Energy Efficiency: A Job Engine for Florida

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Abstract

This paper lays out five key energy efficiency policies that Florida can adopt to spur job growth across the state: setting energy efficiency targets for utilities, adopting state-level appliance standards, promoting the use of combined heat and power, updating building energy codes, and working with cities to benchmark large public and commercial buildings. Using the American Council for an Energy-Efficient Economy's (ACEEE's) dynamic energy efficiency policy evaluation routine (DEEPER) model, we evaluate the economic impacts spurred by each of these polices. We find that, combined, these policies could add more than 135,000 jobs to the Florida economy. For each policy, we offer examples of successful implementation and steps for adoption. We also discuss the potential economic impacts of electric vehicle adoption in Florida.

Introduction

Energy efficiency is an economic powerhouse. In 2017, energy efficiency added more jobs in the United States than any other part of the clean energy economy and employed more than twice as many workers as the ones who produce fossil fuels. Florida is home to many of these efficiency jobs, ranking fourth nationwide (E4TheFuture and E2 2018). Still, significant energy efficiency opportunities remain untapped in Florida. The state ranked 23rd in the American Council for an Energy-Efficient Economy's (ACEEE's) most recent *State Energy Efficiency Scorecard* and 36th for spending on utility-sector electric efficiency programs (Berg et al. 2018). Ramping up energy efficiency in the Sunshine State constitutes an important economic opportunity. That is because efficiency creates jobs both directly by employing workers to perform energy audits, manufacture efficient equipment, and install efficient appliances, and indirectly by generating bill savings that help grow the economy.

This paper lays out five key energy efficiency policies that Florida can adopt to spur job growth across the state:

- Set energy savings targets for utilities
- Adopt state-level appliance standards
- Promote the use of combined heat and power
- Update building energy codes
- Work with major cities to benchmark large public and commercial buildings

For each policy, we offer examples of successful implementation and steps for adoption. We also discuss the potential economic impacts of electric vehicle adoption in Florida.

Methodology

To determine policy opportunities for Florida, we drew from a variety of sources, including ACEEE's *2018 State Energy Efficiency Scorecard*, the State and Local Policy Database, and the experiences of peer states. For each policy, we calculated energy savings (including electricity and, where relevant, natural gas and water) then used average regional retail costs to convert these values to utility bill savings in dollars. We also calculated the costs of implementing each policy. We then used ACEEE's dynamic energy efficiency policy evaluation routine (DEEPER) model to evaluate economic impacts.

We limited our analysis to 10 years of policy implementation, tracking costs and benefits over the life of the efficiency measures installed between 2020 and 2030. Some of these extend well beyond that time frame as measures put in place in 2030 may last until 2050. We discuss the policies in the sections that follow. We provide assumptions underlying our calculations in Appendix A and more detail on the DEEPER model in Appendix B.

Policy Pathways and Results

We find that the set of five policies could create more than 135,000 jobs overall across the state of Florida. Setting energy savings targets for utilities would contribute the bulk of these jobs. We describe these impacts in more detail below.

SET ENERGY SAVINGS TARGETS FOR UTILITIES

Jobs Impact

Of the policy approaches we examined, setting efficiency targets for utilities creates the most jobs by far. Over the 30 years beginning in 2020, setting stronger energy savings goals would create enough economic activity in the state to support over 105,000 jobs.[1] On an undiscounted basis, the efficiency standards have a net benefit of over $14 billion and a benefit–cost ratio of 2.6 to 1.[2]

At their peak, in 2030, the efficiency standards create over 8,000 jobs in a single year, largely from increased demand for workers to implement the efficiency improvements. Job creation is also spread throughout most of the state economy due to energy savings for both residential and commercial electricity customers.

Policy Description

This policy scenario assumes that Florida follows the same target-setting pathway laid out by Arkansas: set energy savings requirements for electric utilities at 0.25% of retail sales in 2020 then ramp up by 0.25% per year for three years to reach 0.75% in 2022 and 2023, rise to 0.90% in 2024 and 2025, and then level out at 1% savings per year for 2026 through 2030.[3]

Appendix A provides additional information on key assumptions for this analysis.

Policy Background

An energy efficiency resource standard (EERS) is one of the most effective ways to achieve and maintain long-term energy savings in the utility sector through implementation of efficiency programs for customers. EERS policies set long-term electric or natural gas energy savings targets for utilities or third-party program administrators within a state. The first EERS was adopted by Texas in 1999. Since then, 26 other states have adopted targets (Berg et al. 2018). EERS models vary by state but share several common features: clear, mandatory, long-term targets (3+ years) for electricity or natural gas savings with the financial backing to support efficiency programs needed to achieve the targets. EERS policies often include incremental savings targets (i.e., 1–2% per year). Some also set cumulative targets (i.e., 20% by 2025). More recently, states have begun exploring models that set multiple goals (Molina 2018). In 2017, all of the top 14 energy-saving states had an EERS (Berg et al. 2018).

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[1] Here and throughout this report, when discussing job creation, we mean a full-time job-year equivalent (i.e., enough work to employ one person full time for a year). This may be split between multiple workers working part-time jobs. We use the term *job* rather than the more unwieldy, but more accurate, *full-time job-year equivalents*. In addition, when reporting job impacts, unless otherwise specified, we are reporting net job creation, which accounts for both the positive impacts of the policies we assess and any negative impacts they might have, including job losses in energy-producing sectors resulting from reduced energy demand.

[2] Unless otherwise indicated, all dollar values are in inflation-adjusted 2017 dollars.

[3] Note that this pathway is somewhat more conservative than the Arkansas model. In 2018, Arkansas regulators approved an energy savings goal of 1.2% for the period 2020–2022.

Because they go beyond annual program planning, EERS policies help utilities incorporate energy efficiency into their long-term integrated resource plans (IRPs). Multiyear targets also provide regulatory certainty for utilities. EERS policies are typically coupled with utility business model adjustments that incentivize utilities to invest in energy efficiency. Many states also have decoupling mechanisms in place to remove the throughput incentive—the connection between utility profits and increased energy sales. This allows utilities to accept EERS policies without fearing for their revenues. More information on these policies can be found in ACEEE's State Policy Toolkit (ACEEE 2019).

Florida does not have an EERS in place. The Florida Energy Efficiency and Conservation Act (FEECA) requires the Florida Public Service Commission (PSC) to establish energy and peak demand savings goals every five years. FEECA also requires affected utilities to establish and implement energy efficiency programs.[4] However, in recent years, the Florida PSC has lowered goals to almost negligible levels (ACEEE 2018e). Electricity savings goals for the 2014–2019 period were only 7% of those in the previous planning cycle (Florida PSC 2014). As a result, only five states saved less electricity than Florida in 2017 (Berg et al. 2018).[5]

Key Steps for Establishing an EERS in Florida

Every five years, the Florida Public Service Commission reviews its energy savings targets and efficiency programs and establishes new goals. The next round of goal setting for utilities occurs in 2019. The results of this process will have a significant impact on customer bill savings and job creation across the state.

Florida could use the framework under FEECA and follow a pathway similar to the one laid out in Arkansas: begin with targets of 0.25% electricity savings as a share of total retail sales for electric utilities, ramp up by 0.25% per year, then level off at 1%. Utility budgets should be sufficient to reach these savings goals.

No single EERS model fits every state and utility. However best practices can help guide Florida and its utilities with implementation and success (Downs and Cui 2014). First, policies should lay out targets that include efficiency programs for all residential, commercial, and industrial customers, with provisions to ensure hard-to-reach and low-income customers are adequately served. Second, Florida should plan for ramp-up periods that give program administrators time to adjust to new energy savings targets and account for regulatory lag. Third, the state should encourage utilities to use complementary policies such as performance incentives and decoupling to achieve savings. Fourth, Florida should set challenging targets and allow a range of eligible savings measures to capture all cost-effective efficiency available. Fifth, Florida should include stakeholders in efficiency planning to ensure smooth regulatory and legislative processes. Finally, clear, transparent, and consistent cost-effectiveness tests should be used in the portfolio planning process.

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[4] The seven utilities subject to FEECA are Florida Power & Light Company, Duke Energy Florida, Tampa Electric Company, Gulf Power Company, Florida Public Utilities Company, Orlando Utilities Company, and JEA.

[5] Savings are ranked as a percentage of total retail sales.

ADOPT STATE APPLIANCE AND EQUIPMENT STANDARDS

Jobs Impact

In our analysis, state-level appliance and equipment standards create an additional 25,000 jobs between 2020 and 2040. These are driven entirely by the energy and water savings generated by more-efficient equipment.

Policy Description

Under this policy scenario, Florida adopts state-level standards for 21 appliances recommended by the Appliance Standards Awareness Project (Mauer et al. 2017). These standards include faucets, showerheads, lawn spray sprinklers, toilets, computers and monitors, high color-rendering-index (CRI) fluorescent lamps, air purifiers, pool pump replacement motors, commercial fryers, commercial dishwashers, commercial steam cookers, portable air conditioners, urinals, audio/video equipment, uninterruptible power supplies, telephones, water coolers, ventilation fans, portable electric spas, heated food-holding cabinets, and compressors. We provide more information on policy assumptions in Appendix A.

Background Information

Appliance and equipment efficiency standards have been one of the most successful policies used by states and the federal government to save energy and reduce utility bills. These standards set minimum efficiency requirements for certain product categories to be sold in the state. The least efficient products are thereby phased out of the market, leaving a wide range of more-efficient products for consumers to choose from. Appliance standards eliminate products with burdensome operating costs while spurring manufacturers to innovate with improved performance in mind.

Current national standards cover approximately 60 categories of products, including home appliances, cooling and heating equipment, and lighting (Stickles et al. 2018). California leads the way in raising and adopting state standards on other products, but states such as Arizona, Texas, and Vermont have also put standards in place (ASAP 2018a). States like Georgia, meanwhile, have targeted water shortages by adopting standards for plumbing products. These standards also have associated energy savings. Florida does not have standards in place beyond those set by the federal government (ACEEE 2018e). However Florida does have a history of setting its own standards. For example, Florida joined with several other states in the 1970s and 1980s to set refrigerator standards, ultimately leading to adoption of a national refrigerator standard in 1987 (ASAP 2018b). During this period, Florida also adopted standards covering central and room air conditioners (Battles 2008).

Key Steps for Adopting Appliance Standards in Florida

Federal appliance and equipment standards are already saving energy and creating jobs in Florida. These savings and job numbers can significantly increase if Florida adopts standards beyond those required by the federal government. To do so, Florida would need to pass legislation to set stronger standards. The Appliance Standards Awareness Project (ASAP) offers several resources for states, including calculations of potential savings from adoption of state standards. ASAP also works directly with state agencies and lawmakers to craft the legislative and regulatory language needed to adopt standards (ASAP 2018a).

PROMOTE COMBINED HEAT AND POWER

Jobs Impact

Increased use of combined heat and power (CHP) is a more modest job creator, adding an additional net 2,300 jobs to the state economy from 2020 to 2030. CHP delivers a net savings to the commercial and industrial sectors of more than $160 million over 10 years. However a significant portion of those savings is spent on material and other parts of the supply chain that come from out of state, lowering the in-state employment impacts.

Policy Description

This policy scenario outlines the adoption of 240 megawatts (MW) of CHP in Florida between 2020 and 2030.[6] Florida can implement a suite of policies to achieve this goal, including clarifying CHP eligibility in interconnection standards, setting production goals for CHP, offering incentives for CHP deployment, working with utilities to include CHP in their portfolios, and setting goals for CHP as a resilience strategy in critical facilities. We list additional assumptions in Appendix A.

Background Information

CHP systems produce significant efficiency improvements in electricity generation by harnessing the energy wasted in conventional generation. CHP systems can operate at efficiency levels as high as 80%; conventional systems usually run at about 45% efficiency (ACEEE 2018b). More important, CHP has significant resilience benefits. While CHP can serve as a baseload resource, it can also ensure an uninterrupted power supply even when the electrical grid is down. This provides assurance that critical facilities such as hospitals, nursing homes, and places of refuge can continue to operate in emergency situations. CHP can also act as a flexible resource by supporting key grid services and balancing demand distributions, thus helping to minimize system costs and maximize customer benefits.

CHP is widely used in industrial and manufacturing facilities, at large institutional sites (e.g., universities and military bases), and recently in commercial buildings with continuous thermal loads (e.g., hospitals, casinos, multifamily buildings). As of 2016, over 82 gigawatts (GW) of CHP capacity existed at more than 4,400 of these locations across the United States (ACEEE 2018a). In Florida, CHP supplies power at 62 sites, accounting for more than 2,700 MW of capacity (DOE 2019). However no new systems were installed in Florida in 2017, due largely to utility policies that discourage their expansion and lack of policies that support their use.

Florida has an incentive program that exempts CHP equipment from the state's sales and use tax but otherwise has limited policies to encourage CHP development. The last time a policy update affected CHP was in 2008 when the Florida Public Service Commission adopted its rules for interconnection standards and net metering. However these rules do not clearly define CHP as eligible for interconnection or net metering (ACEEE 2018e).

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[6] We estimate that 240 MW is achievable potential for Florida. Appendix A provides more details on assumptions.

Key Steps for Promoting CHP in Florida

Currently in Florida, new CHP projects that are non-PURPA-qualifying facilities are illegal unless owned by a regulated utility (Elliott et al. 2007).[7] This poses a significant barrier to CHP deployment across the state. Florida also lacks defined interconnection policies and net metering rules with regard to CHP, creating uncertainty and limiting the economic feasibility of potential CHP projects. Removing some of these barriers would help encourage CHP implementation and deployment.

CHP deployment in the state can be increased in a number of ways. The Public Service Commission can define interconnection standards to allow non-utility-owned CHP systems to connect to the grid. The Institute of Electrical and Electronics Engineers (IEEE) standards establish specific parameters and procedures for connecting to the grid and can be used as a model to simplify transactions and lower capital and transaction costs for project developers and owners (IEEE 2018).

Utilities also have a role to play in expanding CHP across Florida. Putting CHP on the same playing field as traditional supply-side resources would better integrate the technology into system planning and energy resource acquisition efforts, thus encouraging its deployment. One of the best ways to do this is to include CHP in state energy efficiency goals and utility plans and programs. For example, Florida could incorporate CHP into an integrated resource plan (IRP) or make CHP an eligible technology in an EERS or as a separate tier of savings requirements. The state could also develop programs that acquire CHP resources, establish production goals, or offer revenue streams.

Deployment incentives, such as investment tax credits or installed capacity credits, could help encourage CHP deployment in Florida. Incentives should apply to all CHP, regardless of fuel, and in both the commercial and industrial sectors. Other potential incentives could include loans, loan guarantees, project grants offered by the Office of Energy, or net metering standards. CHP should also be embraced as a resilience technology and be included in state resilience planning efforts.

UPDATE BUILDING ENERGY CODES

Jobs Impact

Our analysis indicates that implementing more-advanced building codes would increase employment in Florida by more than 2,000 net new jobs over 20 years. These job gains are spread throughout the economy, resulting mainly from energy savings that are enjoyed by households and businesses and spent on other job-creating goods and services.

Policy Description

Under this policy scenario, Florida commits to adopting new statewide building energy codes for commercial and residential new construction within one code cycle of their publication by the International Code Council. Florida-specific amendments should deliver

[7] PURPA-qualifying facilities are generating facilities that meet the goals of the Public Utility Regulatory Policies Act of 1978 and receive special rate and regulatory treatment.

energy savings at least as great as those associated with the base code, and all municipalities should adopt and enforce the code in a timely fashion. Appendix A provides more information on policy assumptions.

Background Information

Buildings use 74% of the electricity and 41% of the total energy in the United States (ACEEE 2016). Updating and complying with building energy codes is one of the most cost-effective methods to help reduce energy waste in buildings and save consumers money. Building energy codes set minimum energy efficiency performance levels for new and renovated residential and commercial buildings. Most building energy codes are set by states and are based on model codes, including the International Energy Conservation Code (IECC) for residential buildings and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 for commercial buildings. The US Department of Energy (DOE) frequently updates model codes to achieve higher levels of cost-effective energy savings. As the new codes are finalized, states typically adopt them or their own state-specific equivalent. Updating building codes also improves resilience, as the new codes allow buildings to adapt with the surrounding communities as they change (ICC 2018). Building thermal performance, a factor directly influenced by building energy codes, is an important indicator of energy resilience. Improved building envelopes can increase energy efficiency and make homes and buildings more comfortable during power outages by maintaining comfortable temperatures for longer periods.

In the past 15 years, model building codes have led to significant energy savings due to better and more-cost-effective technologies and construction methods. For residential buildings, the 2012 IECC update provided about 30% in savings in covered energy use compared to the 2006 IECC. For commercial buildings, ASHRAE 90.1 achieved similar savings in the 2013 update compared to the 2004 edition (ACEEE 2016). Average energy use per household has decreased even though house size and appliance use have both increased (Ungar 2016). Almost every state has adopted some edition of the IECC and ASHRAE 90.1 codes. Some states, including Iowa, Maryland, Minnesota, and Nevada, review and adopt the new updates as soon as they are released (Berg et al. 2018).

Florida law requires that all new buildings and renovations, both residential and commercial, comply with the sixth edition (2017) Florida Building Code. The Florida Building Commission certified in letters to the US Department of Energy that the new code meets or exceeds 2015 IECC standards (DOE 2018a). In addition, the Florida Energy Efficiency and Conservation Act of 1980 established regulatory guidelines requiring significant utility involvement in supporting building energy code compliance, among other actions that will help save energy. Florida cities also play an important role in code compliance and can leverage state resources for providing training and outreach for code officials.

Key Steps for Updating Building Codes in Florida

Florida has a track record of maintaining up-to-date building energy codes. In 2008, the state enacted HB 697, which outlined the state legislature's mandate to select the most current version of the IECC as a foundational code (DOE 2018a). Going forward, maximizing the energy savings, resilience, and jobs impacts of building energy codes will require regular updates that ensure building codes meet or exceed the most recent IECC updates. This means adopting a new code every three years and ensuring that energy savings increase with each iteration.

On December 1, 2017, the Florida Building Code sixth edition, equivalent to 2015 IECC standards, went into effect. The Department of Business and Professional Regulation is overseeing a 2020 update to the code, a process led by the Florida Building Commission (Florida DBPR 2018a). The chairman is appointed by the governor and has the authority to appoint additional members to the commission (Florida DBPR 2018b). Maximizing job creation from this policy requires that future updates deliver energy savings at least as great as those of the national model codes.

Ensuring strong codes going forward can include both legislative and regulatory pathways. The state legislature can direct the commission to undertake timely code updates. The governor can ensure that commission members are committed to developing state-specific amendments that strengthen, rather that weaken, energy savings requirements.

Benchmark Building Energy Use

Jobs Impact

Benchmarking energy use in commercial buildings is also a modest job creator, adding about 1,000 net new jobs statewide from 2020 to 2030. As modeled, the policy generates net savings in commercial buildings of roughly $50 million and has an undiscounted benefit–cost ratio of 1.3.

Policy Description

In this policy scenario, the state works with large metro areas to implement a benchmarking and transparency requirement for commercial buildings over 50,000 square feet. According to an evaluation report by Mims et al. (2017), benchmarking is associated with energy savings of 1.6–14%. We assume that savings of 7% are realized. We provide additional assumptions in Appendix A.

Background Information

Building energy benchmarking is the practice of comparing a building's energy performance to itself, similar buildings, or modeled simulations of a reference building to make energy performance improvement more transparent. Increasing awareness of energy use, and subsequently waste, helps building owners identify where the most significant energy losses are coming from and upgrade those areas to decrease loss and increase savings. Building upgrades and investments can also increase occupant comfort and property values. State and local governments, property owners, and facility operators, managers, and designers can use benchmarking to improve building performance over time by facilitating energy accounting and quantifying and verifying energy savings. Property managers overseeing multiple properties can use benchmarking data to identify buildings with the greatest potential for cost-effective energy savings upgrades.

Many states implement benchmarking as a lead-by-example strategy, targeting energy savings in state buildings while demonstrating the feasibility and impact of energy efficiency programs to the community. Benchmarking policies can also unleash the power of data in the private sector. State and local governments can require residential and commercial building owners to benchmark and disclose a building's energy use, allowing residents and tenants to see their own energy use and determine ways to decrease costs.

According to the *2018 State Scorecard*, 39 states, including the District of Columbia, have a public building benchmarking requirement (Berg et al. 2018). In addition, 10 states have a mandatory building energy disclosure policy in place, ranging across sectors, and 8 states have some form of voluntary benchmarking and data use program for consumers and building owners to access (ACEEE 2018d). Many states also track their energy use data through the Environmental Protection Agency's (EPA's) ENERGY STAR® Portfolio Manager, while some use another or have created their own data collection platforms (ACEEE 2018f).

In Massachusetts, the Low-Income Energy Affordability Network benchmarked 75% of its affordable multifamily housing stock and used the data to qualify buildings for program incentives (Krukowski 2014). Kentucky tracks real-time energy usage in state buildings and makes these data available through a public-facing dashboard. To date, the Commonwealth Energy Management and Control System (CEMCS) accounts for 164 buildings and more than 10 million square feet (Berg et al. 2018).

In Florida, buildings of 5,000 square feet or greater owned or leased for state business are required to collect energy use and cost data and report it to the Department of Management Services for benchmarking. In 2018, the Florida Office of Energy reported having benchmarked 20% of state-owned or leased facilities with more than 5,000 square feet of air-conditioned space. The city of Orlando also benchmarks energy use across its municipal buildings and privately owned commercial buildings over 50,000 square feet (IMT 2019).

Key Steps for Promoting Building Benchmarking in Florida

Florida has already built the foundation for benchmarking in its lead-by-example programs. Expanding to the private sector could take several forms. A benchmarking requirement passed through the legislature would maximize participation. Florida could expand Orlando's policy to other large cities, requiring existing commercial and multifamily buildings larger than 50,000 square feet to track whole-building energy use. Building owners would report energy use data annually and make their information transparent to the real estate marketplace. In Orlando, the policy covers less than 5% of the city's buildings but accounts for more than 50% of total energy and water used by all buildings citywide.

The state could also work with municipalities to encourage benchmarking by offering financial incentives, creating competition, or providing technical assistance.

Utilities also have an important role to play in facilitating benchmarking for multitenant buildings. Utilities can simplify the process of obtaining data for benchmarking by aggregating energy usage data within a building. This protects the personal information of those within the building while still providing the building owner with data to be used in upgrading. Utilities can also offer programs like retrocommissioning and custom options for large buildings. A state agency overseeing the benchmarking program could help channel participants into these programs.

ELECTRIC VEHICLE ADOPTION

Economic Impact

The electric vehicle (EV) market is still nascent, and key factors, such as vehicle costs and adoption rates, as well as charging infrastructure needs and costs, all have a relatively high degree of uncertainty.

Our initial assessment of increased EV adoption indicates that it is likely to generate significant savings for energy consumers, with a benefit–cost ratio of 1.7. The size of the employment impact on the state will depend largely on questions around what time of day charging is likely to take place, which in turn impacts whether the increased electricity demand is met by in-state generators or imports from other states.

At the same time, reduced gasoline sales would have a negative impact on gasoline production, delivery, and retail sales in the state, though the nature of this impact depends greatly on how the public charging infrastructure is developed. Whether public charging stations are linked to retail stores, for example, will largely influence whether EV adoption increases or decreases sales in the retail sector, which is a significant part of the current gasoline station business model.

These questions and others, such as the location of future electric vehicle, vehicle parts, and charging station manufacturers, are difficult to predict and will also have significant impacts on job creation in the state. Given the wide range of uncertainties and the fact that the ultimate impact could be positive or negative, depending on how these uncertainties resolve themselves, we chose not to make an employment forecast.

Background Information

Electric vehicles can significantly decrease transportation-sector energy use in Florida while also reducing harmful pollution and improving public health.[8] Electric vehicle sales are growing—up 38% from 2016 to 2017 and an additional 32% the following year (Miller, Morris, and Masur 2018). This growth can be attributed to several factors, including EV cost reductions, battery improvement, and state policies that encourage purchase of high-efficiency vehicles (Khan and Vaidyanathan 2018). However several barriers to adoption exist. Electric vehicles still have higher upfront costs, charging infrastructure may be unavailable or inaccessible, and range is limited.

States have worked to expand charging options in various ways. Many have set targets or made public commitments to increase EV sales. Eight states have signed a memorandum of understanding (MOU) that commits to putting a combined 3.3 million electric vehicles on the road by 2025 (Multi-State ZEV Task Force 2019). Under a separate effort, in 2017 the governors of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming signed an MOU establishing a coordination group under the Regional Electric Vehicle Plan for the West (REV West) framework (Arizona et al. 2017). The group was charged with determining best practices for enhancing EV adoption, creating voluntary

[8] Electric vehicles took the top spots in ACEEE's 2019 ranking of energy-efficient vehicles on GreenerCars.org.

minimum standards for charging stations, identifying opportunities to incorporate charging stations into building codes and metering policies, and working with EV manufacturers to stock and market EVs.

Some local efforts in Florida are aimed at promoting the purchase of electric vehicles. JEA offers rebates for plug-in electric vehicles, and customers of Duke Energy and Orlando Utilities Commission are eligible for rebates for new Nissan Leafs (NCSL 2017). Florida has no statewide incentives for high-efficiency vehicles (ACEEE 2018e).

Key Steps for Increasing Electric Vehicle Adoption in Florida

Florida can follow the lead of states involved in regional coordination and develop an electric vehicle action plan. The plan could set targets for EV adoption within the state and include implementation strategies like requiring automakers to ramp up production of zero-emission vehicles to account for a certain percentage of sales.

The state also can direct funds from the Volkswagen settlement agreement, which includes a pot of money specifically for state EV activities, toward the deployment of EV charging infrastructure. Florida can also use these funds to lower the upfront costs of EVs or offer tax incentives beyond those offered by the federal government.

Working with utilities will be critical to better integrate electric vehicles into the grid. Utilities can also offer EV-specific time-of-use rates that encourage overnight charging of electric vehicles (or, alternatively, charging when afternoon solar power is abundant). They can use smart meters to vary charging activities in real time to optimize outcomes for customers and the grid. Some states have also explored utility investment in charging infrastructure in cases where these investments can deliver public benefits (Khan and Vaidyanathan 2018). Duke Energy is already taking steps to add EV infrastructure to its service territory, announcing a plan to roll out more than 500 charging stations in its service territory (Duke Energy 2018). Florida stakeholders, including utilities, local governments, businesses, and nonprofits, also collaborate on EV issues through Drive Electric Florida (DEF 2019).

Conclusion

Energy efficiency can spur substantial job growth in Florida while also delivering other benefits like resiliency and cleaner air. However increasing statewide energy savings and making these outcomes a reality will require commitment from policymakers. Of all the strategies we examine, expanding utility efficiency programs would have by far the greatest employment impact. The other policies show positive, but more modest, jobs results. Overall, energy efficiency has the potential to create 135,000 jobs in Florida by 2030.

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Appendix A. Key Policy Assumptions and Data Inputs

ENERGY EFFICIENCY RESOURCE STANDARD

This policy applies to the electric sector only. Florida electricity sales are from EIA 861. An applied growth rate of 0.04% is based on the Energy Information Administration's (EIA's) *Annual Energy Outlook* (AEO) *2018* reference case projected growth rate for the South Atlantic region. Energy savings are set at 0.25% of retail sales of covered utilities in 2020, 0.50% in 2021, 0.75% in 2022 and 2023, 0.90% in 2024 and 2025, and 1% for 2026 onward. The policy applies only to utilities covered by FEECA with retail sales of more than 2,000 gigawatt-hours (GWh). Energy savings are apportioned into two sectors (residential and commercial/industrial) based on EIA 861 sectoral sales data. Costs are calculated using national-average sector costs for utilities and customers from Hoffman et al. (2015). We assess the impacts of 10 years' worth of an efficiency standard. That is, our analysis assumes that the policy is in place for 10 years and is not in place beyond that. However, once put in place, energy efficiency measures typically continue to return savings for some time. In the case of the efficiency standard, we assume that the resulting measures have an average life of 10 years. This means that the efficiency returns decline every year after they are put in place so that savings from measures installed in year one fall by half after 10 years and fall to zero in the 20th year.

APPLIANCE AND EQUIPMENT STANDARDS

This policy includes full adoption of the 21 standards laid out by the Appliance Standards Awareness Project in *States Go First: How States Can Save Consumers Money, Reduce Energy and Water Waste, and Protect the Environment with New Appliance Standards.* Standards include faucets, showerheads, lawn spray sprinklers, toilets, computers and monitors, high-CRI fluorescent lamps, air purifiers, pool pump replacement motors, commercial fryers, commercial dishwashers, commercial steam cookers, portable air conditioners, urinals, audio/video equipment, uninterruptible power supplies, telephones, water coolers, ventilation fans, portable electric spas, heated food-holding cabinets, and compressors. Utility bill savings and costs are as calculated by ASAP, with methodology and assumptions detailed in Mauer et al. (2017). To be conservatively pessimistic, we assume that the increased costs of more-efficient appliances and equipment represent a pure cost to the state economy, so that the higher levels of revenues associated with them do not increase employment in the state.

COMBINED HEAT AND POWER

This policy assumes 240 MW of CHP adoption spread evenly over the period 2020–2030. We estimated achievable potential using technical potential of 6,989 MW as calculated by US DOE (2016) multiplied by 3.2%. Prior ACEEE research (Elliott et al. 2007) found achievable potential to be 3.2% of technical potential. Energy savings, installation costs, operating and maintenance costs, and program costs were calculated using ACEEE's State and Utility Pollution Reduction Calculator Version 2 (SUPR 2; Kubes, Hayes, and Kelly 2016). The 15-year time horizon in SUPR was compressed to reflect installation over an 11-year period.

BUILDING ENERGY CODES

This policy follows a timely adoption pathway laid out by Athalye et al. (2016) that assumes Florida adopts new codes within one code cycle with a one-year adoption lag. Athalye and colleagues' methodology is somewhat altered in our analysis, replacing the rolling baseline used in their study with a 2015 IECC/ASHRAE 90.1-2013 static baseline to show total savings from future code adoption rather than incremental energy savings relative to the previous code. All other inputs for energy savings calculations are as used by Athalye et al. (2016), including estimates of code compliance (set at 80% for states following a timely adoption pathway).

BENCHMARKING

This policy applies to the nine largest metro areas in Florida: Miami, Tampa, Orlando, Jacksonville, North Port, Cape Coral, Lakeland, Deltona, and Palm Bay. Commercial buildings over 50,000 square feet are included in the analysis. Data on energy usage in these buildings are from US DOE's State and Local Energy Data (DOE 2018b). Our analysis assumes savings of 7%, slightly higher than the 5% modeled by Ungar (2018) but within the range of actual results compiled by Mims et al. (2017). We estimate costs by assuming investments are limited to projects with an average three-year payback period.

ELECTRIC VEHICLES

While we did not estimate employment impacts for the purposes of this paper, we did construct a policy scenario to help understand potential economic impacts and areas of uncertainty. This policy assumes that EV adoption is double what is projected for the business-as-usual scenario in *AEO 2018* (EIA 2019). Florida vehicle sales are based on data published by the Alliance of Automobile Manufacturers, with overall growth in car sales following *AEO 2018* for the southeast region. Incremental costs of electric vehicles compared to gasoline vehicles are based on cost projections for the midterm evaluation of the greenhouse gas (GHG) and Corporate Average Fuel Economy (CAFE) standards (EPA 2018). No tax breaks are included in the analysis. Costs of various charging stations are included. Home charging stations are estimated to cost $1,350 for Level I and $2,304 for Level II, respectively, based on information compiled by Home Advisor. Level 2 public charging stations are estimated to cost $3,108 and Level 3 fast-charging stations average $22,626 based on information from Idaho National Laboratory.

Appendix B. ACEEE's DEEPER Model

We have used ACEEE's DEEPER modeling framework to conduct this assessment. DEEPER employs principles of input–output (I/O) modeling to evaluate the economic impacts of various policy alternatives. Simply put, the model tracks changes in demand for goods and services across the Florida economy and determines how much output from each economic sector is required to meet that demand. It then asks how much labor is required to produce that output and how much state gross domestic product (GDP) (or value added) is associated with that change in demand.

The core of the DEEPER model is the A matrix, or Direct Requirements matrix. This relates industries to one another, detailing how much input from one industry is required to make a dollar's worth of output from another industry. Combining this information with a final demand vector, which represents changes in demand for goods and services for final consumption, returns the amount of output required from each industry to support that level of final demand. For any given increase in final demand of goods and services, determining how much additional output each industry would have to create to meet this increase is conceptually straightforward.

A second critical component of DEEPER is a set of multipliers that convert the resulting increases in output into the amount of employment needed to bring about those increases, how much income that would generate for workers, and how much GDP that would create. DEEPER uses data from the IMPLAN Group for its national and state-level A matrices and multipliers.

We calculate changes in final demand using data on expenditures on energy efficiency, the lifetime energy savings they generate, and the associated avoided energy costs as described above. We account for the cost of the efficiency investments as well as the lost revenues to utilities that result from reduced energy consumption. We also account for interstate and international trade by using regional purchase coefficients that indicate how much of each type of good and service consumed in Florida is also produced there. The model allocates changes in final demand among in-state and out-of-state producers accordingly, so that only changes in Florida-based producers contribute to state employment and value added.

We aggregate all of these state-level impacts to calculate the net change in Florida final demand across 14 economic sectors. The DEEPER model translates these net changes into changes in output and calculates the changes in employment and value added associated with them. The model includes employment and value added associated with the changes in demand, changes in production along the supply chain required to meet that demand, and increased economic activity generated by workers spending their increased income.