

# South Carolina's Energy Future: Minding its Efficiency Resources

## EXECUTIVE SUMMARY<sup>1</sup>

November 2009

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South Carolina's leaders in both the public and private sectors are showing renewed interest in adopting energy efficiency policies and programs. For this reason, the American Council for an Energy-Efficient Economy (ACEEE) chose to work with the State of South Carolina as part of our State Clean Energy Resource Project. ACEEE reviewed many of the state's existing and proposed energy efficiency-related efforts, and determined that South Carolina could benefit from an in-depth analysis of the potential within the state for greater efficiency investments. As this report clearly demonstrates, energy efficiency has the potential to provide short- and long-term economic and social benefits to South Carolina's consumers, such as creating new, local jobs; lowering consumer bills; and abating emissions, all of which will help to stimulate the economy.

Recent developments in South Carolina have shown the state is making a number of prudent investments in energy efficiency that should pay off over time in terms of new jobs and economic growth. Commitments to reduce energy consumption in state-owned buildings, improve building energy codes, weatherize homes, and increase utility investment in electric efficiency programs highlight movement away from business as usual and towards a period of stronger economic and social development.

South Carolina has been hit particularly hard by the recent recession. Growth in real gross state product (GSP) has been steadily declining since 2005, from 2.4% to 0.6%, positioning South Carolina 32<sup>nd</sup> in economic growth in the country. South Carolina's unemployment rate is the fifth highest in the nation, hovering around 11.6% as of October 2009. But current economic conditions should not preclude the state from exploring and exploiting its significant energy efficiency resources. In fact, in helping to revitalize its economy, energy efficiency should be regarded as the state's "first fuel."

Looking beyond the state's existing energy efficiency measures, ACEEE developed additional policy suggestions, which were analyzed as part of this report after extensive stakeholder discussions in the state over a series of months. The results show that South Carolina's economy can benefit greatly by further investment in specific energy and water efficiency measures. For the first time in any of our state reports, ACEEE conducted an analysis of several water efficiency policies, as well as added three new energy efficiency measures of interest to the state: improved efficiency in manufactured housing; implementation of a behavioral awareness program; and a rural/agricultural initiative. This last initiative is of particular importance to a state such as South Carolina with a large population of rural residents.

### Electricity and Water Policy Recommendations

For our energy and water policy analyses, we developed a suite of eleven energy and five water efficiency policy suggestions based on successful models implemented in other states and in-depth consultation with stakeholders in South Carolina. Of the eleven electricity policies we are recommending, there are eight that ACEEE suggests be eligible to contribute towards a utility savings target that would be required by an *energy efficiency resource standard* (EERS),<sup>2</sup> which we suggest be set at 18% of projected sales in 2025. The EERS represents the core of

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<sup>1</sup> This report was prepared by ACEEE staff in partnership with external consultants and made possible by funding from The Energy Foundation, U.S. DOE, U.S. EPA., and the Google Inc. Charitable Giving Fund of Tides Foundation. The complete report is available for free download at <http://aceee.org/pubs/e099.htm>.

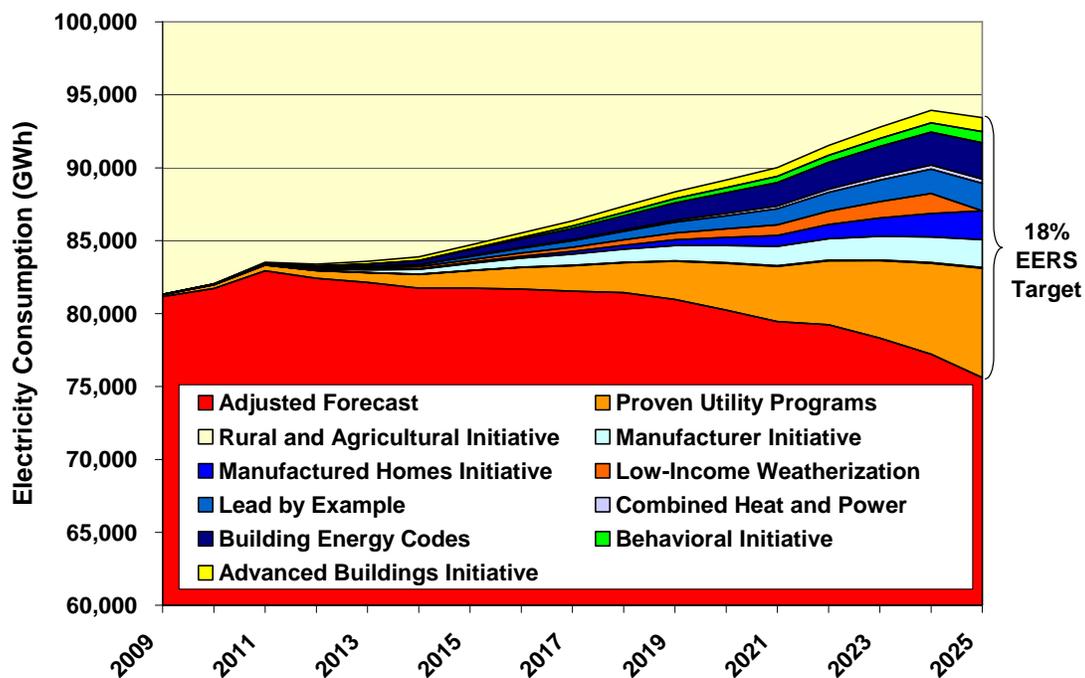
<sup>2</sup> ACEEE has recently created guidance language for creating an EERS, illustrating basic provisions that should be considered for inclusion in a state-level EERS, with accompanying explanations for each provision. This example is intended to provide state legislators, regulators, and other stakeholders with a starting point in drafting a state-specific EERS and as an initial framework from which the negotiation process may

these policies, providing a foundation upon which the other policies may be layered to achieve the greatest savings. But it is important to note that the EERS is simply an amalgamation of the savings generated by the individual policies and utility programs, so its absence does not preclude the efficacy of the policy and program recommendations included in this report. We estimate that the eight policies have the potential to meet 10% of South Carolina's electricity needs by 2025 in our medium case scenario, irrespective of the presence of an EERS.<sup>3</sup> With an EERS in place, however, utilities would be required to meet the remaining 8% of the savings target by implementing their own efficiency programs. Our eleven energy policy recommendations, which include three enabling policies, are as follows:

- A. Energy Efficiency Resource Standard
  - 1) Advanced Building Initiative
  - 2) Behavioral Initiative
  - 3) Combined Heat and Power
  - 4) Lead by Example
  - 5) Low-Income Weatherization
  - 6) Manufactured Homes Initiative
  - 7) Manufacturer Initiative
  - 8) Rural and Agricultural Initiative
  
- B. Enabling Policies
  - 9) Building Energy Codes
  - 10) Workforce Development Initiative
  - 11) Expanded Demand Response Programs

Figure ES-1 shows the contribution of the individual policies and utility programs we have recommended. Our suite of energy efficiency policies will contribute savings of 9,503 GWh, or 10% of South Carolina's electricity demand, by 2025. The remaining 8%, or 7,491 GWh of the EERS target, can be met readily by utility programs. In this report we highlight the best of these programs that have been proven to be effective at reducing electricity consumption in other states across the U.S.

**Figure ES-1. Estimated Reductions in Electricity Use in South Carolina through Energy Efficiency**

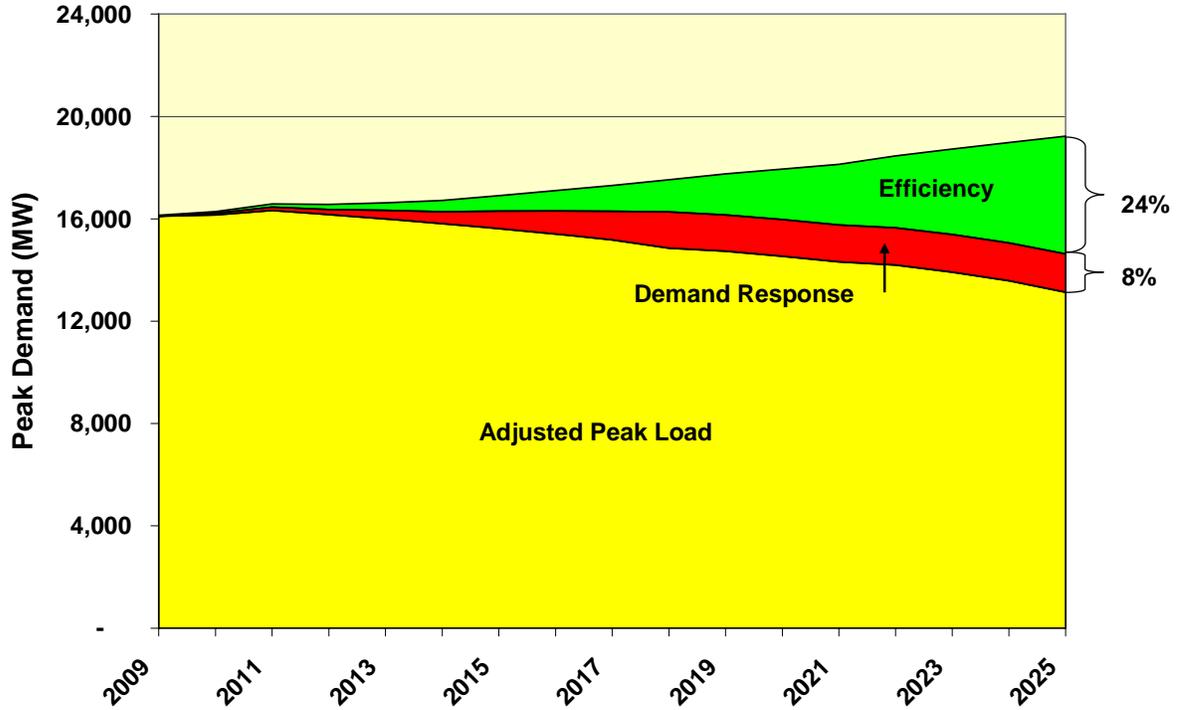


advance, taking into consideration the regulatory environment of the individual state. ACEEE's guidance language is available at [www.aceee.org/energy/state/toolkit.htm](http://www.aceee.org/energy/state/toolkit.htm)

<sup>3</sup> Three of the policies—Lead by Example, Low-Income Weatherization, and the Manufactured Homes Initiative—are policies that have already been implemented in the state, and our analysis attempts to estimate the potential savings that could be realized over the program period and beyond.

We also find that a suite of demand response (DR) recommendations, which focus on shifting energy from peak periods to off-peak periods and cutting back electricity needs during periods with the highest demand, is a critical component of reducing peak demand in South Carolina. Figure ES-2 presents the combined effects of energy efficiency and demand response on peak reductions.

**Figure ES-2. Estimated Reductions in Peak Demand through Energy Efficiency and Demand Response**



To assist South Carolina's public water supply and wastewater treatment systems to meet the growing demand for water and wastewater service cost-effectively, we suggest five water efficiency policies as follows:

- 1) Plumbing Efficiency Standards
- 2) Replacement of Inefficient Plumbing in Pre-1995 Homes
- 3) Utility System Water Loss (Leakage) Reduction
- 4) Water Efficient Landscape Irrigation
- 5) Conservation Pricing of Water and Sewer Service<sup>4</sup>

In addition, we assume that electric utility efficiency programs will direct a portion of their customer incentives to the purchase of energy- and water-efficient clothes washers, and have estimated the water savings that will result. We also estimate the electricity savings that result from these water efficiency measures, both at the customers' location and at water and wastewater utilities that pump and treat less water as a result of these policies. Table ES-1 shows the impact of our recommended water policies on water and electricity consumption.

**Table ES- 1. Summary of Water and Electricity Savings by Water Efficiency Policy**

	Annual Water Savings by Policy (mgd)	Medium Case		High Case	
		2015	2025	2015	2025
	Statewide Plumbing Efficiency Standards	2.1	8.0	2.1	8.0
	Inefficient Plumbing Replacement	2.1	5.0	2.9	7.4
	Utility System Water Loss Reduction	0.8	8.8	1.3	14.5
	Water Efficient Landscape Irrigation	2.2	8.3	2.6	9.8
<b>1</b>	Water Conserving Rate Structures	—	—	—	—

<sup>4</sup> Water savings from conservation pricing were not quantified, but we recommend its inclusion in state water policy in order to address current rate structures that may promote excessive water consumption.

2	Electric Utility Clothes Washer Incentives	0.9	2.2	0.9	2.2
	<b>Total Estimated Water Savings (mgd)</b>	<b>8.1</b>	<b>32.3</b>	<b>9.8</b>	<b>41.9</b>
	<b>Annual Electricity Savings (GWh)</b>				
	Statewide Plumbing Efficiency Standards	12.9	54.1	12.9	54.1
2	Electric Utility Clothes Washer Incentives	—	—	—	—
	<b>Onsite Electricity Savings</b>	<b>12.9</b>	<b>54.1</b>	<b>12.9</b>	<b>54.1</b>
3	<b>Offsite Electricity Savings—All Policies</b>	<b>8.3</b>	<b>30.8</b>	<b>9.9</b>	<b>39.1</b>
	<b>Total Electricity Savings from Water (GWh)</b>	<b>21.2</b>	<b>84.9</b>	<b>22.8</b>	<b>93.2</b>
<b>Notes</b>					
1. Recommended, but potential water savings not quantified.					
2. Clothes washer water savings shown here; clothes washer energy savings are included in Utility Program electricity savings.					
3. Indoor water use reductions yield offsite electricity savings of 3,239 KWh/mg; outdoor water use reductions yield offsite electricity savings of 2,061 KWh/mg.					

To put these savings in perspective, the water savings estimated under the high case for 2025 (41.9 mgd) equates to 6.8% of the total water use reported by South Carolina's public water suppliers in 2006.

Finally, we make a first-order estimate of the impact that successful energy efficiency measures would have on the use of cooling water by thermoelectric power plants in South Carolina. Power plant cooling is the largest off-stream use of water in South Carolina, by far. The operations of baseload power plants will be largely unaffected by energy efficiency programs, but electricity savings will result in reduced generating hours at load-following plants. We estimate that energy efficiency policies under the medium case will reduce water withdrawals by 300 million gallons per day (mgd) in 2015 and over 1,800 mgd in 2025. Withdrawals are likely to be larger than these averages in summer months and lower than these averages in winter months. Given the distribution of the principal load-following thermoelectric plants in the state, we estimate that the bulk of these savings (80%) can be distributed as shown in Table ES-2. We have not assigned dollar values to these savings, but suggest that improvements in stream flows and attendant reliability of supplies for drinking water, fish and wildlife, and power generation itself are likely to result.

**Table ES-2. Estimated Reductions in Thermoelectric Cooling Water Use Resulting from Medium Case Energy Efficiency, by Basin (mgd)**

River Basin	Withdrawals		Consumption	
	2015	2025	2015	2025
Broad	8.0	49.2	0.023	0.142
Congaree	4.6	28.3	0.013	0.081
Cooper	125.0	772.2	1.078	6.665
Edisto	26.5	164.0	0.229	1.415
Saluda	17.6	108.8	0.152	0.939
Savannah	59.6	368.2	0.253	1.565

**Impacts on Employment and the Economy from Energy and Water Efficiency**

The energy savings from these efficiency policies and programs can cut the net annual electricity and water bills for customers by \$9 million in 2015. Net annual savings grow to \$1.3 billion in 2025. While these savings will require some public and customer investment, by 2025 net cumulative savings on electricity bills will reach \$5.1 billion. These savings are the result of two effects. First, participants in energy and water efficiency programs will install efficiency measures, such as more efficient appliances or heating equipment, therefore lowering their electricity and water consumption and electric and water bills. In addition, because of the current volatility in energy prices, efficiency strategies have the added benefit of improving the balance of demand and supply in energy markets, thereby stabilizing regional electricity prices for the future.

Investments in efficiency policies and programs can also help create new, high-quality "green-collar" jobs in South Carolina while increasing both wages and GSP. Our analysis shows that energy efficiency investments can create almost 22,000 new, local jobs in South Carolina by 2025 (see Table ES-3), including well-paying trade and professional jobs needed to design, install, and operate energy efficiency measures. These new jobs, including

both direct and indirect employment effects, would be equivalent to 175 new manufacturing facilities locating to the state.

**Table ES-3. Economic Impact of Energy Efficiency Investments in South Carolina**

Macroeconomic Impacts	2010	2015	2020	2025
Jobs (Actual)	13,597	18,891	19,625	21,887
Wages (Million \$2007)	\$402	\$533	\$515	\$408
GSP (Million \$2007)	\$767	\$985	\$716	\$99

## Conclusions

South Carolina is at a turning point where the state and its policymakers can choose either to continue to depend upon conventional energy resource generation, or choose to slow—or even to reduce—future demand for electricity by investing in efficiency. As this assessment demonstrates, there are plenty of cost-effective energy and water efficiency opportunities in the state. However, as this report also discusses, these opportunities will not be realized without changes and additions to its current policies and programs. The state ranked 37<sup>th</sup> out of the 50 states in ACEEE's recently released *2009 State Energy Efficiency Scorecard*. That score can be improved significantly without harm to the economy—in fact with a positive outcome for both jobs and economic growth.

These policy and program suggestions should not be viewed as definitive, but as the starting point for a dialog among stakeholders on how to better realize the resource that is energy efficiency. To facilitate this future dialog, ACEEE is funded to provide limited technical assistance for eighteen months following the release of the report. Since we intend this report to be used as a roadmap to guide future efficiency resource decisions, it is important that ACEEE remains available to stakeholders to help as needed and as staff resources allow.

We do not, however, suggest that our efficiency policy suggestions will necessarily meet all of the state's future energy demand. Clearly there are other policies and programs that could be implemented to realize even more of the available energy efficiency resource. Most of the electric and water policies we suggest can also be augmented to realize even greater savings, which we analyze in our more aggressive “high case” policy scenario. Nonetheless, while energy efficiency is perhaps the only new energy resource available in the immediate future and can make an important contribution in the longer term, the state will likely need additional generation resources to meet the remainder of the new load and replace older, less efficient power plants in the coming years. But utilizing energy efficiency as South Carolina's first fuel resource will provide the time needed to engage in the important dialog over how the state will proceed to define its energy future.

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### ***ABOUT THE AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY (ACEEE)***

ACEEE is a nonprofit organization dedicated to advancing energy efficiency as a means of promoting economic prosperity, energy security, and environmental protection. For more information, see <http://www.aceee.org>. ACEEE fulfills its mission by:

- Conducting in-depth technical and policy assessments
- Advising policymakers and program managers
- Working collaboratively with businesses, public interest groups, and other organizations
- Organizing conferences and workshops
- Publishing books, conference proceedings, and reports
- Educating consumers and businesses

Support for our work comes from a broad range of foundations, governmental organizations, research institutes, utilities, and corporations.