



ENERGY EFFICIENCY IN THE SOUTH

APPENDIX G

STATE PROFILES OF ENERGY EFFICIENCY OPPORTUNITIES IN THE SOUTH: FLORIDA

Marilyn A. Brown,¹ Joy Wang,¹ Matt Cox,¹ Youngsun Baek,¹ Rodrigo Cortes,¹ Benjamin Deitchman,¹ Elizabeth Noll,¹ Yu Wang,¹ Etan Gumerman,² Xiaojing Sun²

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¹Georgia Institute of Technology

²Duke University

A Profile of Energy-Efficiency Opportunities in Florida

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 Florida’s residential, commercial and industrial sectors. 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 18 million people,² the State represents about 6.1% of the U.S. population, 5.3% of the nation’s Gross Domestic Product (GDP), and 4.5% of U.S. energy consumption (Figure 1).³ Thus, compared to the rest of the nation, Maryland has a lower than average level of energy intensity.ⁱ

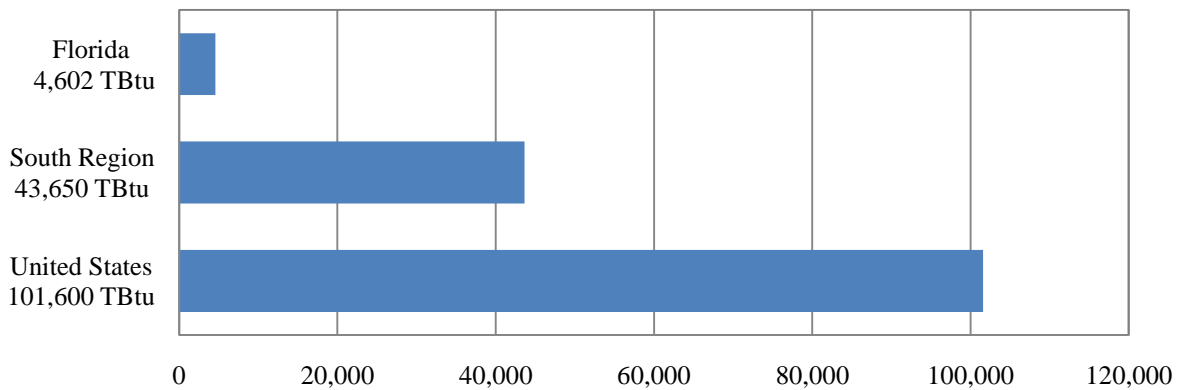


Figure 1: Energy Consumption in Florida, the South, and the U.S., 2007³

Florida’s industrial sector consumes a lower percentage of the State’s energy than the South or the nation (Figure 2). This contributes to Florida’s low per capita energy consumption,⁴ ranking 44th nationally.³

The State consumes more petroleum and other fuels, such as electricity imports, and relatively less coal than the South and the nation as a proportion of overall energy consumption (Figure 3). Florida’s electricity is largely generated from natural gas (39%), coal (34%), nuclear (15%), petroleum (<10%) and renewables (3%). Florida is also a national leader in generating electricity from unconventional sources like municipal solid waste and landfill gas.^{3,4}

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

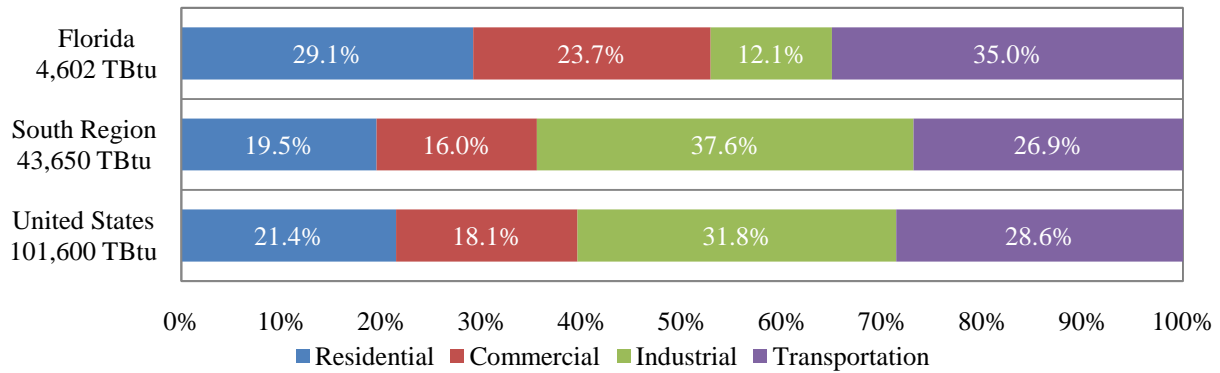


Figure 2: Energy Consumption in Florida, the South, and the U.S. by Sector, 2007³

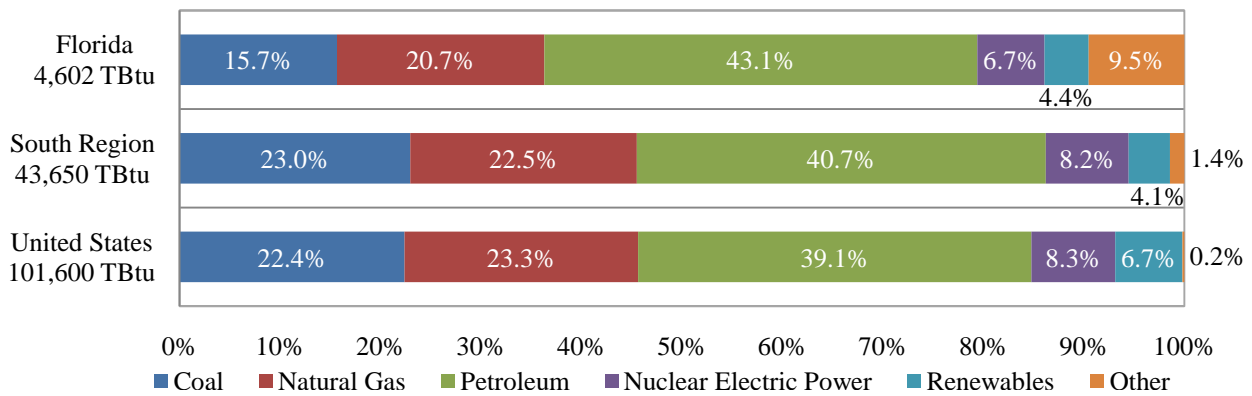


Figure 3: Energy Consumption in Florida, the South, and the U.S. by Fuel Type, 2007³

Florida has a number of energy efficiency policies already in place. For example, it has enabled municipalities to create property-assessed clean energy tax liens, a bond mechanism for financing energy-efficiency and renewable energy projects. The State also offers tax credits for commercial and industrial efficiency efforts, and recently updated both appliance and building codes. Utilities in Florida actively participate in promoting energy-efficiency, offering grants, low interest loans and rebates for all sectors. More state initiatives are described in recent Southern States Energy Board and National Association of State Energy Officials publications.^{4,5}

Nevertheless, the *2009 State Energy Efficiency Scorecard* from the American Council for an Energy-Efficient Economy suggests 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 Florida 23rd 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

In the *Meta-Review of Efficiency Potential Studies and Their Implications for the South*, Chandler and Brown (2009) reviewed five energy-efficiency studies that covered Florida. Electricity savings range from 10-11% from projected energy consumption under a “maximum achievable” scenario in two of these studies.⁷ Florida’s 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. In a 2007 Florida study, the ACEEE estimated energy efficiency and renewable energy policies could reduce peak demand in the state by 20 GW in 2023. An additional 9.6 GW reduction could be achieved with demand response efforts.⁸

Energy Efficiency Potential by Sector

The State’s total energy consumption (residential, commercial, industrial, and transportation sectors) is projected to increase 40% 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 Florida. Altogether, these policies offer the potential to reduce Florida’s energy consumption by approximately 16% of the energy consumed by the State in 2007 (or 740 TBtu in 2030) (Figure 4). This avoided consumption is equivalent to about. With these policies, Florida’s projected energy consumption could be constrained to modest growth. For complete policy descriptions, refer to *Energy Efficiency in the South* by Brown et al. (2010).

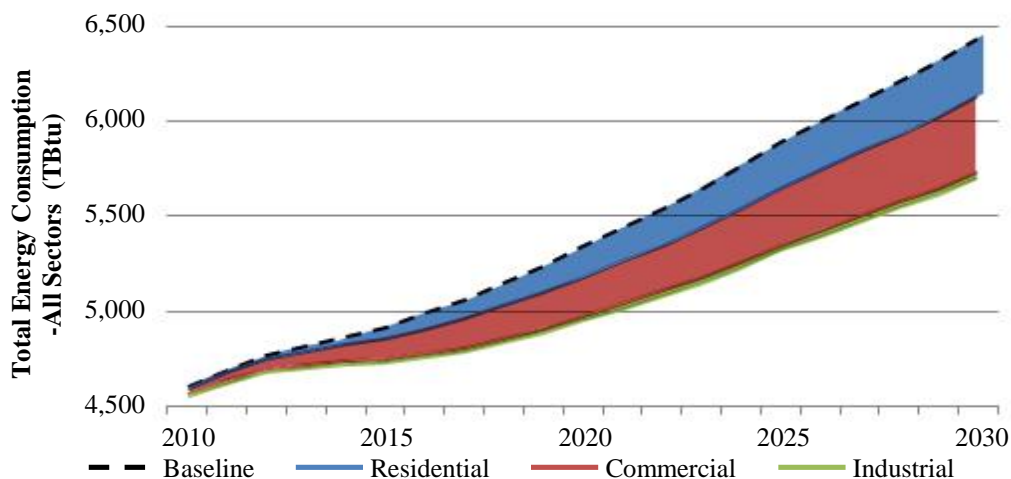


Figure 4: Energy Efficiency Potential in Florida

(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 Florida (Figure 5). In 2020, savings from all three sectors is about 9% (390 TBtu) of the total energy consumed by the State in 2007. Electricity savings constitute 380 TBtu of this amount. With

these policies, the electricity generated by a dozen 500-MW power plants in 2020 and 23 such power plants in 2030 could be avoided.⁹

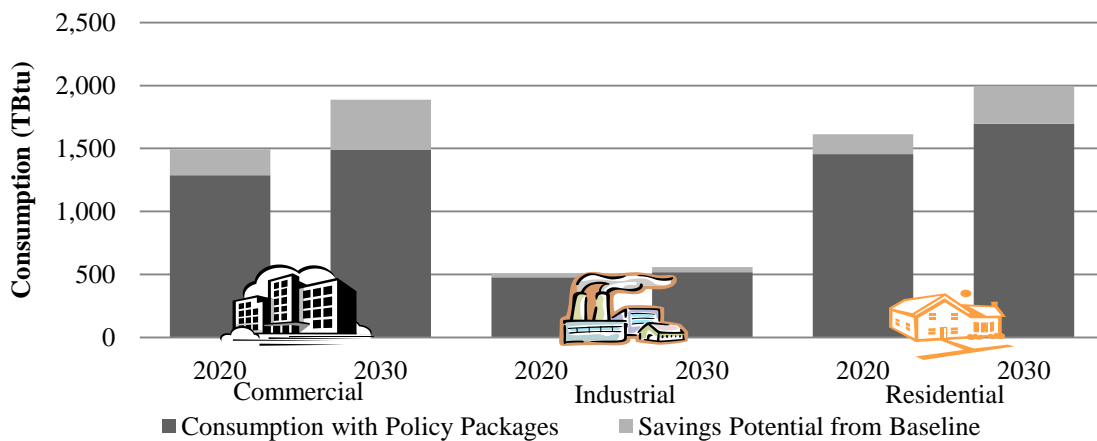


Figure 5: Energy Efficiency Potential by Sector in Florida, 2020 and 2030

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 Florida’s projected residential consumption by about 10% (160 TBtu) in 2020 and 15% (300 TBtu) in 2030 (Figure 6).

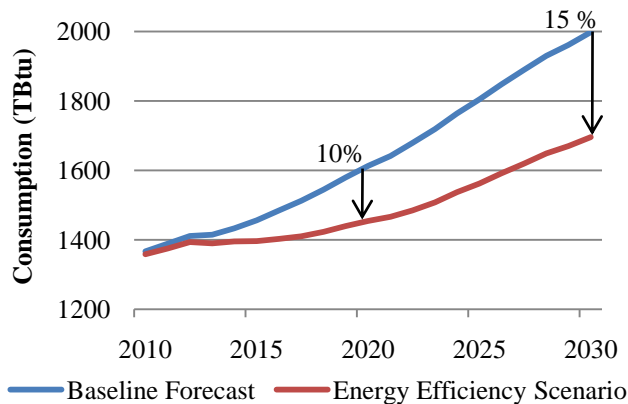


Figure 6: Residential Sector Savings

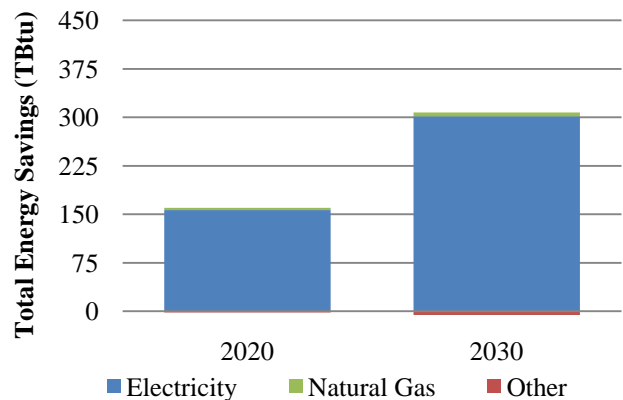


Figure 7: Residential Sector Savings by Fuel Type

In 2020, the residential energy required by about 840,000 Floridian households could be avoided by these policies, representing about \$328 in annual energy savings per household. The principal energy savings are from electricity, due in part to the limited use of heating fuels in Florida (Figure 7). With these policies, the projected growth of residential energy consumption could be approximately halved over the next two decades.

Commercial Sector

The implementation of appliance standards and retrofit policies in Florida’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 210 TBtu, which is equivalent to the amount of energy that 5,830 Wal-Mart stores spend a year. Each business in Florida could save \$66,000 on average.¹⁰ 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 Florida could be more than cut in half by these two energy efficiency policies.

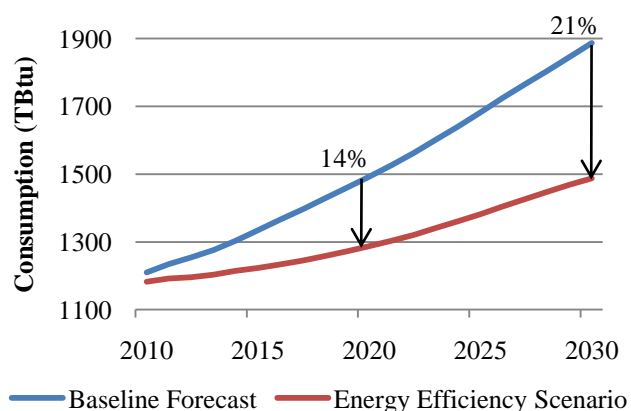


Figure 8: Commercial Sector Savings

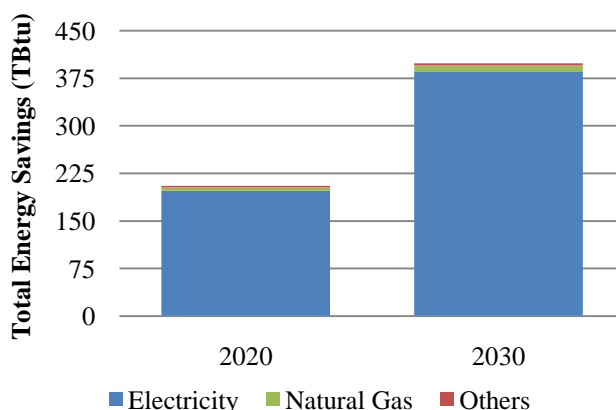


Figure 9: Commercial Sector Savings by Fuel Type

Industrial Sector

The implementation of plant utility upgrades, process improvements, and improved combined heat and power policies in Florida’s industrial sector can reduce projected consumption by about 6% (30 TBtu) in 2020 and 7% (41 TBtu) in 2030 (Figure 10). The industrial energy required by about 43 average industrial facilities could be avoided in 2020, roughly \$19,500 in annual energy savings per industrial facility. The principal energy savings are from electricity (Figure 11). These three energy efficiency policies could reduce the growing consumption of industrial energy projected over the next two decades.

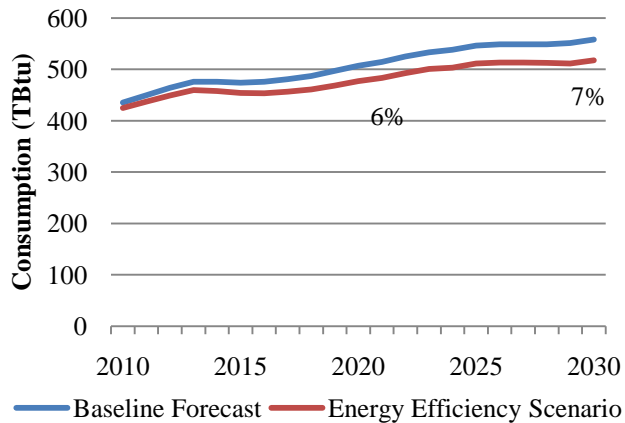


Figure 10: Industrial Sector Savings

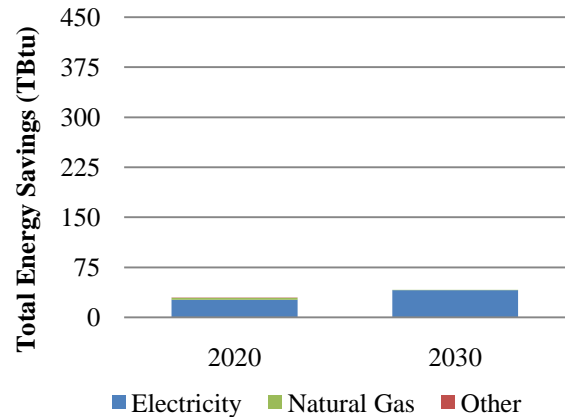


Figure 11: Industrial Sector Savings by Fuel Type

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%.¹¹

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.¹²

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.¹³

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

Box 1:

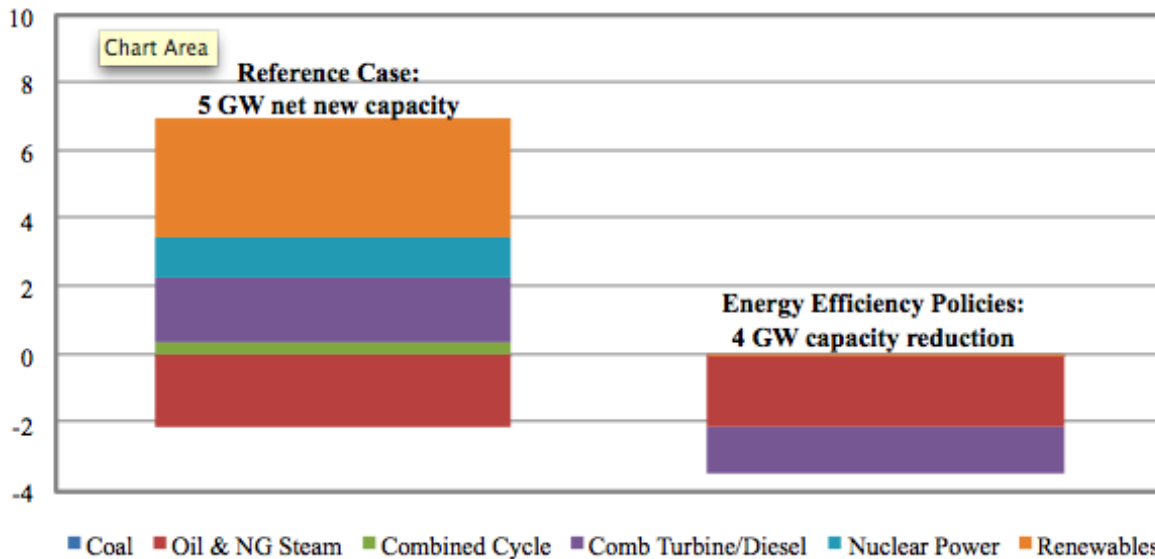
**The Impact of Energy Efficiency on Electricity and Water in Florida:
A 2020 Snapshot for the Florida Reliability Coordinating Council Region**

Electricity

Energy efficiency could significantly reduce Florida’s need for new electricity generation capacity in the next decade. With the suggested energy efficiency policies, a nearly 4 GW capacity reduction from 2010 levels could be achieved. The projected 5 GW of new net capacity in the reference case could be avoided with the energy efficiency policies.

These same policies could also alter the energy sources used for electricity generation in the State. In comparison to 2010 capacity, the reference case projects additional capacity for renewable, nuclear, combined turbine/diesel, and combined cycle generation in 2020. Both the reference and efficiency scenarios project a 2 GW reduction in oil and natural gas steam generation. The efficiency scenario also projects a 2 GW reduction in combined turbine/diesel generation.

Florida's New Capacity for 2020



Water

In the reference case, Florida is anticipated to consume 11.8 billion gallons of freshwater for electricity production in 2020, an increase of 5.1% from 2009. With the energy efficiency policies, freshwater consumption is reduced by 200 million gallons, representing a 1.7% decline from the reference case projection. However, in both cases, overall water consumption increases. Most of Florida’s water consumption for electricity production is ocean-supplied, reducing the strain on freshwater sources.

Economic and Financial Impacts

The nine energy efficiency policies evaluated in *Energy Efficiency in the South* would reduce energy costs for Florida consumers and could generate jobs in the State (Table 1). Residential, commercial and industrial consumers could benefit from total energy savings of \$7.4 billion in 2020 (\$3.9 billion of which is specific to electricity), and \$14.9 billion in total energy savings in 2030. In comparison, Florida spent \$23.9 billion on electricity in 2007.¹⁴

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 Florida would experience a net gain of 63,900 jobs in 2020, growing to 94,100 in 2030. In comparison, there were over 1 million unemployed residents of Florida at the end of 2009.¹⁵

As is true for the South at large, the policies would also lead to an increase in Florida's economic activity. Specifically, its Gross State Product would increase by an estimated \$514 million in 2020 and an increase of \$905 million 2030. This change is a small fraction of the Florida's \$736 billion economy.¹⁶

Table 1: Economic and Employment Impacts of Energy Efficiency

Indicator	2020	2030
Public Sector Policy Financial Incentives (in million \$2007)	1,790	2,899
Private Sector/Household Productive Investment (in million \$2007)	578	744
Change in Electricity Costs (in million \$2007)	-3,868	-8,073
Change in Natural Gas Costs (in million \$2007)	-549	-985
Annual Increased Employment (ACEEE Calculator)	63,900	94,100
Change in Gross State Product (in million \$2007)	514	905

Conclusions

The energy efficiency policies described in this profile could set Florida 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, Florida 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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