ENERGY EFFICIENCY IN THE SOUTH

APPENDIX G

STATE PROFILES OF ENERGY EFFICIENCY OPPORTUNITIES IN THE SOUTH: DELAWARE

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 Sun[2]

April 13, 2010

[1]Georgia Institute of Technology

[2]Duke University

A Profile of Energy-Efficiency Opportunities in Delaware

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 Delaware'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 SNUG-NEMS (National Energy Modeling System).[1]

With a population of 860,000 million people,[2] Delaware represents about 0.29% of the U.S. population, 0.44% of the nation's Gross Domestic Product (GDP), and 0.3% of U.S. energy consumption (Figure 1). Thus, compared to the rest of the nation, Delaware has a lower-than-average level of energy intensity (i.e., it consumes less energy per dollar of economic activity).

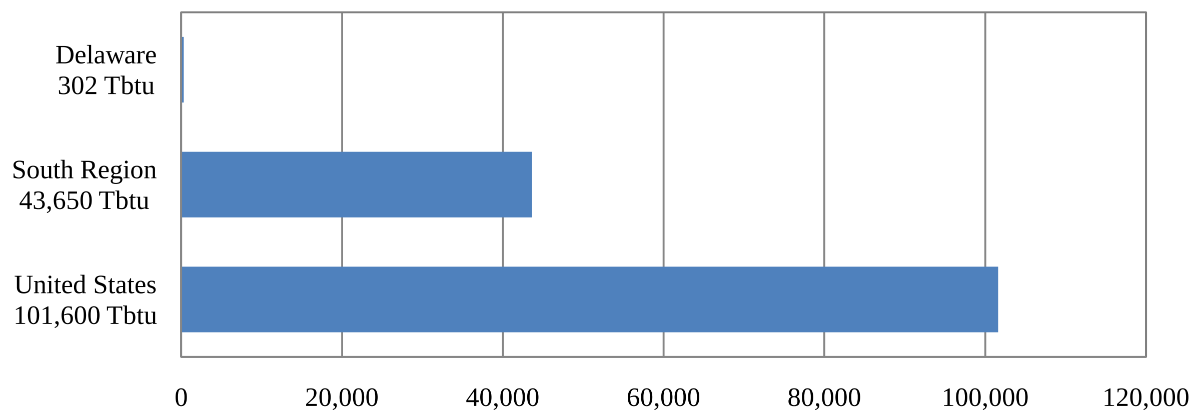

Figure 1: Delaware, South, and United States Energy Consumption, 2007[3]

Delaware's consumption of energy by sector is consistent with that of the South and US as shown in Figure 2. Delaware receives 16% of its energy from outside the state and consumes significantly less renewable resources for energy than the South and US (Figure 3). Delaware's per capita energy consumption is similar to that of the nation as a whole.[4]

Delaware has a restructured electricity market and the entire state is part of the PJM Interconnection. The state has a low level of generation capacity and its largest consumer of electricity is the industrial sector due to the manufacturing base in its economy.[5]

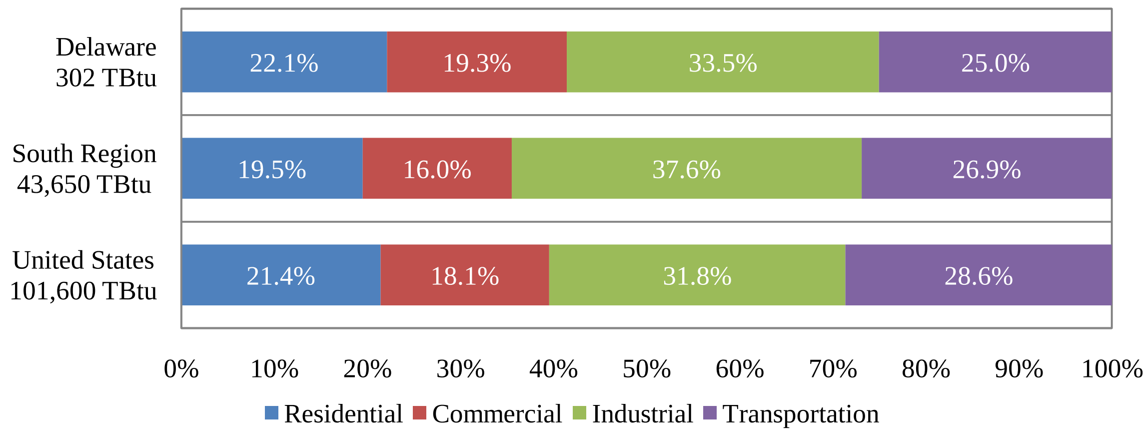

Figure 2: Delaware, South, and United States Energy Consumption by Sector, 2007[6]

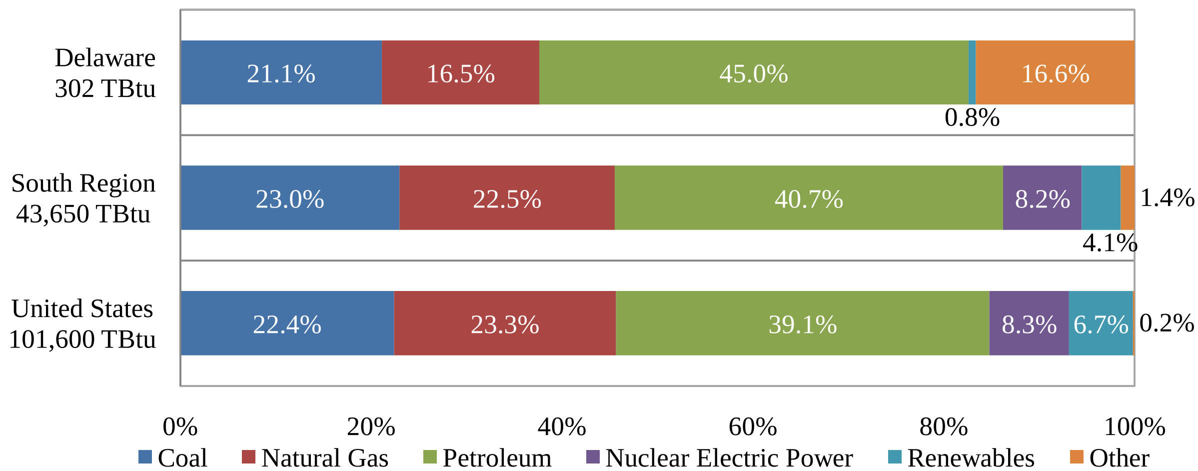

Figure 3: Delaware, South, and United States Energy Consumption by Fuel Type, 2007[7]

Delaware participates in the Regional Greenhouse Gas Initiative (RGGI), which is a cap and trade program among 10 Northeast and Mid-Atlantic States intended to reduce carbon emissions from power plants. Through the auction of CO_2 allowances, 65% of the state's proceeds are directed to the Sustainable Energy Utility, which is responsible for energy efficiency and renewable energy programs for households and businesses.[8]

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 Delaware 20th of the 50 states and DC for its adoption and implementation of energy-efficiency policies.[9] 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.

Chandler and Brown reviewed Delaware's energy-efficiency studies in the Meta-Review of Efficiency Potential Studies and Their Implications for the South (2009). There were not any state specific studies available for consideration in that report. Through extrapolation, that study found that Delaware could reduce its energy by 8% to 31% in 2030.[10]

Energy Efficiency Potential by Sector

The State's total energy consumption (residential, commercial, industrial, and transportation sectors) is projected to increase 6% from 2010 to 2030. This profile describes the ability of nine energy policies to accelerate the adoption of cost-effective energy-efficient technologies in the residential, commercial, and industrial sectors of Delaware. Altogether, these policies offer the potential to reduce Delaware's energy consumption by approximately 17% of the energy consumed by the State in 2007 (52 TBtu in 2030) (Figure 4). Delaware's projected baseline does not rise as significantly as other states in the South, however are consistent with the projections of neighboring states. With these policies, Delaware's energy consumption could drop well below its 2010 levels by 2030.

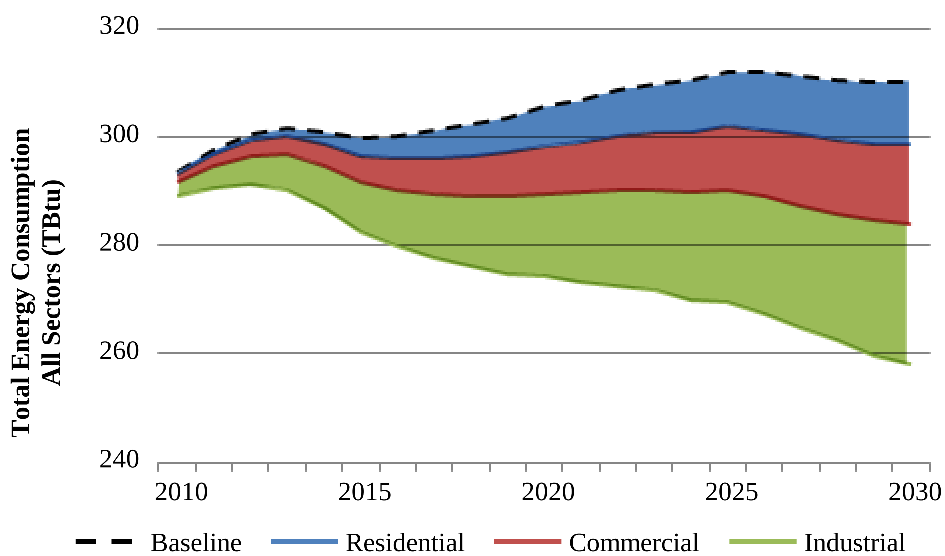

Figure 4: Energy Efficiency Potential in Delaware

The commercial and residential sectors offer the greatest energy efficiency potential in Delaware (Figure 5). In 2020, savings from all three sectors is about 9% (31 TBtu) of the total energy consumed by the State in 2007. Electricity savings constitute 20 TBtu of this amount. The energy-efficiency savings from the three sectors decrease the total projected consumption for the state by 10.3% in 2020 and 16.8% in 2030. With these policies, planners could avoid the construction of half a new power plant to meet growing demand by 2020.[11]

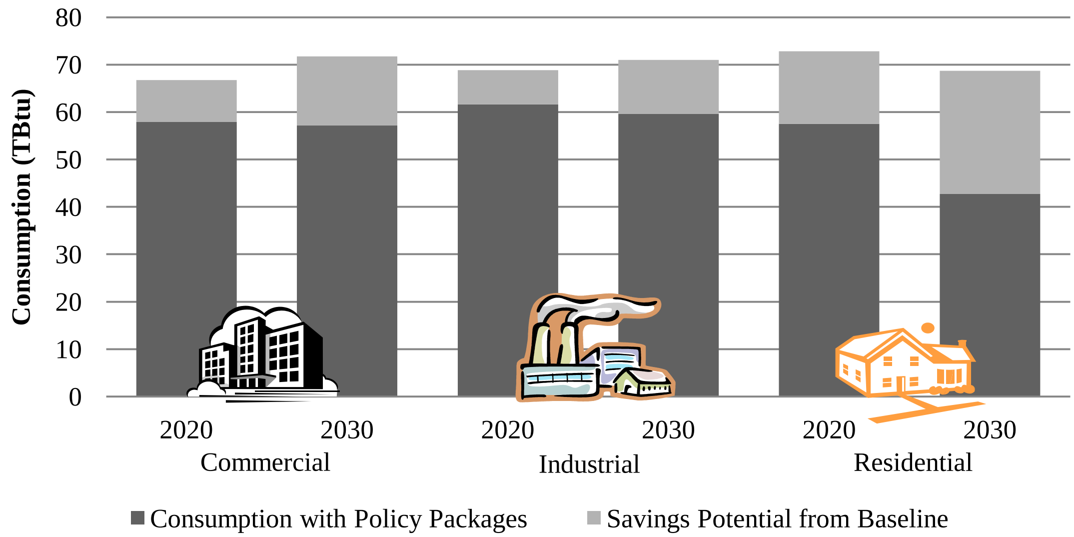

Figure 5: Energy Efficiency Potential by Sector in Delaware, 2020 and 2030

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 Delaware's projected residential consumption by about 11% (7 TBtu) in 2020 and 16% (11 TBtu) in 2030 (Figure 6).

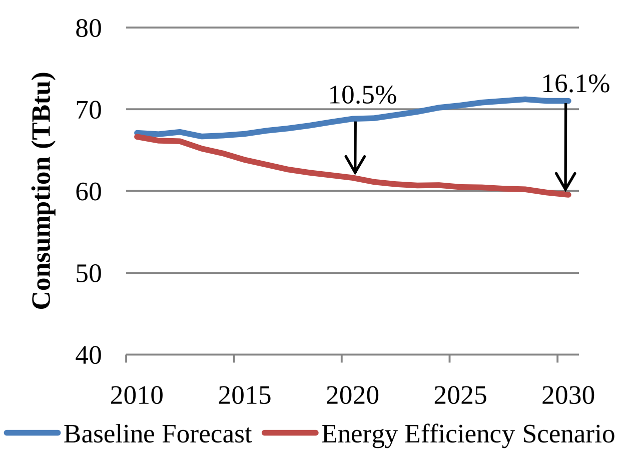

Figure 6: Residential Sector Savings

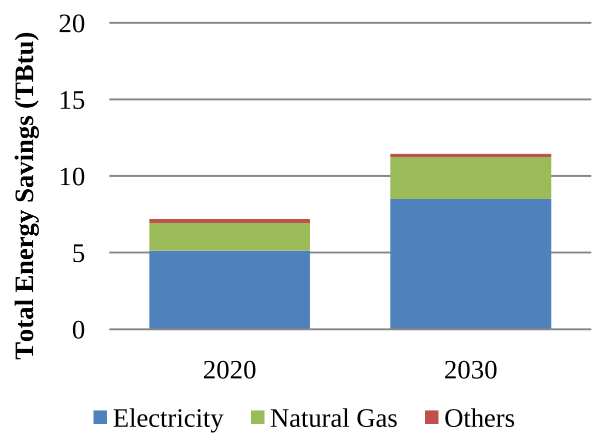

Figure 7: Residential Sector Savings by Fuel Type

In 2020, the residential energy required by about 35,000 Delaware households could be avoided by these policies, representing about $320 in annual energy savings 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 decrease as shown in Figure 6.

Commercial Sector

The implementation of appliance standards and retrofit policies in Delaware's commercial sector could reduce projected energy consumption in 2020 by approximately 13%, and by 20% in 2030 (Figure 8). In 2020, the commercial sector could save about 9 TBtu , which is equivalent to the amount of energy that 250 Wal-Mart stores spend a year. [1210] Each business in Delaware could save $58,000 on average. The principal energy savings are from electricity, (Figure 9). The growth of commercial energy consumption forecast for Delaware could be constrained with these two energy efficiency policies.

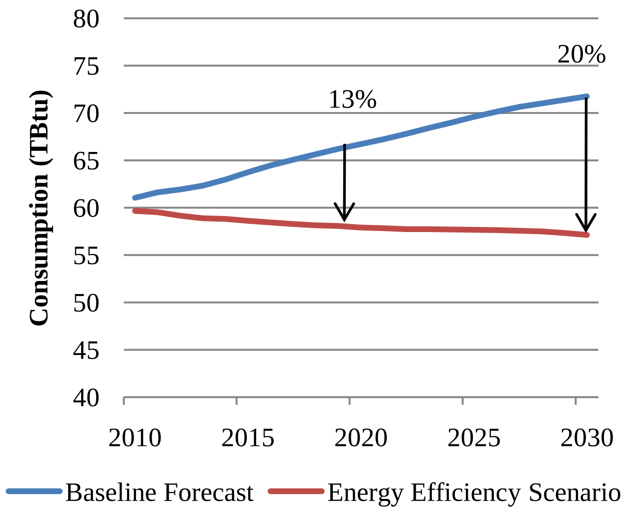

Figure 8: Commercial Sector Savings

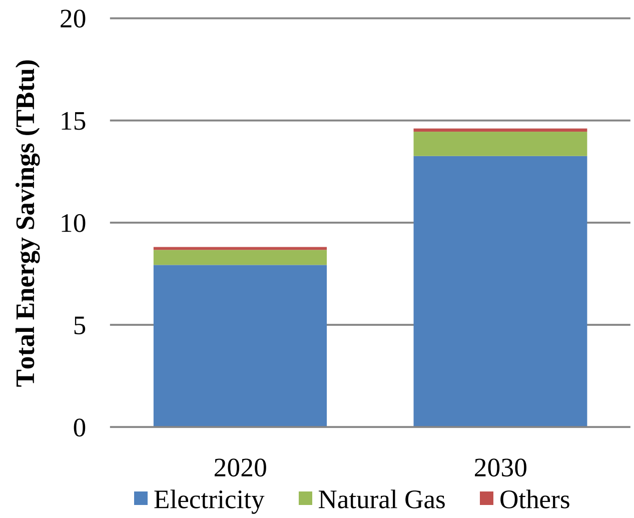

Figure 9: Commercial Sector Savings by Fuel Type

Industrial Sector

The implementation of plant utility upgrades, process improvements, and combined heat and power policies in Delaware's industrial sector can reduce projected consumption by about 21.0% (15 TBtu) in 2020 and 37.8% (26 TBtu) in 2030 (Figure 10). The industrial energy required by about 22 average industrial facilities could be avoided in 2020, roughly $70,500 in annual energy savings per industrial facility. The principal energy savings are from natural gas, but significant electricity savings could also occur (Figure 11). These three energy efficiency policies could significantly reduce the consumption of industrial energy over the next two decades.

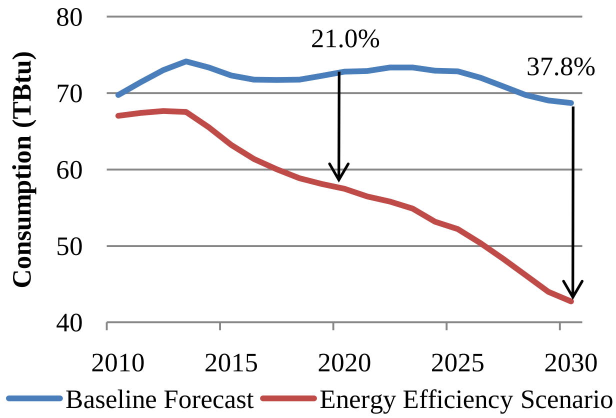

Figure 10: Industrial Sector Savings

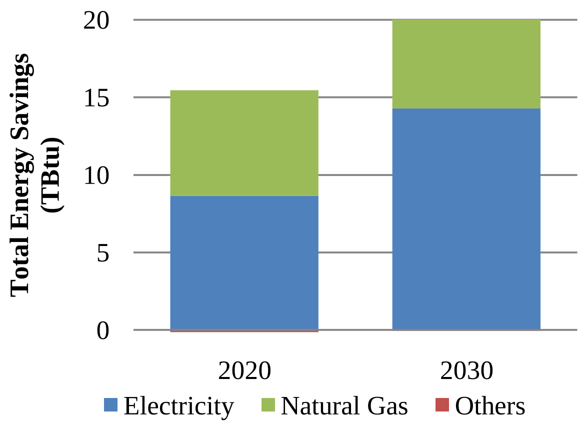

Figure 11: Industrial Sector Savings by Fuel Type

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 from 50-62% and pay back initial costs within three years. [13]

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.[14]

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.[15]

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 Delaware consumers and could generate jobs in the State (Table 1). Residential, commercial and industrial consumers could benefit from total energy savings of $376 million in 2020 ($200 million of which is specific to electricity), and $631 million in total energy savings in 2030. In comparison, Delaware spent $1.3 billion on electricity in 2007.[16]

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 Delaware would experience a net gain of 3,600 jobs in 2020, growing to 4,500 in 2030. In comparison, there were 37,600 unemployed residents of Delaware at the end of 2009.[17]

As is true for the South at large, the policies would also lead to an increase in Delaware's economic activity. Specifically, its Gross State Product would increase by an estimated $10 million in 2020 and by $14 million in 2030. This change is a small fraction of the Delaware's $60 billion economy.[18]

Table 1: Economic and Employment Impacts of Energy Efficiency

Indicator	2020	2030
Public Sector Policy Financial Incentives (in million $2007)	81	112
Private Sector/Household Productive Investment (in million $2007)	34	37
Change in Electricity Costs (in million $2007)	-200	-348
Change in Natural Gas Costs (in million $2007)	-33	-47
Annual Increased Employment (ACEEE Calculator)	3,600	4,500
Change in Gross State Product (in million $2007)	10	14

Conclusions

The energy efficiency policies described in this profile could set Delaware 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, Delaware 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
This study project is funded with support from the Energy Foundation (www.ef.org), the Kresge Foundation (www.kresge.org) and the Turner Foundation (www.turnerfoundation.org). The support of these three foundations is greatly appreciated.

Footnotes and References

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