "Chapter 9: Developing a Resource Strategy," *Sixth Northwest Power Plan*, February 2010.

**Q. PLEASE DESCRIBE HOW ENERGY EFFICIENCY SHOULD BE INCORPORATED INTO A LEAST COST INTEGRATED RESOURCE PLANNING PROCESS.**

A. There are two common approaches to ensure that energy efficiency is fully utilized in a least cost integrated resource planning process. States or utilities may either determine the potential for energy efficiency in a utility's service territory, or they may set a performance target, which may be revisited based on experience.

In many circumstances, a "bottom-up" efficiency potential study is the basis for determining how much energy efficiency should be included in resource plans. Often, this process is a result of a utility or state authority policy to achieve "all cost-effective energy efficiency." Iowa, Colorado, California and Florida are among the states that use this approach. This is also the approach favored by NAPEE in its "Guide to Resource Planning with Energy Efficiency" (November 2007). Another approach to setting an energy efficiency target is to rely on industry experience to set energy efficiency goals. The Tennessee Valley Authority and Minnesota offer examples of this approach. After energy efficiency goals are established, either by administrative direction or through legislation, a detailed efficiency study is typically commissioned. However, this study may differ from a "potential study" because of a strong focus on program scope, scale and design rather than on identifying a total potential.[18]

While Commission Rules envision the "bottom-up" approach, the Commission granted Georgia Power a waiver to utilize a "top-down" approach that demonstrates a focus on program scope, scale and design rather than on identifying a total potential. I discuss these two approaches in my testimony regarding Georgia Power's DSM programs application.

**Q. WHAT ADDITIONAL BENEFITS COULD IMPROVED PLANNING PRACTICES OFFER?**

A. Beyond long-term cost savings, an additional benefit of energy efficiency is a reduction in the risk of rate spikes driven by factors such as shifts in fuel costs, extreme weather

[18] Neither a potential study nor industry experience can provide a precise measure of "cost-effective energy efficiency" in the same way that a supply-side generation plan can anticipate generation capacity with reasonable accuracy. These methods may either understate or overstate the potential for energy efficiency to meet system resource needs in much the same way that a system load forecast is unable to provide an accurate prediction of future energy demand and use.

events, or extraordinary demand growth. Energy efficiency is a resource that delivers energy savings benefits to customers under virtually any scenario; even if benefits are not twice the cost (a typical utility program estimate), system benefits typically outweigh the costs under many different "futures" that may be studied. In contrast, an idled or underutilized power plant is a cost to the system that may provide no benefits.

Most utilities considers uncertainties in resource planning through "either scenario analysis or stochastic analysis, or a combination of the two," as described in a recent survey of sixteen resource planning processes prepared for the California Public Utilities Commission.[19] Georgia Power uses a scenario analysis in its resource plan. For each scenario, Georgia Power and most other utilities evaluate the cost of alternative resource portfolios using a present value revenue requirement or some equivalent calculation. Georgia Power and some other utilities rely exclusively on these analyses to evaluate risk by following the scenario analysis approach.

In contrast, a number of utilities also include a "stochastic measure of portfolio risk," in which a number of variables (load, fuel price, etc.) are varied randomly in a Monte Carlo analysis to generate a quantitative measure of risk. Ten of the sixteen resource planning processes reviewed for the California Public Utilities Commission included a quantitative measure of risk; Georgia Power was among the six that did not.

Many of these Monte Carlo analyses allow for energy efficiency resources to vary in investment level and timing. Most notably, the Northwest Power and Conservation Council, the planning body for the Bonneville Power Administration, explicitly considers the "insurance" or "hedging" value of risk reduction due to energy efficiency in its formal planning process. The results of this analysis are illustrated in Exhibit JDW-IRP-8, an annotated version of a figure produced for the council's fifth plan.

The council has recently released the "Sixth Northwest Power Plan." The plan ***"seeks an electrical resource strategy that minimizes the expected cost and risk of the regional power system over the next 20 years. Across multiple scenarios considered in the development of the Sixth Power plan, one conclusion was constant: the most cost-***

[19] Energy and Environmental Economics, Inc. and Aspen Environmental Group, "Survey of Utility Resource Planning and Procurement Practices for Application to Long-Term Procurement Planning in California," prepared for California Public Utilities Commission Docket R.08-02-007, April 2009.

***effective and least risky resource for the region is improved efficiency of electricity use."***[20]

**Q. DOES GEORGIA POWER'S RESOURCE PLANNING QUANTIFY THE RISK AND COST IMPLICATIONS OF THE ALTERNATIVES IT CONSIDERS?**

A. No, Georgia Power has not adopted resource planning practices that quantify the risk and cost implications of different choices regarding investment in energy efficiency. The base case is evaluated under fuel cost cases in the program planning worksheet, and under a variety of sensitivities in the financial review and mix study. However, it is not possible to determine whether a different level of investment in energy efficiency would reduce the risk of rate increases because no other energy efficiency case is evaluated under alternative assumptions.

Of the three energy efficiency cases that Georgia Power analyzed, Georgia Power's analysis only allows for comparison of the base and aggressive energy efficiency cases under the base case scenario for fuel, load growth, in-service dates, construction costs, etc.

It is not possible to compare Georgia Power's legislative case to either the base or aggressive energy efficiency cases under the same scenario conditions. Neither the program planning worksheets, financial review, nor the mix study include an analysis of the legislative case under the same assumptions as the base or aggressive energy efficiency cases.

If Georgia Power had analyzed its legislative and energy efficiency cases using the same sensitivities that it evaluated for the base case, this could have provided some directional guidance on these topics. However, in comparison with utilities using stochastic or Monte Carlo resource planning methods, such an enhancement would not offer a quantitative estimate of the price spike risk of different energy efficiency investment levels.

[20] Northwest Power and Conservation Council, *Sixth Northwest Power Plan*, February 2010.

## II. Adequacy of 10-year Demand-Side Resource Forecast

**Q. HAS GEORGIA POWER PROVIDED A SUBSTANTIALLY ACCURATE 10-YEAR FORECAST OF DEMAND-SIDE RESOURCES?**

A. No, Georgia Power appears to have miscalculated the costs and benefits of energy efficiency programs.

- Georgia Power appears to have improperly applied avoided costs to energy efficiency measures.
- The formulas used by Georgia Power to calculate cost-effectiveness test results in the DSM programs application demonstrate anomalies that suggest one or more significant errors.
- Georgia Power made assumptions about energy efficiency cost trends that are not justified, and are contrary to research regarding economy of scale effects.

These miscalculations, as well as flawed analytic methods discussed later in my testimony, invalidate Georgia Power's conclusions regarding the cost-effectiveness in the DSM programs application. Since Georgia Power's forecast of energy efficiency programs (a major component of demand-side resources) depends on this cost-effectiveness evaluation, the overall forecast cannot be relied upon for purposes of supply-side resource planning.

Georgia Power also evaluates the cost-effectiveness and revenue impacts of its DSM programs in the IRP mix study and financial review, but these findings are also unreliable because the findings appear to improperly mix Georgia Power territory data with Southern electric system regional data.

I also reviewed the calculations describing the measure-level energy savings impacts of the energy efficiency cases evaluated by Georgia Power; I did not identify any problems with these calculations.

Overall, Georgia Power has not provided "substantially accurate data and an adequate method of forecasting" of its proposed energy efficiency programs. I found problems in the program planning worksheets supporting the DSM programs application and in the mix study and financial review supporting the IRP.

**Q. HOW DID GEORGIA POWER IMPROPERLY CALCULATE AVOIDED COSTS FOR ENERGY EFFICIENCY MEASURES?**

A. The most significant error in the DSM program planning worksheets is an improper application of avoided costs to all but the first program year (2011). The resulting miscalculations likely result in an underestimate of the benefits of energy efficiency programs across the board for all cases and all programs.

Unfortunately, the miscalculations are quite complicated to explain.

Georgia Power calculates avoided costs for each measure by comparing the cost of electric service for a base measure to a change (efficient) measure. This cost is calculated by considering the various components of electric service, such as power plant capacity, transmission, distribution and fuel. The program planning worksheets include a present value calculation of each component, for each measure, taking into account the measure life, load shape, and other relevant factors. These same worksheets also include the expected revenues associated with the sale of electricity to support the measure and other relevant data that can be calculated at the measure level,[21] which provide the basic description of the measure from a planning perspective.

Avoided costs should be calculated uniquely for each program year based on forecasting the avoided cost for each year in which energy savings occurs and calculating total avoided costs on that basis.

The key assumption in the program planning worksheet that creates the problem is that the measure is installed in 2011. For measures installed in future years, the avoided costs are simply an inflated version of the 2011 measure installation avoided cost . The result is that, in present value terms, avoided capacity costs (on a unit basis) are approximately zero in the first several years, then rise, then fall and rise again, and then gradually fall to nearly zero.[22] (This description is in general terms to avoid revealing any information Georgia Power has claimed to be a Trade Secret.).

[21] Some "measures" appear to represent a portfolio of closely associated measures, which is consistent with the top-down approach used by Georgia Power.

[22] These data were elicited by calculating the unit avoided capacity cost value for measures with different measure lives. For example, the avoided capacity value for 2020 would be the difference between the unit avoided capacity cost for a measure with a 10-year measure life and a measure with a 9-year measure life. The avoided capacity cost for the measure is given in two columns in the referenced worksheet, the capacity savings in a different column, so the unit avoided cost is straightforward to calculate.

For much of the data calculated in these worksheets (tabbed as "2010 Final Pricem Output Base" and "… Output Chg"), there would be no difference in the results for a measure installed in 2011 and one installed in 2015.

If Georgia Power had calculated avoided costs for its DSM measures using a program year life, then one would expect to find that a measure with a ten-year measure life would have a much larger avoided cost if installed in 2015 than if installed in 2011. This is because the installation in 2015 avoids the early years with approximately zero avoided capacity costs and thus during its ten-year measure life has a more consistent trend of avoiding costs.

Instead of using what is known as a "vintage year" approach to calculating avoided costs, Georgia Power simply inflates the 2011 costs at a uniform escalation rate.[23] The source and method for calculating and applying this escalation rate is not given. I did not locate any discussion of why Georgia Power selected an escalation rate rather than a vintage year method for calculating the avoided capacity cost associated with energy efficiency measures. It is also unclear to me why Georgia Power would assume that energy and capacity costs would escalate at the same rate, which their resource planning model allows for different assumptions about energy and capacity cost escalation.

**Q. WHY DO YOU BELIEVE THERE ARE ERRORS IN THE COST-EFFECTIVENESS FORMULAS THAT LEAD TO SUBSTANTIAL ERRORS IN THE TEST RESULTS?**

A. For the electric-only measures, it appears that the costs for the RIM test are identical to the benefits for the Participant test as presented in the worksheet "Econ Screen." For measures with an impact on gas and water costs, the Participant benefits are increased by the non-electric benefits. I verified this problem in the aggressive case program planning worksheet; the only exceptions were the three load-building measures.

In general, RIM costs should not be equal to Participant benefits. Exhibit JDW-IRP-9 is NAPEE's "Summary of the Benefits and Costs Included in Each Cost-

[23] Georgia Power applies the escalation rate to the total avoided cost. Other avoided costs (fuel, variable O&M, etc.) appear to increase at approximately the same rate that they are discounted in the present value calculation. In other words, the unit avoided energy cost is approximately the same for measures with 5 and 25 year measure lives. There is some variation, which is likely due to load shape variation.

Effectiveness Test." Among the items that are considered in RIM costs that are not considered to be Participant benefits are "program overhead costs." Among the items that are considered to be Participant benefits but not RIM costs are "applicable tax credits or incentives." I did not evaluate Georgia Power's formulas to determine which calculation may be in error.

Another error results from improperly increasing the cost of the residential lighting and appliance program from about $4 million to about $9 million in the base case.[24] The program planning worksheet assumes that program administration/management and marketing costs continue even after the program has ceased operation. (The program operates for three years only; other programs operate for ten years.)

In general, there did not appear to be much attention given to the proper allocation of overhead across programs. However, other than the significant negative impact on the cost-effectiveness of the residential lighting and appliance program for seven years, allocation of overhead costs is not likely to significantly affect cost-effectiveness.

**Q. WHY ARE THE ASSUMPTIONS ABOUT ENERGY EFFICIENCY COST TRENDS MADE BY GEORGIA POWER UNJUSTIFIED IN LIGHT OF RESEARCH EVIDENCE?**

A. Georgia Power adopted a uniform escalation rate for program costs based on capital and labor inflation rates without any apparent consideration of economy-of-scale impacts. Research indicates that as program impacts increase, economies of scale kick in and unit costs decrease.[25]

Economies of scale occur for several reasons. One reason that Georgia Power does appear to consider is that program management overhead is spread more widely at larger program scales. However, these costs are relatively small and thus this effect is almost negligible. Another effect is that as efficiency programs achieve scale, marketing and consumer education costs are reduced as customers find information more accessible in a range of marketing channels.

[24] See Georgia Power corrected response to data request STF-GDS-1-2, Trade Secret disk STF-GDS-1A (REVISED), STF-GDS-1-2 (REVISED)_DSM Case 1 Program Planning Sheet.TS.xls, April 9, 2010.

[25] Takahashi, K and D Nichols, "The Sustainability and Costs of Increasing Efficiency Impacts: Evidence from Experience to Date," 2008 ACEEE Summer Conference, August 2008.

**Q. HOW DID GEORGIA POWER IMPROPERLY MIX DATA FROM ITS TERRITORY WITH SOUTHERN ELECTRIC SYSTEM DATA IN ITS MIX STUDY AND FINANCIAL REVIEW?**

A. In the financial review (IRP Technical Appendix Volume 2), it appears that the "Total Annual GWH" represents Southern electric system data rather than Georgia Power Retail for each case of "Present Worth Calculations of Revenue Requirements." In contrast, the "Total Annual Revenue Requirement" appears to be Georgia Power Retail data. The three calculations of average ¢/kWh in each case appear to be revenue requirements for Georgia Power divided by retail sales for Southern Company, which would be an improper rate calculation.

On April 30, SACE filed a data request for corrected data and working copies of all computer models (with embedded formulae), in electronic format, used to perform the calculations presented in the Financial Review (IRP Volume 2). As of the time of filing this testimony, I have not received these data. I have also reviewed responses to Commission Staff Data Requests available to me at the time of filing this testimony, and have not found data or information relevant to this issue.

**Q. WHAT ARE THE IMPLICATIONS OF THE SOUTHERN ELECTRIC SYSTEM POOLING ARRANGEMENT FOR ENERGY EFFICIENCY?**

A. The implications of this issue for the entire mix study and financial review are unclear. Under its system pooling arrangement, Southern electric system functions at a generation and transmission level as a "single, integrated public-utility system." In addition to providing economic dispatch and other temporary benefits to the operating companies, Georgia Power explains that the system pooling arrangement is intended to benefit customers by "Staggering construction of new generating facilities so that each retail Operating Company can construct and install the optimum sized generating facilities while utilizing economies of scale."

The implications of the system pooling arrangement for aggressive investment in energy efficiency by one operating company are not discussed by Georgia Power, and the data mismatch in the financial review serve to highlight this substantial omission.

According to Georgia Power's description of the system pooling arrangement, "Each Operating Company retains its lowest cost resources to serve its customers." Since energy efficiency resources are zero cost resources in a dispatch process, the benefits of

these resources should be retained by Georgia Power. To the extent that the pooled supply side resources are underutilized, the Pool has an obligation to market those excess resources to the wholesale markets but is not financially responsible for the performance of those resources.

Another question that arises is whether the other operating companies are taking full advantage of their lowest cost resource, energy efficiency. To the extent that the other operating companies are not taking advantage of this resource, the marginal cost of electricity from the system pool may be higher than it otherwise would be.

The mix study reflects this arrangement in the sense that it optimizes the deployment of supply-side resources across the entire system to reduce costs through optimizing the timing and size of new generating facilities. However, it also reflects these deficiencies since it does not provide for similar optimization across the entire system pool for demand-side resources, nor does it describe how to ensure that one operating company's costs are not increased due to tepid interest in energy efficiency by another operating company.

**Q. HAS GEORGIA POWER PROVIDED A SUBSTANTIALLY ACCURATE 10-YEAR FORECAST OF PROGRAM IMPACTS?**

A. Yes, it appears that the Georgia Power forecast of energy savings and capacity benefits from the programs it proposes is calculated in a reasonable manner that does not appear to include the types of errors I found in the cost calculations. My review consisted of various ratio tests in which I endeavored to form a general impression with reference to other utility program filings with which I am familiar. I did not identify any problematic trends in the estimate of program impacts.

The DSM programs application includes adequate descriptions of each program, with appropriate information regarding program impacts in terms of capacity, energy, number of customers and other information for each program.

**Q. WHAT SPECIFIC RECOMMENDATIONS DO YOU HAVE REGARDING GEORGIA POWER'S FORECAST OF ENERGY EFFICIENCY COSTS AND PROGRAM IMPACTS?**

A. I recommend that Georgia Power revise its analysis to provide a more consistent and accurate estimate of avoided costs, review and correct errors in its cost-effectiveness calculations, and reconsider its assumptions about energy efficiency cost trends, giving

weight to industry experience with economies of scale in program costs. Based on these revised findings, Georgia Power should reconsider its conclusions regarding energy efficiency program scale.

I also recommend that Georgia Power revise its financial review and mix study to remove the mismatch of Georgia Power territory data with Southern Company regional data.

Finally, I recommend that Georgia Power consult with its partners in the Southern electric system pool to consider how to equitably deal with issues related to demand-side resources as the lowest cost resource in the system, and revise its mix study and financial review to reflect such considerations for the Georgia Power territory.

After these changes are made, interested parties should have full opportunity to review the revised resource plan and comment.

## III. Adequacy of Analysis of Demand-Side Resource Options

**Q. HAS GEORGIA POWER OFFERED THE MOST ECONOMIC AND RELIABLE COMBINATION OF POTENTIAL DEMAND AND SUPPLY-SIDE RESOURCES?**

A. Although Commission Rule 515-3-4-.05(1)(a) requires Georgia Power to submit a resource plan "based on the most economic and reliable combination of potential demand and supply-side resources," the evidence submitted by Georgia Power suggests that a higher level of investment in energy efficiency would have greater total system benefits and lower rates.

At a minimum, Georgia Power's "legislative case" alternative is superior to its recommended programs and level of investment. The higher level of investment is likely to be justified whether constrained to the data presented by Georgia Power or whether reasonable adjustments are made to Georgia Power's data and methods.

In addition to the misrepresentation of the "legislative case" findings, Georgia Power undervalues the benefits and overestimates the costs of energy efficiency in a number of ways. Some of these problems are discussed earlier in my testimony regarding Georgia Power's forecast of costs and benefits of energy efficiency. In addition, fundamental assumptions related to capacity planning and cost allocation also result in

undervaluing energy efficiency. For these reasons, it is not possible to draw a robust conclusion regarding the best program mix and level of investment to benefit Georgia Power's customers, but it appears likely that a much larger investment than the "legislative case" represents would be cost-effective.

**Q. PLEASE DESCRIBE THE LEGISLATIVE CASE ANALYZED BY GEORGIA POWER IN ITS DSM PROGRAMS APPLICATION.**

A. The legislative case is a scenario with several programs that differs from the base case in both scale and scope. The legislative case is larger scale, achieving 348 GWh and 92 MW in savings in 2013, compared to 160 GWh and 48 MW for the base case.[26] The legislative case has more programs, and its programs typically promote more technologies and practices to save energy.

The cost-effectiveness evaluation for the legislative case differs from that of the base case in several respects. The reasons for these differences are not explained in the either the IRP or the DSM programs application.

- In the economic scenario summary, the legislative case is compared with the base and aggressive cases, but with a different fuel cost scenario. For the base and aggressive cases, the "moderate" fuel scenario is used. For the legislative case, the "moderate with volatility" fuel scenario is used.
- The legislative case is not evaluated in the financial review or mix study components of the IRP.
- In the DSM programs application, the base and aggressive cases are evaluated without considering any carbon or alternative compliance payment costs. The legislative case is evaluated only with additional carbon and alternative compliance payment costs. There is no common reference scenario within which to determine the cost-effectiveness of the legislative case without carbon and alternative compliance payment costs. However, in the IRP, the mix study and financial review do include evaluation of the base case in a range of scenarios, including some with carbon and alternative compliance payment costs.

[26] All of the programs are larger, except for the commercial and industrial audit programs. The audit programs are smaller because the program offerings are increased to include commercial retro commissioning and industrial custom programs.

I also note that the defects with the cost-effectiveness analysis discussed above apply to the legislative case in general.

**Q. HOW DOES GEORGIA POWER'S EVIDENCE DEMONSTRATE THAT THE 'LEGISLATIVE CASE' SHOULD BE PREFERRED OVER THE RECOMMENDED 'BASE CASE'?**

A. Georgia Power's own evidence suggests that its legislative case (also described as "Case 2," would be superior to the recommended base case level of energy efficiency. Georgia Power concludes that:

> If Case 2 is implemented in the absence of legislation, the portfolio would put additional upward pressure on rates of approximately $55 million annually based on 2013 steady state calculations. Over the life of all programs within Case 2, rates would increase by more than $381 million relative to the supply-side option in the absence of legislation. (p. 5-26)

However, *this conclusion is not supported by the evidence in Georgia Power's documents*; even in the original filing the data cited in the text of the IRP do not appear in the referenced tables.

In Georgia Power's revised economic analysis of the legislative case, the rate impacts are "downward," not "upward," representing $1.31 million in rate impact *benefits* in 2013. It is not clear what public data Georgia Power is citing with respect to the lifetime rate increase of $381 million, but the revised Trade Secret spreadsheet indicates a lifetime rate decrease.

Furthermore, in addition to misrepresenting the data, the nature of the analysis is also misrepresented. Georgia Power did not present any data indicating that it analyzed the legislative case (Case 2) "in the absence of legislation." There is no such analysis in the DSM programs application representing base case assumptions ($0 carbon cost, no alternative compliance payment). Furthermore, the legislative case is entirely omitted from the analysis supporting the resource plan, particularly the mix study and financial review.

Nevertheless, I was able to estimate the cost-effectiveness of this case under base case assumptions using Georgia Power data, and it appears that this case outperforms the base case for each cost-effectiveness test as performed by Georgia Power. This strongly

suggests that the legislative case would outperform the base case if it were evaluated in a revised mix study and financial review.

**Q. WHAT MIGHT GEORGIA POWER HAVE FOUND IF IT HAD ANALYZED ITS LEGISLATIVE CASE UNDER BASE CASE CONDITIONS?**

A. The legislative case performs better than recommended base case in all aspects of Georgia Power's cost-effectiveness evaluation, if one accepts the data and methods at face value. As demonstrated in Exhibit JDW-IRP-10, the legislative case appears to be about twice as cost-effective as the base case using the total resource cost test.

Notably, the rate impact test score indicates that the legislative case would exert "downward" pressure on rates rather than driving rate increases as represented by Georgia Power.

I estimated the cost-effectiveness of the legislative case to approximate the base case scenario by using the $10 and $20 cost per ton carbon scenarios with the moderate fuel costs. I compared all the data in the "Econ Screen" respective worksheets and determined that two columns of data could explain the different results between the two scenarios. I then copied two additional worksheets into the program planning workbook, "Econ Screen ($10)" (ES10) and "Econ Screen ($20)" (ES20). In the original "Econ Screen" worksheet, I replaced the formula for the columns labeled "B" and "D" with the formula 2 x ES10 – ES20. The result is a linear estimate of the cost of energy and avoided costs for a $0 cost per ton carbon scenario.[27]

**Q. WHAT OTHER PROBLEMS WITH GEORGIA POWER'S ANALYSIS RESULT IN UNDERESTIMATING THE ECONOMIC VALUE THAT ENERGY EFFICIENCY OFFERS TO GEORGIA POWER CUSTOMERS?**

A. The analysis methods selected by Georgia Power put energy efficiency at a further disadvantage compared to supply side resources, and could cause Georgia Power customers to pay unnecessary capacity addition costs in three ways.

[27] It is unclear whether the ACP 2.5 c/kWh adjustment to the model would have a significant effect. As a cross-check to verify that my method was reasonable, I reviewed the base case financial review results for $0, $10 and $20 carbon costs (cases 14, 18 and 22). Case 14 has $0 CO2 and ACP 0 c/kWh. The revenue requirement for these three cases is reasonably close to linear, suggesting that my method is a reasonable approximation considering that I do not have the full model available to perform the correct calculation.

First, as discussed above, the Southern electric system pooling agreement may be increasing costs for Georgia Power customers inequitably if other operating companies are not adopting energy efficiency at the same level (and thus effectively "idling" lower cost resources). Although the resource plan does not present enough data to analyze this agreement comprehensively, it is possible that the agreement could result in greater generation costs to the Georgia Power system as a result of other operating companies failing to implement cost-effective energy efficiency.

Second, Georgia Power modeled its mix study without allowing for the deferral or cancellation of certified capacity additions. If the model had then identified cost-effective deferral or cancellation options to be replaced by additional cost-effective energy efficiency investments, this could have resulted in lower customer costs.

Third, the model presumes that lost base rate revenues will occur for the entire life of an energy efficiency measure; more realistically, Georgia Power will adjust its capital expansion plan after several years to align it with past and ongoing energy efficiency programs.

By failing to capture all the opportunities for energy efficiency to provide economic value to Georgia Power customers, Georgia Power has failed to recommend the most economic and reliable level of demand-side resources in its resource plan.

**Q. HOW COULD GEORGIA POWER HAVE DESIGNED ITS MIX STUDY TO ALLOW FOR THE DEFERRAL OR CANCELLATION OF CERTIFIED CAPACITY ADDITIONS?**

A. It is reasonable to consider that certified capacity additions may be deferred or even cancelled when economic changes or new opportunities provide a more cost-effective option. While Georgia Power actively considers rescheduling certified capacity additions in practice, the resource plan does not indicate that Georgia Power models allow certified capacity additions to be rescheduled or cancelled.[28]

[28] For example, in response to a request to "discuss the impact on the 2010 IRP Plan and Mix study if commercial operation of the Vogtle 3 and 4 nuclear units is delayed," Georgia Power's response described impact on the study as affecting the scheduling of natural gas power plant construction. However, when asked about its "contingency plans" if the units were delayed, Georgia Power provided a wider range of options, including "expansion of energy efficiency programs." See Georgia Power response to data requests STF-GDS-1-72, March 12, 2010, and 5-4, April 5, 2010. This suggests that while Georgia Power considers energy efficiency programs a potentially viable substitute for Plant Vogtle, its process for developing the plan and mix study do not allow for such a substitution.

Georgia Power recently requested deferral of McDonough Units 4, 5 and 6 which it asserts would benefit customers "through the reduction in revenue requirements in 2011 and 2012."[29] However, as noted in the staff memo responding to this request, the "net present value … of the Company's proposal … is a *negative $130 million*."[30] While the staff indicates that significant issues "remain unresolved," it is notable that Georgia Power views long-term cost impacts to achieve short-term savings as a worthwhile tradeoff.

While details in Georgia Power's request indicate that the company cannot indefinitely delay McDonough Units 4 and 5 due to circumstances related to the multipollutant rule, it is not clear whether there is any reason beyond load growth that is driving the schedule for Unit 6.[31] A more aggressive schedule and scope of energy efficiency programs, particularly with a geographic focus on the North/Northeast areas of Georgia, could allow for the period of reduced revenue requirements to be extended as well as benefitting those customers participating in the programs through lower electric bills.

In addition to McDonough Unit 6, Georgia Power could also consider deferring or cancelling the other certified capacity additions identified in the IRP. For example, Georgia Power received certification for Plant Vogtle Units 3 and 4 from the Commission one year ago,[32] and if warranted by further analysis, delay or cancellation of these units in favor of more aggressive energy efficiency would be similar to recent announcements by other utilities in timing and impact.

For example, Progress Energy Florida delayed its construction schedule for the Levy County nuclear project by 20 months, resulting in "short-term customer price

[29] Georgia Power Company, *Georgia Power Company's Request for Expedited Approval of The First Quarter 2010 McDonough Construction Monitoring Report*, Georgia Public Service Commission, Docket No. 24506, April 16, 2010.

[30] Newsome, T, Memorandum titled "Energy Committee Item: Docket No. 24606: Georgia Power Company Request for Expedited Approval of the First Quarter 2010 McDonough Construction Monitoring Report," Georgia Public Service Commission, Docket No. 24506, April 29, 2010. Emphasis in original.

[31] Georgia Power proposes to delay McDonough Unit 6 by seven months to January 1, 2013. Since shutdown of McDonough Units 1 and 2 would be rescheduled for no later than April 30, 2012, it appears likely that Georgia Power does not need Unit 6 to replace Units 1 and 2 but rather to provide all or part of the project's certified additional capacity.

[32] Amended Certification Order remanded to the Commission by the Superior Court of Fulton County, *Final Order on Petition for Judicial Review*, Judge Wendy L. Shoob, Civil Action File No. 2009 CV 170648, May 5, 2010.

relief,"[33] and FPL has suspended activities on two additional nuclear units at Turkey Point based on recent regulatory action, recession-driven load-growth estimates, fuel cost forecasts, and demand side management and environmental incentives.[34] In short, it is practical and potentially cost-effective to delay, slow construction or otherwise adjust the financial and construction schedule associated with a prospective nuclear power plant.

Based on the cost ($40 million/year) and impact (348 GWh and 92 MW) data provided in the legislative energy efficiency case, it would appear that approximately the same amount of energy anticipated from Georgia Power's share of Plant Vogtle could be saved at program cost of approximately $1 billion. The peak demand reduction associated with this scaled-up estimate would be approximately four times the capacity delivered by Plant Vogtle.

Similarly Georgia Power might consider delaying or cancelling the transfer of wholesale capacity to retail service, as previously accepted by the Commission in Docket No. 26550-U.

While my testimony does not offer sufficient evaluation to determine whether more aggressive energy efficiency programs would allow deferring or cancelling certified capacity additions, this is precisely the type of analysis that a well-designed resource planning process should include. In fact, precisely such an analysis is used to assist several utilities with determining an appropriate level of energy efficiency program investment.

For example, the Northwest Planning and Conservation explicitly considers this type of consideration in its planning process during its Monte Carlo (stochastic) optimization modeling.[35] Other resource planning practitioners that consider deferrals and cancellations are discussed in the recent report to the California Public Utilities Commission discussed above.[36]

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[33] Progress Energy Florida, "Progress Energy shifts Levy nuclear project schedule," press release, May 1, 2009.

[34] FPL Group, Inc. *Form 10-K for the Fiscal Year Ended December 31, 2009,* February 25, 2010.

[35] Northwest Power and Conservation Council, "Appendix J: The Regional Portfolio Model," *Sixth Northwest Power Plan*, February 2010.

[36] Energy and Environmental Economics, Inc. and Aspen Environmental Group, "Survey of Utility Resource Planning and Procurement Practices for Application to Long-Term Procurement Planning in California," prepared for California Public Utilities Commission Docket R.08-02-007, April 2009.

The analysis involved in mitigating the annual costs associated with excess reserve margins is conceptually similar to the process of balancing the opportunity to pursue energy savings with the need to generate revenue to pay for committed capacity. Notably, the difference between Georgia Power's short term reserve margin of 13.5% and its long term reserve margin target of 15% is less than the likely impact of two years of leading energy efficiency programs.[37]

While there are costs associated with deferral or cancellation, the opportunity to reduce costs by revising current capacity addition plans should not be arbitrarily excluded from the resource planning process. It is clear that Georgia Power has not considered the possibility that more aggressive energy efficiency programs might result in a cost-effective rescheduling or adjustments of certified capacity additions.

It is also worth noting that supply side capacity additions are not the only resource that may be delayed or cancelled due to changing circumstances. The NWPCC process described above also allows for rescheduling (advancing or delaying) some energy efficiency investments based on growth and other relevant factors.

**Q. WHY IS IT UNREASONABLE FOR GEORGIA POWER TO USE A MODEL THAT IMPLICITLY ASSUMES LOST REVENUES WILL CONTINUE INDEFINITELY?**

A. The models used by Georgia Power to calculate rate impact measure (RIM) test results presume that lost revenues will occur for the entire life of an energy efficiency measure. This is unreasonable because Georgia Power has the opportunity to anticipate that it will invest in energy efficiency and begin to adjust its capital expansion plan accordingly. When its capital expansion plan properly anticipates the impact of energy efficiency measures, a utility has the opportunity to fully recover its revenue requirement through base rates.

The RIM test is useful because, according to the California Standard Practice Manual, "Under many conditions, revenues lost from DSM programs have to be made up by ratepayers. The RIM test is the only test that reflects this revenue shift along with the other costs and benefits associated with the program."[38] The converse of this is also true:

[37] See Georgia Power response to data requests STF-GDS-6-1 and 6-3, April 9, 2010; IRP p. 1-12.

[38] California Public Utilities Commission, *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*, July 2002.

when revenues lost from DSM programs *do not* have to be made up by ratepayers, then the RIM test can measure a revenue shift that will not actually occur.

The actual revenue shift that is reasonably measured by the RIM test occurs in the period between (a) a rate adjustment resulting from an energy efficiency program and (b) the point at which the capital expansion plan is adjusted to fully reflect the impact of that energy efficiency program.[39]

The model used by Georgia Power appears to continue to count lost revenues as a cost in the RIM test well past the point at which Georgia Power should have adjusted its capital expansion plan to account for energy efficiency programs. For example, the installation of an energy efficient heat pump in 2011 is estimated to have a measure life of 25 years. It is simply unreasonable to suggest that in the year 2035, Georgia Power will collect an inadequate amount of revenue to meet the revenue requirement associated with rates.

It is correct that an unanticipated investment in energy efficiency can cause "upward pressure on rates," but only for a period of time that can be managed by the utility. In the near term, many energy efficiency measures will result in a reduction in base rate revenue that exceeds the potential cost savings associated with reduced demand (capacity).

Realistic application of the RIM test would include termination of the lost revenue assumption after a period of time, either abruptly or phased out over several years to reflect the period in which it would be feasible for capital expansion plans to be gradually aligned with the impacts of past and ongoing energy efficiency programs.

Another context in which lost revenues are relevant is in a rate structure designed to reduce the shareholder disincentive to utility-led energy efficiency programs. An alternative to decoupling or frequent rate cases, a lost revenue adjustment mechanism is an explicit performance-based mechanism to compensate a utility for lost revenues associated with undercollection of the fixed cost portion of base rates.

[39] National Action Plan for Energy Efficiency, *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*, November 2008.

If a lost revenue adjustment mechanism were to operate over the entire measure life, a utility could be compensated for failing to recover its revenue requirement even after 20 or 30 years for some measures. Clearly this is an absurd perspective.

Recently, Duke Energy and Progress Energy Carolinas have received orders from commissions in several states approving 36-month lost revenue adjustment mechanisms. In my DSM programs application testimony (Docket No. 31082), I recommend this approach for Georgia Power as well. I believe this is an appropriate limitation on the consideration of lost revenues, and that RIM test calculations would be more informative and useful if they reflected a similar limitation.

**Q. WHAT SPECIFIC RECOMMENDATIONS DO YOU HAVE REGARDING GEORGIA POWER'S ANALYSIS OF POTENTIAL DEMAND-SIDE RESOURCES?**

A. Based on the evidence I have described in my testimony, I conclude that an aggressive energy efficiency program similar to the one studied by Georgia Power at the recommendation of the DSM Working Group is the most economic and reliable demand-side resource strategy. The recommended base case level of investment is likely to result in a less economic and reliable combination of demand and supply-side resources, particularly in the long term.

While the evidence as put forward by Georgia Power does suggest that the aggressive case would not be the most economic choice, my testimony has demonstrated that the evidence supporting Georgia Power's recommendation is flawed due to mistakes and improper analysis. A revised analysis should include the following changes:

- Correction of the mistakes in forecasting costs and benefits as described earlier in my testimony;
- Correction of the legislative case analysis so that it may be compared with the base and aggressive cases under comparable assumptions including the fuel cost and legislative requirements;
- Evaluation of the legislative case in the financial review and mix study;
- Consider the implications of the Southern electric system pooling agreement and the potential for deferral or cancellation of certified capacity additions when modeling the benefits of energy efficiency, potentially through use of a Monte Carlo

(stochastic) model that includes cost-based logic for optimizing deferral or cancellation opportunities; and

- Limiting the duration of lost base rate revenues to a 36-month period or some other appropriate term in cost-effectiveness evaluations to reflect the expectation that Georgia Power can adjust its capital expansion plan to reflect reduced sales.

If Georgia Power makes these changes, the resulting analysis and recommendations should be more in line with the conclusions reached by a number of other resource planning experts at utilities, regional agencies, private consulting firms and federal agencies.

If Georgia Power does not revise its forecast of efficiency cost and benefits, its forecast methods, or its analysis of alternative levels of energy efficiency investment, then I recommend that at a minimum Georgia Power be directed to rely upon its "legislative case" alternative for future resource planning purposes. The higher level of investment is likely to be justified whether constrained to the data presented by Georgia Power or whether reasonable adjustments are made to Georgia Power's data and methods.

**Q. DOES THAT CONCLUDE YOUR TESTIMONY?**

A. Yes, it does.

Exhibit ____ (JDW-IRP-1)


# John D. Wilson — Director of Research, Southern Alliance for Clean Energy

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Washington, DC 20009

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wilson@cleanenergy.org


## EXPERIENCE

**Southern Alliance for Clean Energy**

Director of Research, Asheville, North Carolina and Washington, DC, 2007 – present
http://www.cleanenergy.org/

- Manage energy efficiency programs
- Conduct supporting research and policy development across all program areas

**Galveston-Houston Association for Smog Prevention**

Executive Director, Houston, Texas, 2001 – 2006
http://www.ghasp.org/

- Member, Regional Air Quality Planning Committee
- Member, Transportation Policy Technical Advisory Committee
- Member, Steering Committee, TCEQ Interim Science Committee
- Published over a dozen reports
- In the media over 250 times
- Awards & recognition from the City of Houston, *Houston Press*, and environmental groups
- First executive director, grew staff to three full time plus several part time & consulting

**The Goodman Corporation**

Senior Associate, Houston, Texas, 2000 – 2001
http://www.thegoodmancorp.com/

- Project Manager, Houston Main Street Corridor
- Project Manager, Houston Downtown Circulation Study
- Project Manager, Austin Corridor Planning
- Project Manager, Ft. Worth Berry Street Corridor Initiative

**Florida Legislature**

Senior Legislative Analyst and Technology Projects Coordinator, Office of Program Policy Analysis and Government Accountability, Tallahassee, Florida, 1997- 1999
http://www.oppaga.state.fl.us/

- Coordinator, Florida Government Accountability Report, 1999
- Coordinator, Project Management Software Implementation, 1999
- Creator and Editor, *Florida Monitor Weekly*, 1998 - 99
- Author or team member for reports on water supply policy, environmental permitting, community development corporations, school district financial management and other issues – most recommendations implemented by the 1998 and 1999 Florida Legislatures

**Florida State University**

Environmental Management Consultant, Tallahassee, Florida, 1997
http://www.pepps.fsu.edu/FACT97/index.html

- Project staff, *Florida Assessment of Coastal Trends*, 1997

**Houston Advanced Research Center**

Research Associate, Center for Global Studies, Woodlands, Texas, 1992 - 96
http://www.harc.edu/mitchellcenter/index.html

- Performance Award, 1995
- Coordinator, Houston Environmental Foresight, 1993 - 96
- Coordinator, Rio Grande/Rio Bravo Basin Initiative, 1992 - 94
- Secretary, Task Force on Climate Change in Texas, 1992 - 94
- Researcher, *Policy Options: Responding to Climate Change in Texas*, 1992 - 93

**US Environmental Protection Agency**

Student Assistant, Climate Change Division, Washington, DC, 1991 - 92

- Special Achievement Award, 1991

## EDUCATION

**Harvard University**

Master in Public Policy, John F. Kennedy School of Government, 1992

- Concentration areas: Environment, negotiation, economic and analytic methods

**Rice University**

Bachelor of Arts, conferred cum laude, 1990

- Majors: Physics (with honors) and history

**Additional Training and Experience**

Spanish language; Advanced computer skills; Served and led political committees for the Sierra Club and Clean Water Action; Certified Master Wildlife Conservationist, Leon County Extension Service

Exhibit ____ (JDW-IRP-2)

**Duke Energy Carolinas Energy Efficiency Program Bill Analysis**

## Example Annual and Monthly Bill Impact for Participating Customers

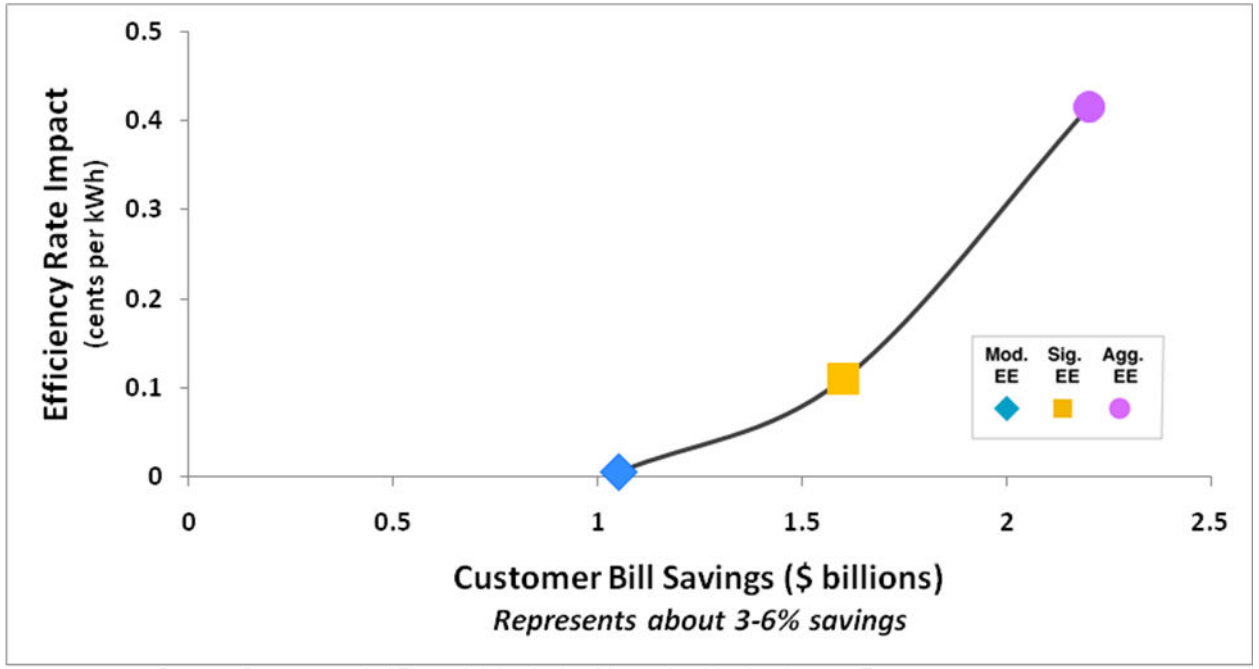
| | Avg Monthly Usage (kWh) | Reduction in Usage (kWh/mo) | Adjusted Usage (kWh) | Approx. Monthly Savings | Approx. Annual Savings | |
|---|---|---|---|---|---|---|
| Home Energy House Call with Kit | 1,000 | 81 | 919 | $6.71 | $80.51 | |
| 6 CFLs | 1,000 | 32 | 968 | $2.66 | $31.87 | |
| Smart $aver Central A/C | 1,000 | 70 | 930 | $5.82 | $69.89 | |
| | | | | $15.19 | $182.27 | **Gross Customer Benefit** |
| | | | | $1.74 | $20.83 | Approximate Rider Expense |
| | | | | $13.45 | $161.44 | **Net Benefit to Customer After Rider** |

**NOTES:** Assumes residential tail block rate = $0.083/kWh
Assumes energy efficiency rider = $0.001736/kWh
Assumes typical residential customer uses (on average) 1,000 kWh per month

Testimony of Raiford Smith, Duke Energy Carolinas, North Carolina Utilities Commission Docket 2009-226-E, December 2, 2009.

Exhibit ____ (JDW-IRP-3)

**LBNL Study: Net Customer Bill Savings *After* Considering Energy Efficiency Rate Impact**




Source: Cappers et al., "Financial Analysis of Incentive Mechanisms to Promote Energy Efficiency: Case Study of a Prototypical Southwest Utility," LBNL-1598E (March 2009).

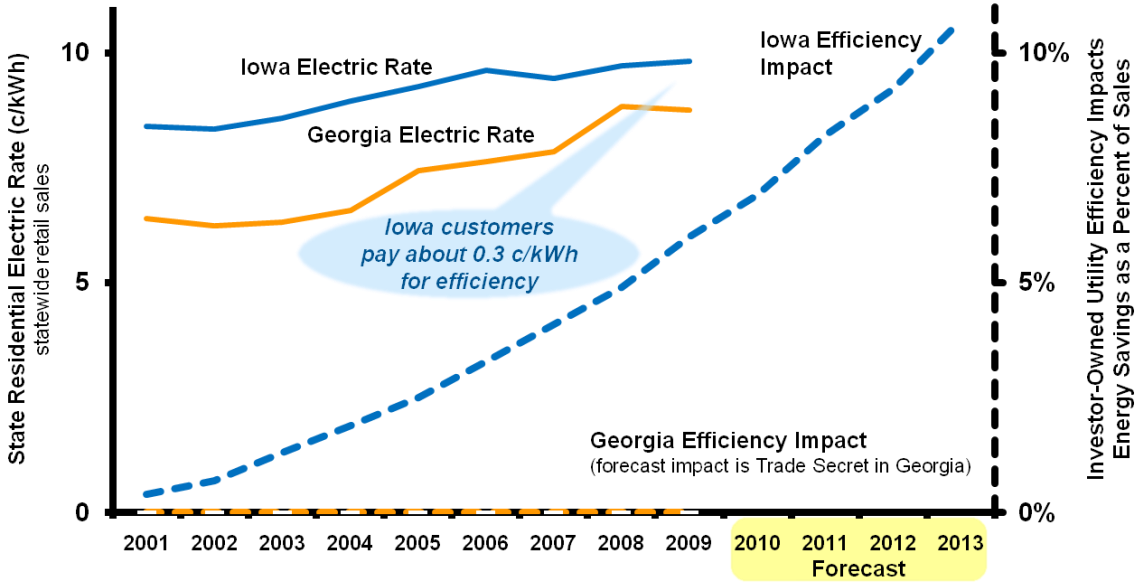
Exhibit ____ (JDW-IRP-4)

## Comparison of Electric Rate and Efficiency Impacts, Iowa and Georgia

Contrary to some claims, energy efficiency programs do not automatically drive rates upward. This exhibit compares residential electric rate and energy efficiency program impacts for the state of Iowa to those of Georgia.

Over the past decade, Georgia retail electric rates have increased at a greater rate than rates in Iowa. Yet during this time period, Georgia has had effectively no energy efficiency programs from an energy savings perspective. Since 2004, about 3.5% of Iowa utility retail sales revenue has been spent on energy efficiency and load management programs. This investment has helped Iowa utility customers cut electricity use by 6%, resulting in substantial bill savings for participants.

Of course, successful energy efficiency programs are only one of several reasons that Iowa has avoided significant increases in electric rates while helping many of its customers save energy and cut bills. This result should be neither surprising nor controversial: Similar to Georgia Power's findings, Iowa utility-led energy efficiency programs are estimated to have benefits that are twice their cost.




Source: Analysis of data from Iowa Utilities Board and the US Energy Information Administration.

Exhibit ____ (JDW-IRP-5)

**Annual Energy Savings Implied by 24 State Energy Efficiency Targets or Mandates, Compared with Georgia Power**

| State | Implied Annual Energy Savings Goal | Date Established | Target End Date | Efficiency Goal Details |
|---|---|---|---|---|
| **California** | > 2.0 % | 2004 | 2013 | EE is first resource to meet future electric needs; All achievable efficiency potential |
| **Connecticut** | > 2.0 % | 2007 | 2018 | All achievable cost effective |
| **Massachusetts** | > 2.0 % | 2008 | n/a | All achievable cost effective |
| **Rhode Island** | > 2.0 % | 2008 | n/a | All achievable cost effective |
| **Washington** | > 2.0 % | 2006 | 2025 | All achievable cost effective |
| **Arizona** | 2.0 % | 2009 | 2020 | 20% by 2020 |
| **Illinois** | 2.0 % | 2007 | 2015 | 2.0% per year |
| **Maryland** | 2.0 % | 2008 | 2015 | Per capita energy use reduced 15% |
| **Vermont** | 2.0 % | 2008 | 2011 | 2.0% per year (contract goals) |
| **New Jersey** | ≤2.0 % | 2008 | 2020 | 20% of 2020 load |
| **Iowa** | 1.5 % | 2009 | 2010 | 1.5% per year |
| **Minnesota** | 1.5 % | 2007 | 2010 | 1.5% per year |
| **New York** | 1.5 % | 2008 | 2015 | 10.5% of 2015 load |
| **Ohio** | 1.4 % | 2008 | 2019 | 2.0% per year |
| **Colorado** | 1.0 % | 2007 | 2020 | 1.0% per year |
| **Michigan** | 1.0 % | 2008 | 2012 | 1.0% per year |
| **New Mexico** | 1.0 % | 2009 | 2020 | Minimum 10% of 2005 load |
| **Nevada** | 0.6 % | 2005 | n/a | 0.6% of 2006 annually |
| **Pennsylvania** | 0.6 % | 2008 | 2013 | 3.0% of 2009-2010 load |
| **Hawaii** | 0.5 % | 2004 | 2020 | 0.4-0.6% per year |
| **Texas** | 0.5 % | 2007 | 2010 | 20% of load growth |
| **Virginia** | 0.5 % | 2007 | 2022 | 10% of 2006 load |
| **Florida** | 0.4 % | 2009 | 2019 | 3.6% by 2019 |
| **North Carolina** | 0.3 % | 2007 | 2018 | Cumulative forecast of 2.9% energy savings: Wilson Exhibit 7 |
| ***Georgia Power*** | ***TRADE SECRET*** | ***n/a*** | ***2020*** | *As proposed in 2010 IRP and DSM Programs Application* |

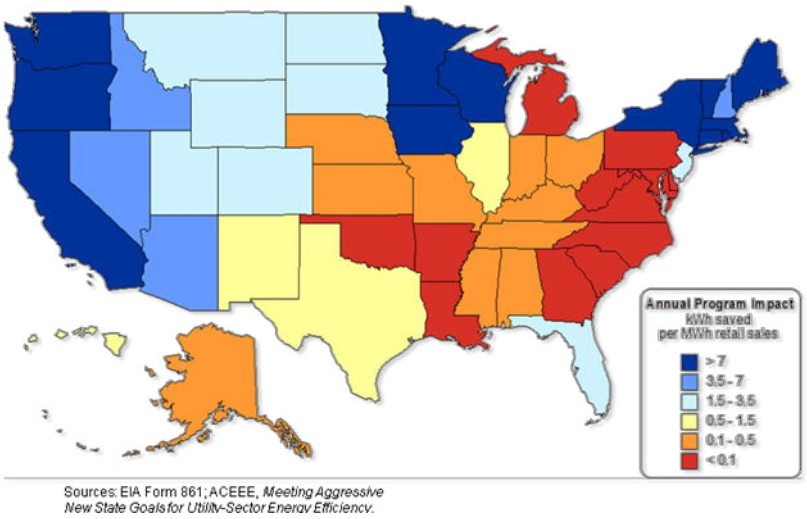
Notes: The form of state energy efficiency targets, mandates, goals or resource standards vary. The "implied annual energy savings goal" is a point estimate reflecting the magnitude of annual energy savings due to typical or peak program year impacts for states which require all achievable energy efficiency.

The annual energy savings goal associated with the DSM programs recommended by Georgia Power is provided in its Trade Secret response to data request STF-GDS-2-15, March 12, 2010.

Sources:

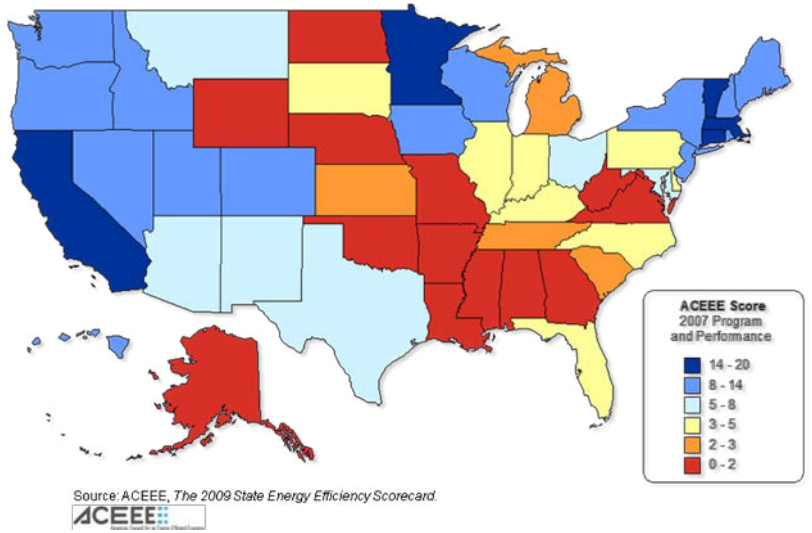
- Except as noted, from Exhibit PHM-1, "Direct Testimony of Philip H. Mosenthal," Florida Public Service Commission Dockets 080407 through 080413-EG, July 6, 2009. The exhibit is the witnesses' analysis of data compiled in American Council for an Energy-Efficient Economy, "Laying the Foundation for Implementing a Federal Energy Efficiency Standard, March 2009, report no. E091.
- Florida data are calculated from Florida Public Service Commission, Final Order No. PSC-09-0855-FOF-EG for Dockets 080407 through 080413-EG, December 30, 2009.
- Maryland, Ohio and Virginia data are calculated from Federal Energy Regulatory Commission, "Energy Efficiency Resource Standards (EERS) and Goals," July 8, 2009.
- Arizona data are calculated from Arizona Corporation Commission, Decision No. 71436 for Docket No. RE-00000C-09-0427, December 18, 2009.

**Energy Efficiency Program Impacts, by State (2007)**




Sources: EIA Form 861; ACEEE, *Meeting Aggressive New State Goals for Utility-Sector Energy Efficiency.*

**ACEEE Score for Utility and Public Benefits Programs and Policies, by State (2007)**

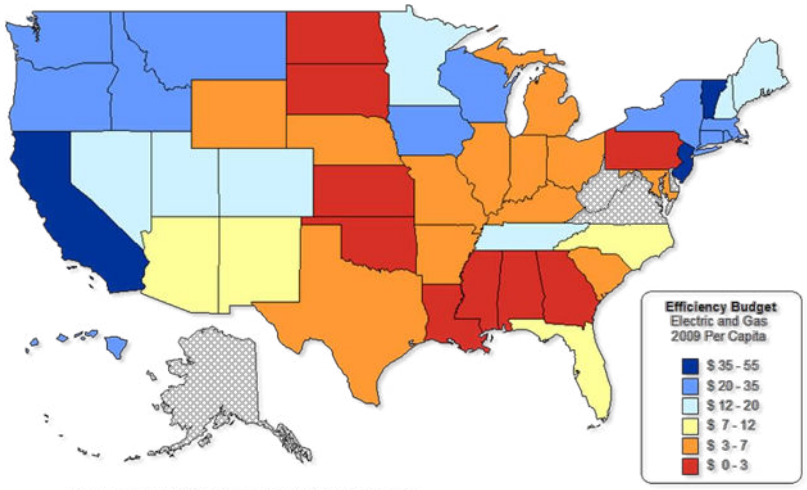



Source: ACEEE, *The 2009 State Energy Efficiency Scorecard.*

ACEEE

Exhibits to John D. Wilson Direct Testimony
On Behalf of SACE
GPSC Docket No. 31081

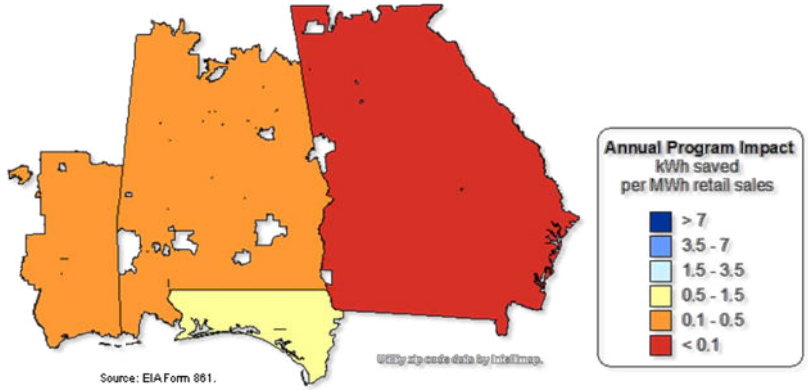
**Reported Energy Efficiency Program Budgets, by State (2009)**




Source: CEE, *The State of the Efficiency Program Industry: Budgets, Expenditures and Impacts, 2009.*

CEE

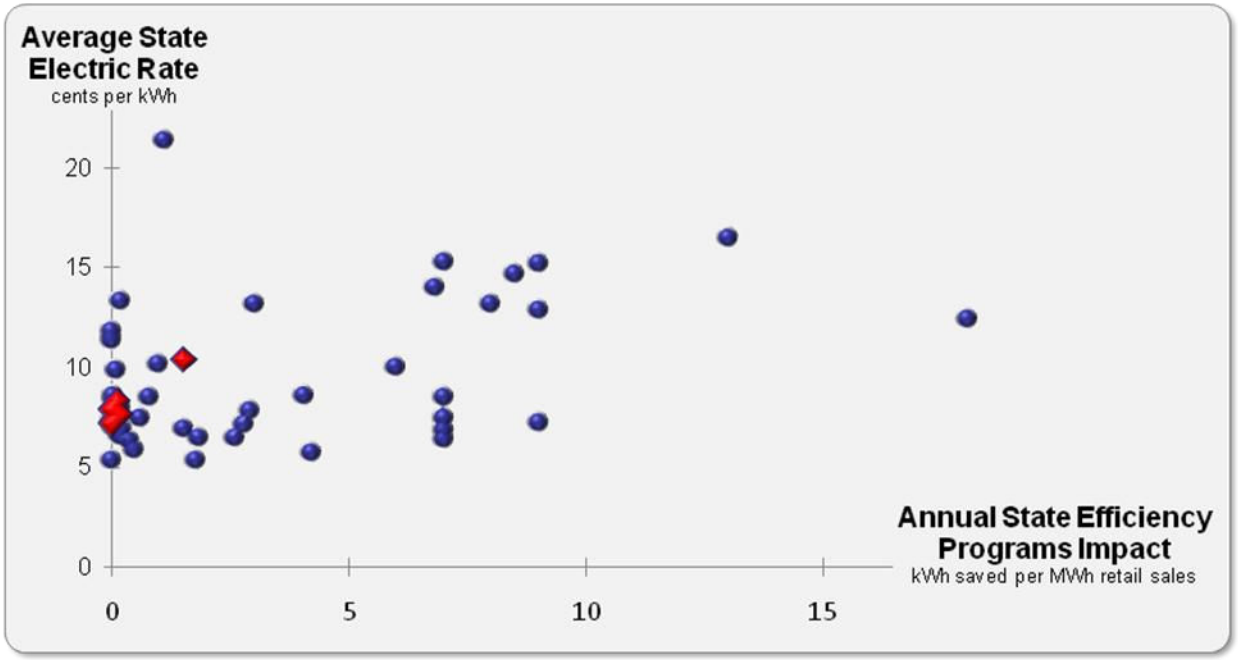
**Energy Efficiency Program Impacts, by Southern Company Retail Operating Company (2007)**




Exhibits to John D. Wilson Direct Testimony
On Behalf of SACE
GPSC Docket No. 31081

Exhibit ____ (JDW-IRP-6)

**Energy Efficiency Impacts Are Large in Some States Where Rates Are Comparable to the Southeast**




Source: Analysis of data ACEEE, EIA Form 861, as described in Wilson, J., "Energy Efficiency Program Impacts and Policies in the Southeast," Southern Alliance for Clean Energy, May 2009.

Note: In 2008 and 2009, average Georgia electric rates were 8.8 cents/kWh.

Exhibit ____ (JDW-IRP-7)

## Overcoming Unique Challenges to Energy Efficiency Resources

Energy efficiency resources are different because in three critical ways. First, energy savings or conservation resources cannot be controlled or stored in the same way that conventional supply-side resources can be managed. Second, energy efficiency impacts cannot be measured in the same way that supply-side resources can be metered at the plant and customer site. Third, energy efficiency resources are typically delivered by a service provider network and customer base that is far more diverse and complex than the contractors who assist utilities in building and maintaining power plants. In a utility resource plan, these differences must be considered when assessing the uncertainties and risks associated with energy efficiency resources.

The uncertainties and risks of energy efficiency are associated with several "well-recognized barriers" responsible for the "current underinvestment in energy efficiency," including:

- Lack of information, awareness
- Lack of capital
- Utility financial regulation – disincentive to utility support
- Utility planning policy – energy efficiency not equal to supply resources
- Efficiency programs not up to date
- Transaction costs
- "Split-incentive" or "Principal-Agent" problem[1]

Leading energy efficiency programs address each of these customer and market barriers from the policy level all the way down to implementation – and back again.

One technique that leading energy efficiency programs use to address these barriers is to ramp up gradually over time as the program builds success in overcoming customer and market barriers such as lack of information. This delivery schedule is a marked contrast to that of conventional generation resources, which are typically delivered in large chunks on a particular capital improvement schedule. The ramp up approach is also needed because the actual capacity of a demand-side resource is only discovered through effective program execution – potential studies and industry experience are merely forecasts of actual program results.

Energy efficiency resources are measured differently than supply-side resources. An extensive professional practice has developed with the goal of providing useful estimates of the value of energy efficiency. While a review of the field of measurement and verification techniques is beyond the scope of this exhibit, The National Action Plan's *Model Energy Efficiency Program Impact Evaluation Guide* (November 2007) describes this process in detail. The consolidation of evaluation, measurement and verification (EM&V) procedures into guides and manuals reflects the growing rigor and reliability of these tools. Although different approaches are used, these typically reflect different decisions regarding the balance to be struck between cost and level of detail in these measurements.

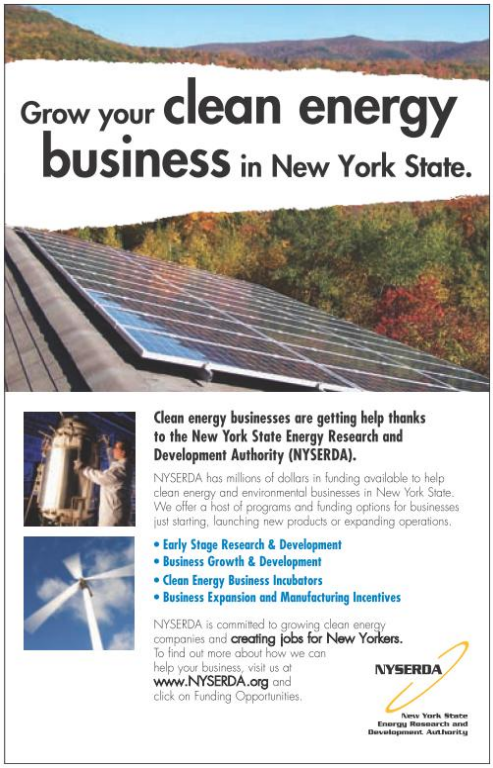
Bringing utility energy efficiency programs up to date requires an investment in training and resource acquisition by utilities, but it also requires convincing business partners in service provider networks to do the same. The fact that our organizations, as well as all southeastern utilities, routinely draw on

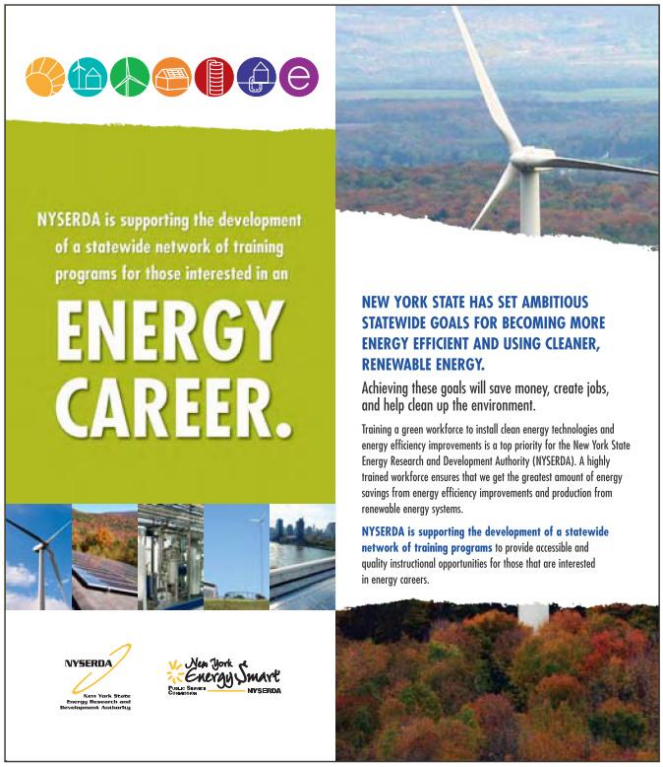
[1] National Action Plan for Energy Efficiency (2006).

consulting expertise from outside the region speaks directly to the overall shortage of energy efficiency leading companies with relevant experience in this region.

Utilities with leading energy efficiency programs (e.g., Alliant Energy) as well as state administered programs (e.g., NYSERDA) offer business partner network benefits including marketing, technical, and trade show assistance – as well as a role in improving program design. For example, NYSERDA has an extensive business and workforce development strategy, as illustrated below.

**NYSERDA Business and Workforce Development Marketing Materials**



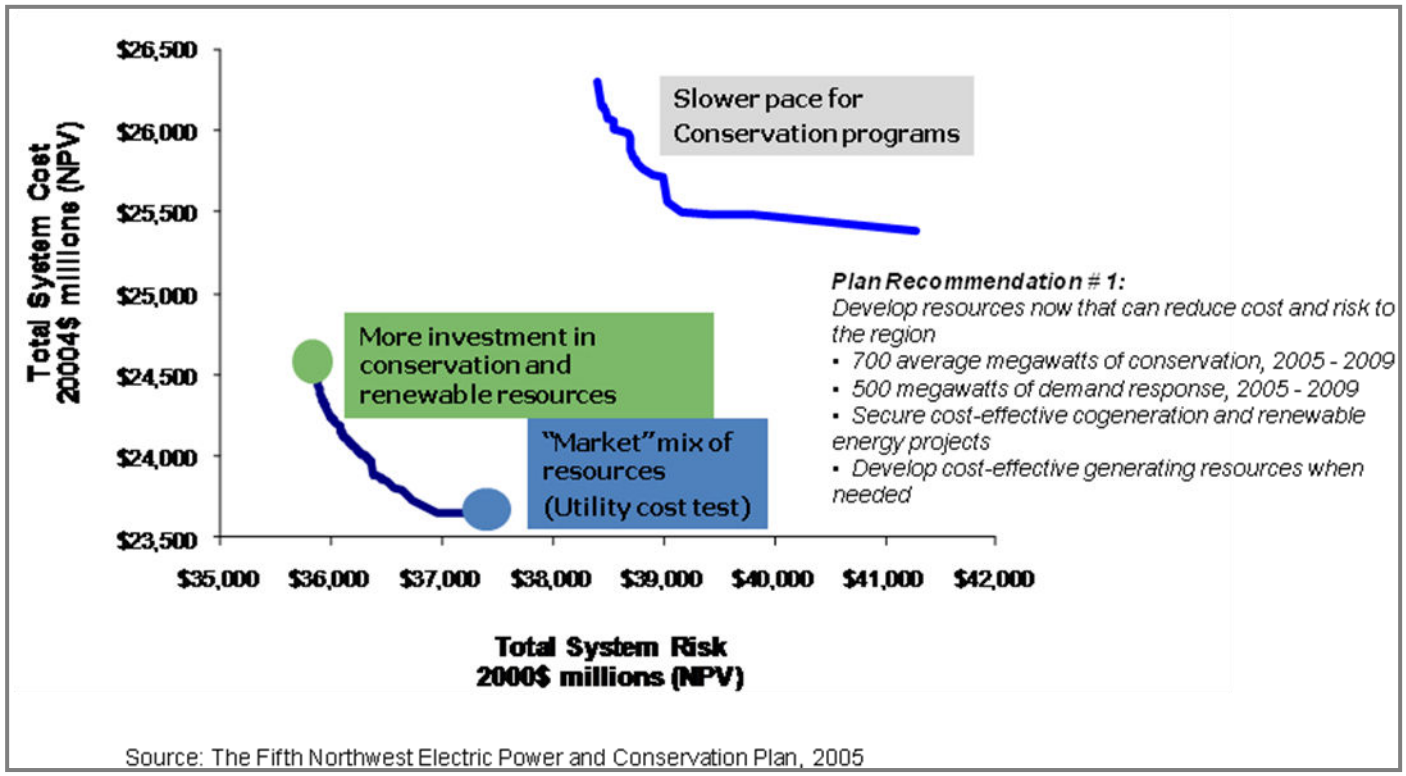




Source: New York State Energy Research and Development Authority, *Annual Report 2008-2009*.

Exhibit ____ (JDW-IRP-8)

## Aggressive Energy Efficiency Programs Reduce Price Spike Risk

The Northwest Power and Conservation Council (NWPCC) considers a wide range of portfolio options in its resource plan analysis. Its resource portfolio planning analysis is a multi-variable sensitivity analysis which forecasts the cost and risk associated with the best combinations of various available resources. The portfolio option that offers the "least cost" is the one with the "market mix" of energy resources, what a typical least cost planning exercise might suggest.



Source: The Fifth Northwest Electric Power and Conservation Plan, 2005

However, by examining the price spike risk associated with each portfolio option, utilities in the region served by the Bonneville Power Administration (of which NWPCC is the statutory planning authority) determined that portfolio options with more conservation and renewable energy could cost up to 4% more, but would reduces system risk by up to 5%. The portfolio options selected by NWPCC in its last two planning cycles have a cost that was somewhat above the "market" mix in cost, with somewhat lower risk. The policy of the NWPCC is that the additional cost in the selected option represents a regional insurance hedge that is in the interests of customers concerned about the risk of price shocks.

Another aspect of the NWPCC analysis illustrated in this exhibit is the impact of a "slower pace" option for energy efficiency programs. With delayed implementation of energy efficiency, all of the portfolio options had both higher cost and higher risk than the "faster pace" option.

Exhibit ____ (JDW-IRP-9)

**Summary of Benefits and Costs Included in Each Cost-Effectiveness Test**

| Test | Benefits | Costs |
|---|---|---|
| PCT | *Benefits and costs from the perspective of the customer installing the measure* | |
| | ▪ Incentive payments<br>▪ Bill savings<br>▪ Applicable tax credits or incentives | ▪ Incremental equipment costs<br>▪ Incremental installation costs |
| PACT | *Perspective of utility, government agency, or third party implementing the program* | |
| | ▪ Energy-related costs avoided by the utility<br>▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution | ▪ Program overhead costs<br>▪ Utility/program administrator incentive costs<br>▪ Utility/program administrator installation costs |
| RIM | *Impact of efficiency measure on non-participating ratepayers overall* | |
| | ▪ Energy-related costs avoided by the utility<br>▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution | ▪ Program overhead costs<br>▪ Utility/program administrator incentive costs<br>▪ Utility/program administrator installation costs<br>▪ Lost revenue due to reduced energy bills |
| TRC | *Benefits and costs from the perspective of all utility customers (participants and non-participants) in the utility service territory* | |
| | ▪ Energy-related costs avoided by the utility<br>▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution<br>▪ Additional resource savings (i.e., gas and water if utility is electric)<br>▪ Monetized environmental and non-energy benefits (see Section 4.9)<br>▪ Applicable tax credits (see Section 6.4) | ▪ Program overhead costs<br>▪ Program installation costs<br>▪ Incremental measure costs (whether paid by the customer or utility) |
| SCT | *Benefits and costs to all in the utility service territory, state, or nation as a whole* | |
| | ▪ Energy-related costs avoided by the utility<br>▪ Capacity-related costs avoided by the utility, including generation, transmission, and distribution<br>▪ Additional resource savings (i.e., gas and water if utility is electric)<br>▪ Non-monetized benefits (and costs) such as cleaner air or health impacts | ▪ Program overhead costs<br>▪ Program installation costs<br>▪ Incremental measure costs (whether paid by the customer or utility) |

Source: Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects.

National Action Plan for Energy Efficiency, *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*, November 2008.

Exhibit ____ (JDW-IRP-10)

**Georgia Power Energy Efficiency Programs: Economic Scenario Summary**
**Including SACE-Extended Analysis of Legislative Case**

## Case 1 (Base) - $0 $CO_2$ - 0¢ ACP - Economic Scenario Summary

| Fuel | Energy Reduction (GWH) | Capacity Reduction (MW) | RIM ($millions) | TRC ($millions) | PAT ($millions) | PT ($millions) | ST ($millions) | CSE ($/kWh) |
|---|---|---|---|---|---|---|---|---|
| High | 160.36 | 48.11 | ($7.39) | $161.56 | $175.17 | $168.95 | $167.95 | $0.012 |
| Moderate with Volatility | 160.36 | 48.11 | ($12.75) | $152.00 | $165.61 | $164.75 | $157.87 | $0.012 |
| Moderate | 160.36 | 48.11 | ($15.75) | $147.21 | $160.82 | $162.96 | $152.85 | $0.012 |
| Moderate (Base Case) | 160.36 | 48.11 | ($15.56) | $147.01 | $160.61 | $162.57 | $152.63 | $0.012 |
| Low | 160.36 | 48.11 | ($20.08) | $139.94 | $153.55 | $160.02 | $145.20 | $0.012 |

Note: Economic summary figures are based on 2013

**Source: Georgia Power, DSM Program Documentation Technical Appendix, Economic Scenario Summary (Revised April 5, 2010).**

## Case 2 (Legislative) - 2.5¢/kWh ACP - Economic Scenario Summary

| FUEL | Energy Reduction (GWH) | | | Capacity Reduction (MW) | | | RIM ($millions) | | | TRC ($millions) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ |
| High | 348.44 | 348.44 | 348.44 | 91.85 | 91.85 | 91.85 | | $7.07 | ($0.509) | | $337.18 | $352.89 |
| Moderate with Volatility | 348.44 | 348.44 | 348.44 | 91.85 | 91.85 | 91.85 | | $1.31 | ($1.15) | | $320.97 | $353.27 |
| Moderate | 348.44 | 348.44 | 348.44 | 91.85 | 91.85 | 91.85 | $12.31 | $3.22 | ($8.23) | $300.35 | $320.28 | $344.07 |
| Low | 348.44 | 348.44 | 348.44 | 91.85 | 91.85 | 91.85 | | ($1.86) | ($17.30) | | $311.21 | $331.02 |

| FUEL | PAT ($millions) | | | PT ($millions) | | | ST ($millions) | | | CSE ($/kWh) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ | $0-$CO_2$ | $10-$CO_2$ | $20-$CO_2$ |
| High | | $368.04 | $383.72 | | $330.11 | $353.40 | | $348.57 | $365.10 | | $0.014 | $0.014 |
| Moderate with Volatility | | $351.87 | $384.10 | | $319.66 | $354.42 | | $331.52 | $365.22 | | $0.014 | $0.014 |
| Moderate | $331.29 | $351.18 | $374.92 | $288.04 | $317.06 | $352.30 | $310.90 | $330.67 | $355.41 | $0.014 | $0.014 | $0.014 |
| Low | | $342.12 | $361.90 | | $313.07 | $358.33 | | $321.00 | $341.75 | | $0.014 | $0.014 |

Note: Economic summary figures are based on 2013

**Source: Georgia Power, DSM Program Documentation Technical Appendix, Economic Scenario Summary (Revised April 5, 2010).**

**The $0-$CO_2$ scenario results are SACE-extended analysis as described in testimony.**

## Case 3 (Aggressive) - $0 $CO_2$ - 0¢ ACP - Economic Scenario Summary

| Fuel | Energy Reduction (GWH) | Capacity Reduction (MW) | RIM ($millions) | TRC ($millions) | PAT ($millions) | PT ($millions) | ST ($millions) | CSE ($/kWh) |
|---|---|---|---|---|---|---|---|---|
| Moderate | TRADE SECRET | TRADE SECRET | ($232.84) | $584.97 | $642.31 | $815.81 | $611.33 | $0.025 |

Note: Economic summary figures are based on 2013

**Source: Georgia Power, DSM Program Documentation Technical Appendix, Economic Scenario Summary (Revised April 5, 2010).**