ENERGY EFFICIENCY IN THE SOUTH

APPENDIX G

STATE PROFILES OF ENERGY EFFICIENCY OPPORTUNITIES IN THE SOUTH: GEORGIA

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A Profile of Energy-Efficiency Opportunities in Georgia

The economic recession, climate change concerns and rising electricity costs have motivated many states to embrace energy efficiency as a way to create new local jobs, lower energy bills and promote environmental sustainability. With this surge of interest in energy efficiency, policymakers are asking: "how much energy can be saved?" This profile addresses the opportunity for energy efficiency improvements in the residential, commercial and industrial sectors of Georgia. It draws on the results of a study of *Energy Efficiency in the South* conducted by a team of researchers at the Georgia Institute of Technology and Duke University. The study presents primary and in-depth research of the potential for energy-efficiency improvements, using a modeling approach based on the EF-NEMS (National Energy Modeling System).[1]

With a population of 9.5 million people[2], the State represents about 3.2% of the U.S. population, 2.9% of the nation's Gross Domestic Product (GDP), and 3.1% of U.S. energy consumption (Figure 1).[3] Thus, compared to the rest of the nation, Georgia has a higher than average level of energy intensity.[i]

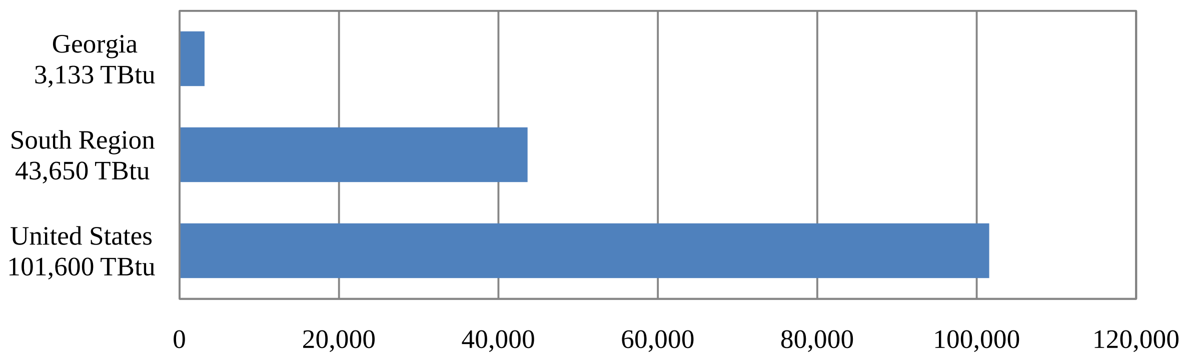


Figure 1: Energy Consumption in Georgia, the South, and the U.S., 2007[3]

Georgia's use of residential and transportation energy as a percentage of its overall energy consumption exceeds that of the nation and the rest of the South. On the other hand, its industrial energy consumption is lower (Figure 2). Georgia is 29th in per capita energy use,[3] a score that is raised due to the state's position as a leader in the pulp and paper industries.[4]

The State consumes more coal and nuclear energy and relatively less natural gas than other states in the South and the nation as a proportion of overall energy consumption (Figure 3). Georgia's electricity is largely generated from coal (63%) and nuclear (23%), with natural gas (9%), hydroelectric (2%), and biomass (2%) producing the rest.[4]

[i] Energy intensity is the ratio of the state's energy consumption to its Gross State Product (GSP).

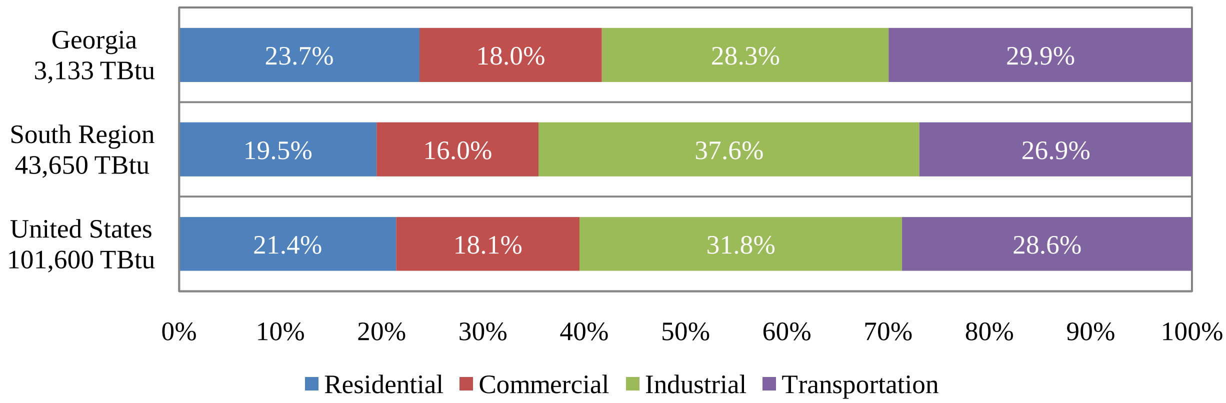


Figure 2: Energy Consumption in Georgia, the South, and the U.S. by Sector, 2007[3]

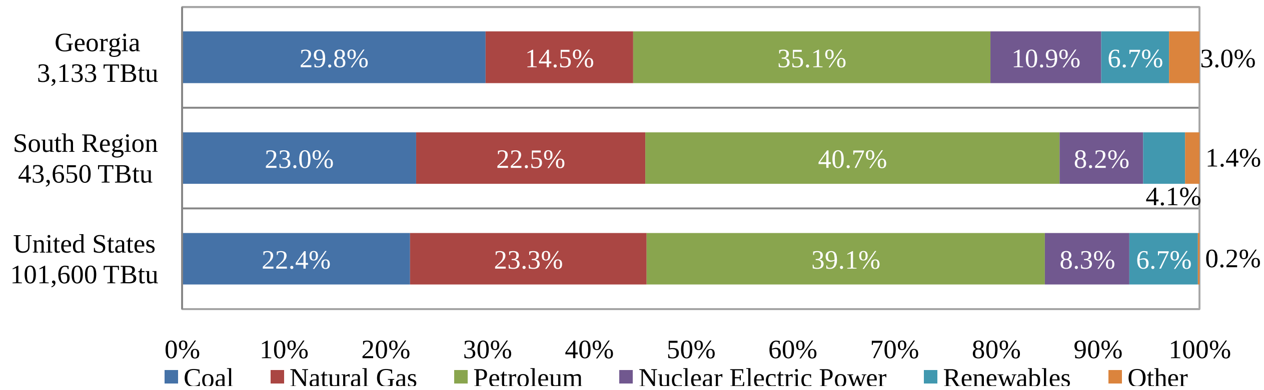


Figure 3: Energy Consumption in Georgia, the South, and the U.S. by Fuel Type, 2007[3]

Georgia has a number of energy efficiency policies already in place. For instance, the Governor's Energy Challenge has committed the State to reducing building energy use 15% by 2020. The State offers a property tax credit for renewable and energy-efficiency projects, and through the Federal American Recovery and Reinvestment Act, the State has allocated over $5 million for on-bill financing of energy-efficiency upgrades. Georgia also has a successful weatherization program, retrofitting over 2500 homes in 2008. More state initiatives are described in recent Southern States Energy Board and National Association of State Energy Officials publications.[4,5]

However, the *2009 State Energy Efficiency Scorecard* from the American Council for an Energy Efficient Economy (and other studies of the State and region) suggests that additional policy initiatives could be implemented in the State to encourage households, businesses, and industries to utilize energy more effectively. Specifically, the ACEEE study rated Georgia 44th of the 50 states and DC for its adoption and implementation of energy-efficiency policies. This score is based on the state's performance in six energy efficiency policy areas: utility and public benefits, transportation, building energy codes, combined heat and power, state government initiatives, and appliance efficiency standards.[6]

Chandler and Brown reviewed Georgia's energy-efficiency studies in the *Meta-Review of Efficiency Potential Studies and Their Implications for the South* (2009). Electricity savings range from 11-27% from projected energy consumption under maximum achievable scenarios in these studies.[7] Georgia's overall energy-efficiency potential would be higher than this range with the implementation of all cost-effective opportunities, but the number of studies with such estimates is limited.

Energy Efficiency Potential by Sector

The State's total energy consumption (residential, commercial, industrial, and transportation sectors) is projected to increase 15% from 2010 to 2030. This profile describes the ability of nine energy policies to curb this growth in energy use by accelerating the adoption of cost-effective energy-efficient technologies in the residential, commercial, and industrial sectors of Georgia. Altogether, these policies offer the potential to reduce Georgia's energy consumption by approximately 12% of the energy consumed by the State in 2007 (370 TBtu in 2030) (Figure 4). With these policies, Georgia's energy consumption could drop to below its 2010 levels by 2030. For complete policy descriptions, refer to *Energy Efficiency in the South* by Brown et al. (2010).

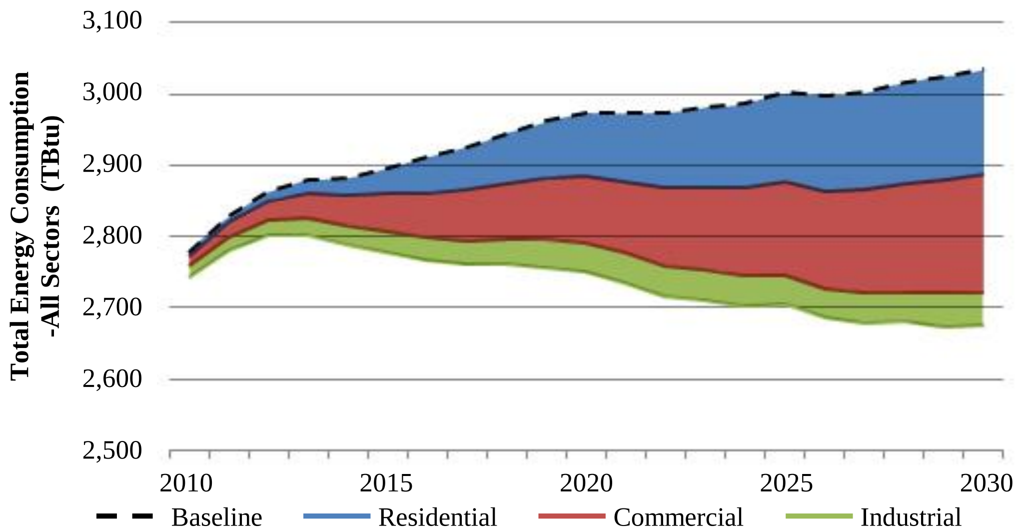


Figure 4: Energy Efficiency Potential in Georgia

(Note: The baseline includes projected transportation sector consumption, as well as residential, commercial and industrial consumption.)

The commercial and residential sectors offer the greatest energy efficiency potential in Georgia (Figure 5). In 2020, savings from all three sectors is about 7% (230 TBtu) of the total energy consumed by the State in 2007. Electricity savings constitute about 200 TBtu of this amount.

With these policies, the electricity generated by six 500-MW power plants in 2020 and ten such power plants in 2030 could be avoided.[8]

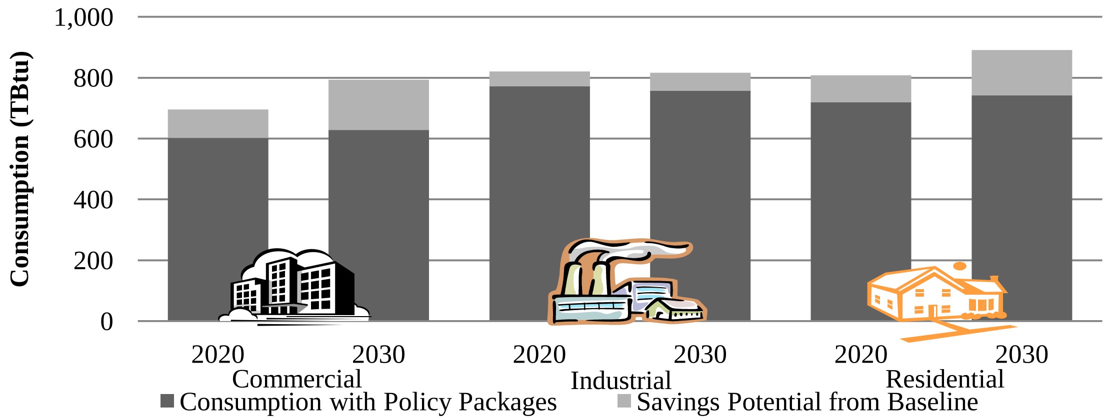


Figure 5: Energy-Efficiency Potential by Sector in Georgia, 2020 and 2030

Residential Sector

Four residential energy efficiency policies were examined: more stringent building codes with third party verification, improved appliance standards and incentives, an expanded Weatherization Assistance Program, and retrofit incentives with increased equipment standards. Their implementation could reduce Georgia's projected residential consumption by about 11% (88 TBtu) in 2020 and 17% (150 TBtu) in 2030 (Figure 6). In 2020, the residential energy required by about 400,000 Georgian households could be avoided or about $340 per household. The principal energy savings are from electricity, but significant natural gas savings could also occur (Figure 7). With these policies, residential energy consumption could remain largely unchanged over the next two decades.

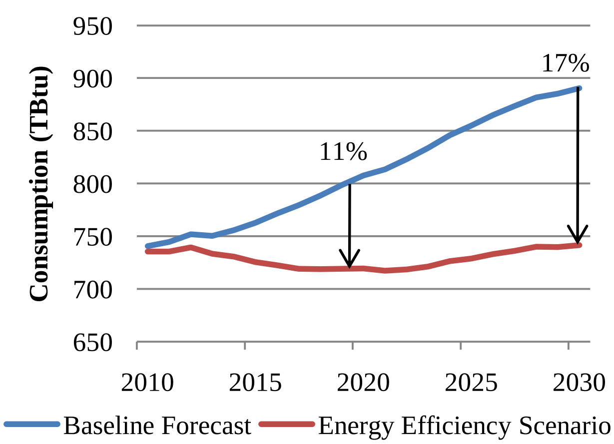


Figure 6: Residential Sector Savings

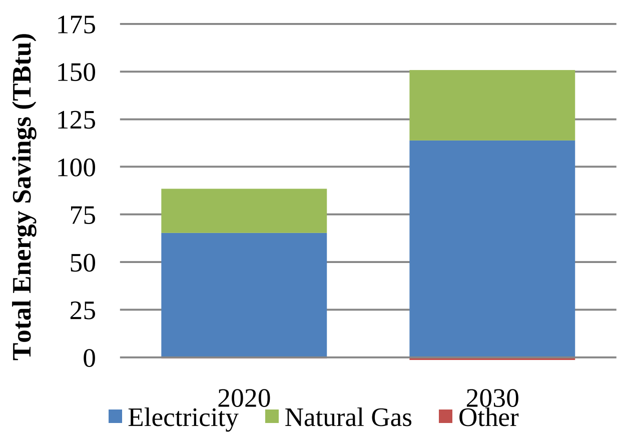


Figure 7: Residential Sector Savings by Fuel Type

Commercial Sector
The implementation of appliance standards and retrofit policies in Georgia's commercial sector could reduce projected energy consumption in 2020 by approximately 14%, and by 21% in 2030 (Figure 8). In 2020, the commercial sector could save about 94 TBtu, which is equivalent to the amount of energy that 2,700 Wal-Mart stores spend a year. Each business in Georgia could save $63,100 on average.[9] The principal energy savings are from electricity, with natural gas and other fuels providing additional savings (Figure 9). The rapid growth of commercial energy consumption forecast for Georgia could be constrained to only modest growth with these two energy efficiency policies.

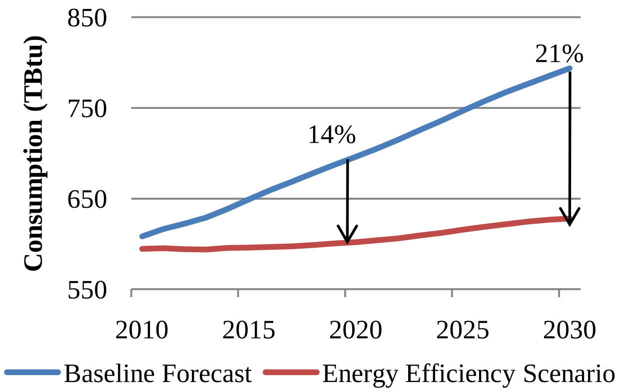


Figure 8: Commercial Sector Savings

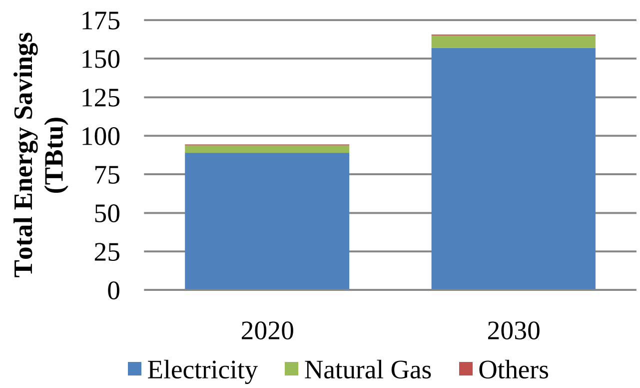
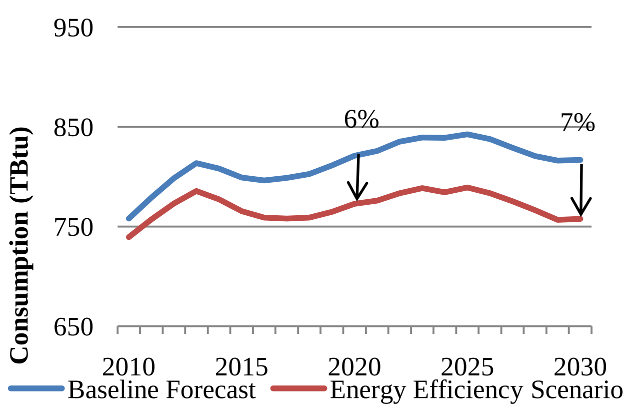


Figure 9: Commercial Sector Savings by Fuel Type

Industrial Sector
The implementation of plant utility upgrades, process improvements, and combined heat and power policies in Georgia's industrial sector can reduce projected consumption by about 6% (48 TBtu) in 2020 and 7% (59 TBtu) in 2030 (Figure 10). The industrial energy required by about 70 average industrial facilities is avoided in 2020, or about $48,000 average annual savings per industrial facility. The principal energy savings are from electricity, but natural gas savings could also occur, especially in 2020 (Figure 11). These three energy efficiency policies could significantly reduce the growing consumption of industrial energy projected over the next two decades.



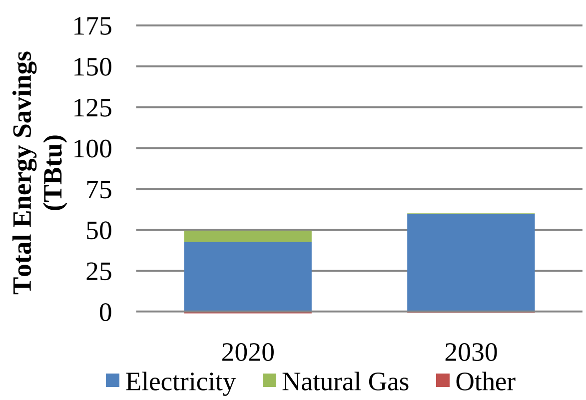


Figure 10: Industrial Sector Savings

Figure 11: Industrial Sector Savings by Fuel Type

Efficient Technology Opportunities

The projected energy efficiency potential can be realized through an array of new and existing technologies. *Energy Efficiency in the South* enumerates a number of these.

New residential products can provide greater energy savings without sacrificing performance. For instance, recently available heat pump water heaters can cut annual energy costs for water heating up to 62%.[10]

Opportunities for commercial energy efficiency may be obtained through technologies like the geothermal heat pump (ground-source heat pump), which can reduce energy consumption by up to 44% when compared to air-source heat pumps and by up to 72% when compared to electric resistance heating with standard air-conditioning equipment. Though the installation cost is higher, the long lifetime of 20-25 years ensures energy bill savings.[11]

Super boilers, which represent over 95 percent fuel-to-steam efficiency, can be implemented in the industrial sector. This technology is able to improve heat transfer through the use of advanced firetubes with extended surfaces that help achieve a compact design through reducing size, weight, and footprint. The advanced heat recovery system combines compact economizers, a humidifying air heater, and a patented transport membrane condenser. [12]

These technologies are illustrative. Please refer to *Energy Efficiency in the South* for additional technology descriptions and examples.

Economic and Financial Impacts

The nine energy efficiency policies evaluated in *Energy Efficiency in the South* could reduce energy costs for Georgia consumers and could generate jobs in the State (Table 1). Residential, commercial and industrial consumers could benefit from total energy savings of $3.8 billion in 2020 ($2.1 billion of which is specific to electricity), and $6.8 billion in total energy savings in 2030. In comparison, Georgia spent $10.8 billion on electricity in 2007.[13]

Using an input-output calculation method from ACEEE – with state-specific impact coefficients and accounting for declines in employment in the electricity and natural gas sectors – we estimated that Georgia would experience a net gain of 32,200 jobs in 2020, growing to 43,100 in 2030. In comparison, there were 482,200 unemployed residents of Georgia at the end of 2009.[14]

As is true for the South at large, the policies would also lead to an increase in Georgia's economic activity. Specifically, its Gross State Product would increase by an estimated $70 million in 2020 and $94 million in 2030. This change is a small fraction of the Georgia's $398 billion economy.[15]

Table 1: Economic and Employment Impacts of Energy Efficiency

Indicator	2020	2030
Public Sector Policy Financial Incentives (in million $2007)	882	1,299
Private Sector/Household Productive Investment (in million $2007)	349	391
Change in Electricity Costs (in million $2007)	-2,070	-3,824
Change in Natural Gas Costs (in million $2007)	-341	-513
Annual Increased Employment (ACEEE Calculator)	32,200	43,100
Change in Gross State Product (in million $2007)	70	94

Conclusions

The energy-efficiency policies described in this report could set Georgia on a course toward a more sustainable and prosperous energy future. If utilized effectively, the State's substantial energy-efficiency resources could reverse the long-term trend of ever-expanding energy consumption. With a sustained and concerted effort to use energy more wisely, Georgia could grow its economy, create new job opportunities, and reduce its environmental footprint.

For more information on the methodology used to derive this state profile, please see *Energy Efficiency in the South*.

Acknowledgements

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Footnotes and References

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