



Florida Energy and Climate Plan

POWERING CHANGE



Dear Floridians:

Energy impacts every single one of us – every single day, all day long. We use energy to produce food, power our devices and homes, move around our communities, and drive our industries and economy. Meanwhile, climate change is posing an accelerating threat to our state, economy, and daily life.

That's why I'm pleased to present you with the Florida Energy and Climate Plan. This plan provides realistic steps and strategies for Florida to secure clean, affordable energy while creating new opportunities for Florida's economy and addressing the growing crisis of climate change.



All of Florida's energy sectors are interdependent, with the potential to affect our water, air, and our quality of life. In the Florida Energy and Climate Plan, you will find comprehensive policies that consider Florida's energy landscape to have effective, measurable, meaningful change.

Ten years have passed since the state has considered a comprehensive energy plan. Since then, Florida's energy landscape has changed dramatically. Energy prices were more volatile, and renewable energy like solar was not as sophisticated or extensively deployed. Further, energy storage and electric vehicle technologies were in their infancy. Clean energy technologies have matured, and their costs have become more competitive with traditional fuel sources.

The climate science is clear: climate change is accelerating because of human activity – and few places are more vulnerable to its effects than Florida. If our state is unprepared to address this climate crisis, Floridians will pay the price. Florida is expected to face \$76 billion in climate change costs by 2040.¹ Most of these losses will come from sea level rise, which is expected to increase by one to four feet by 2100.² Our agricultural producers will be faced with more volatile weather. The dry season will be drier, the wet season will be wetter, and storms will be more frequent and violent. Floridians will also have to contend with 105 more days a year of dangerous heat by 2050,³ disproportionately affecting children, seniors, and vulnerable populations.

¹ Wilson, K. (2019, June 20). Florida could face \$76 billion in climate change costs by 2040, report says. *Tampa Bay Times*. Retrieved from <https://www.tampabay.com/florida-politics/buzz/2019/06/20/florida-could-face-76-billion-in-climate-change-costs-by-2040-report-says/>

² Climate Change Impacts in the United States, U.S. National Climate Assessment

³ (2016, October 27). Florida's Climate Threats. Retrieved from <https://statesatrisk.org/florida>

Combating climate change isn't a zero-sum fight between the environment and the economy. Our economy can benefit from green job creation, and through a shift from greenhouse gas emitting fuels to clean energy technologies. Currently, Florida imports nearly all fossil fuels, thereby sending a significant amount of funds out of state. Embracing renewable, sustainable, clean energy technologies creates an opportunity for Florida to develop a clean energy industry within our state; – an industry that will provide good jobs and stimulate the manufacturing industry. While this transition will not happen overnight, it is critical that we get started now – the fate of Florida's future generations hangs in the balance.

A better future for all Floridians is possible through sound policies and programs. Energy efficiency and water conservation improvements are the most cost-effective near-term solutions to reducing our state's overall fossil fuel emissions. Reducing energy consumption lowers the overall state energy load, helping all consumers keep their rates low. Low-income and fixed-income Floridians can often benefit most from energy efficiency improvements, the costs for which we must consider how to mitigate. Renewable energy technologies like solar with battery storage is growing rapidly, but there are still technical challenges that would benefit from increased research and development.

Investing in solutions is investing in Florida. Many of these new industries thrive in Florida's friendly business climate, and more can be done to foster innovative clean energy companies in Florida. Our state's transition to a clean energy economy needs to be deliberate to ensure our most vulnerable citizens aren't bearing the heaviest burden, that our workforce has opportunities to transition into these new industries, and that our next generation can enjoy the state we love and call home.

Our department is home to the state's Office of Energy, responsible by law for developing and implementing Florida's energy policies, programs, and projects. This plan is a product of that office, and a roadmap for our shared future.

I hope you will read the Florida Energy and Climate Plan and consider how you can be part of this plan. Together, we can keep Florida growing!

Sincerely,



Nicole "Nikki" Fried
Florida Commissioner of Agriculture

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I. Introduction

The Florida Energy and Climate Plan (Plan) was developed by the Florida Department of Agriculture and Consumer Services (FDACS), Office of Energy. This Plan is meant to highlight important energy and climate change issues, and spark discussion around these topics. Additionally, the Plan will act as a guide for the Office of Energy in the years ahead.

There are nine focus areas that the FDACS Office of Energy believes are critical to Florida's progress. All nine focus areas are connected in some form because Florida's energy system is connected to everything from health and wellness, to our environment, to the economy. Therefore, advancements must be considered on a systems level.

Each focus area provides a discussion on the current situation and is followed by:

- Recommended FDACS Initiatives
- Recommended Collaborative Actions
- Recommended Legislative Actions
- Questions for Future Engagement

Recommended FDACS Initiatives are initiatives that FDACS can act upon without additional legislative authority or funding. Many of these recommendations build upon existing FDACS initiatives.

Recommended Collaborative Actions are actions that FDACS has identified that require collaboration with other state agencies and/or stakeholders. Because of energy's interconnectedness, there are numerous other state agencies and stakeholders with important roles that must be included in the conversation.

Recommended Legislative Actions are the FDACS Office of Energy's recommendations for legislative actions that will advance policies to encourage progress towards a more sustainable energy system.

Each focus area concludes with Questions for Future Engagement. Again, this Plan is meant to spark conversation about solutions to Florida's energy and climate issues. There is still a lot to learn, and these questions are meant to further the discussion.

The goal of the Florida Energy and Climate Plan is to provide a guide for the Office of Energy and the Florida Department of Agriculture and Consumer Services, while also growing the conversation surrounding Florida's energy and climate future.

II. Encourage Investments in Energy Efficiency and Renewable Energy



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Key Points of Discussion:

- Constantly flowing energy is a valuable resource vital to Florida's growing population of citizens, farms, businesses, and tourists.
- Measuring energy usage is the key to pinpointing and managing energy inefficiency.
- Florida's unique climate defines how its buildings use energy and water resources, which in turn informs the construction of resilient, energy efficient homes, and businesses.
- Low income residents bear a heavy energy cost burden in part because they tend to live in older homes not built to withstand Florida's hot and humid climate.

Priority Action Items:

- Optimize the state's benchmarking procedures to identify and reduce energy waste in state owned and leased facilities.
- Ensure that the Florida Building Code modification process continues to promote resiliency through energy efficiency and renewable energy (EERE) technologies.
- Encourage the development of clean energy technology and job training programs.



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Discussion:

As of June 2019, Florida's population was over 21.6 million and is estimated to increase to 26 million by 2030.¹ In 2017, there were over 47,500 commercial farms in Florida, farming a total of 9.45 million acres.² In addition, an estimated 126.1 million tourists visited our State in 2018, which is a 50 percent increase in the last 10 years.³ Each of these people living, working, and vacationing here depend upon Florida's electric grid to power every aspect of their daily activities.

The Continued Case for Energy Efficiency and Renewable Energy

In 2018, the Florida Reliability Coordinating Council estimated that over the next 10 years, Florida will add more than one million new residential energy customers, and over 50,000 new commercial customers. To plan for this anticipated demand, the Florida Public Service Commission (FPSC) assembles a Ten-Year Site Plan where

¹ Florida Chamber of Commerce, The Florida Scorecard, <https://thefloridascorecard.org/>.

² FDACS website, <https://www.freshfromflorida.com/Agriculture-Industry/Florida-Agriculture-Overview-and-Statistics>.

³ Visit Florida, <http://www.visitfloridamediablog.com/home/florida-facts/research/>.

utilities predict grid demand and their energy capacity growth in the state on a ten-year cycle. Each electric generating utility is required to provide information to the FPSC on what new electric generation sources they plan to bring online and what sources, if any, they plan to retire. Florida's utilities currently estimate electricity generation will need to increase 7.6 percent by 2027.⁴

The goal of energy efficiency is to reduce the amount of power needed to operate buildings, appliances, and equipment. This can be achieved by upgrading existing buildings or equipment, or by replacing them with newer ones designed to reduce energy usage. By implementing EERE measures in buildings and equipment, Florida can meet its growing population's energy needs through investments in EERE innovation. Focusing on new technologies and education for EERE also brings about new economic opportunities and jobs for the state.

Investing in EERE in the home and workplace improves health conditions, lowers grid demand, and provides proven cost savings.⁵ Consumers interested in saving energy and decreasing greenhouse gas (GHG) emissions through EERE measures should focus first on energy efficiency before installing renewable energy technologies. An energy inefficient building is still an energy inefficient building, whether it uses renewable energy or not. After energy efficiency is achieved, the goal of renewable energy is to produce sustainable power onsite, thereby reducing the need for fossil fuels and the associated GHG emissions.

Encouraging hesitant consumers to make these EERE investments is an ongoing challenge. To help consumers overcome their hesitancy, the FDACS Office of Energy offers grants to local governments and small businesses to help offset the cost to implement innovative EERE technologies and demonstrate the savings potential. These programs promote the department's goal of implementing alternative energy technologies that can be a source of new jobs and employment opportunities for many Floridians.⁶

The FDACS Office of Energy has encouraged Floridians to adopt EERE technologies across the state in part through the Florida Small Community Energy Efficient Lighting Grant Program. It was designed to assist small local governments in reducing their total energy usage and costs by replacing inefficient lighting with energy-efficient lighting. Under this program, 18 local governments received a total of \$2,338,767 for new lighting systems in their communities. Project objectives include replacing existing lighting fixtures at public libraries, community center parking lots, baseball and soccer

⁴Florida Reliability Coordinating Council, [2018 Regional Load & Resource Plan, FRCC-MS-PL-191](#), p. 2.

⁵ United States Department of Energy, Office of Energy Efficiency & Renewable Energy, <https://www.energy.gov/eere/office-energy-efficiency-renewable-energy>.

⁶ See section 377.601, Florida Statutes, for full Legislative intent for Energy Resources Planning and Development.

fields, and recreational complexes that include a roller rink, a walking path, two playgrounds, three basketball courts, two handball courts, and two tennis courts. Outdated lighting fixtures will be replaced with energy efficient LED and solar-powered lighting. Energy usage and operating costs data from one year before and after the replacements were installed will be analyzed to measure the savings.⁷

The Need for Building Efficiency and Measuring Savings

Floridians requires constant energy to operate the buildings in which we live and work, and the devices, appliances, and equipment that makes our lives easier. Decreasing Florida's energy usage is a priority. It means less energy costs for consumers, less demand on the electric grid, and reduced GHG emissions, all of which contribute to more comfortable, healthier work and living spaces.

Identifying energy waste in a building system is the first step to improving its efficiency. Benchmarking is the process of collecting and analyzing a building's aggregate consumption to calculate fluctuations in its energy usage, water usage, and GHG emissions. Individual building information can also be compared to other buildings to evaluate performance. Benchmarking is an effective initial tool for pinpointing long-term energy waste and mitigating fiscal losses in operational costs. Once energy waste is identified, appropriate energy efficiency measures can be implemented to avoid additional waste of resources, lowering operating costs and emissions. After energy efficiency measures have been implemented, there may also be an opportunity to incorporate renewable energy technologies into the system.

Benchmarking is critical in helping commercial and industrial buildings identify and locate those systems most in need of improvement. This is especially important in the commercial sector, accounting for 39 percent of Florida's energy consumption in 2017.⁸ Proper maintenance and upgrades in existing commercial buildings help to achieve better building efficiency and help lower operating costs.

In 2008, to demonstrate the value of benchmarking and lead the way for the commercial sector, the Florida Legislature passed section 255.257, Florida Statutes, the Florida Energy Conservation and Sustainable Buildings Act. The legislation directs "state agencies to incorporate sustainable building practices into the design, construction, and renovation of state buildings."⁹

Through this act, the Florida Department of Management Services (FDMS) developed the State Energy Management Plan (SEMP). The purpose of the SEM is to develop a

⁷ Per section 377.603, Florida Statutes, FDACS OOE can collect and report energy data on the projects it manages.

⁸ FPSC, Review of 2018 Ten-Year Site Plans of Florida's Electric Utilities, p. 13.

⁹ FDMS, 2017-2018 State Energy Management Plan, https://www.dms.myflorida.com/content/download/144726/966212/SEMP_FY2017-18_FINAL.pdf.

comprehensive system to manage and reduce the consumption and costs of non-renewable energy in large state-owned and metered state-leased facilities.¹⁰

As a part of the SEMP, the FDACS Office of Energy and all other state agencies are required to submit monthly utility data (energy, water usage, waste and cost) to FDMS from all state-owned and private-lease facilities for which the agency is contractually obligated to pay for utility consumption data. For the State of Florida, this is over 700 state-owned and leased buildings.

Since 2014, FDMS has published the SEMP Annual Summary Report that aggregates statewide energy consumption by each executive-branch department or agency. FDMS provides this information to agencies so that it “can, and should, be used to prioritize energy conservation efforts and capital improvements.”¹¹

For fiscal year 2017-2018, 20 state agencies reported data representing energy and water usage for nearly 46 million square feet of air-conditioned space. The State of Florida spent over \$113 million on utilities for this period, at an average cost of \$2.46 per square foot per year. Of that, FDACS spent \$1,353,000 on utilities for approximately 435,800 square feet, at \$3.10 per square foot per year.¹²

Table 1: State of Florida – Energy Performance Metrics

Fiscal Year (FY)	Gross Square Footage (GSF)	Annual Energy Consumption (AEC) [kBtu]	Energy Performance Index (EPI) [kBtu/sf/yr.]	Annual Utility Cost (AUC) [\$ /yr.]	Cost Utilization Index (CUI) [\$ /sf/yr.]
FY 2013-14	48,658,296	3,570,724,059	73.4	\$117,092,115.53	\$2.41
FY 2014-15	47,947,983	3,853,514,020	80.4	\$113,594,247.22	\$2.37
FY 2015-16	45,820,611	3,407,807,671	74.4	\$111,371,328.88	\$2.43
FY 2016-17	46,195,003	3,664,904,210	79.3	\$109,583,395.35	\$2.37
FY 2017-18	45,996,560	3,849,427,563	83.7	\$113,081,267.04	\$2.46

¹⁰ FDMS, State Energy Management Plan For State Facilities in Florida, February 2010, https://www.dms.myflorida.com/content/download/65458/280548/STATE_ENERGY_MANAGEMENT_PLAN_-_February_2010.pdf.

¹¹ FDMS, 2017-2018 State Energy Management Plan, p. 2.

¹² Ibid.

Figures 1 and 2 provide five-year comparisons for the state. Green lines represent positive trends, indicating improved performance or reduced costs. Red lines represent negative trends, indicating reduced performance or increased costs.¹³

Figure 1: State of Florida
Annual Energy Consumption (AEC)
5-Year Comparison

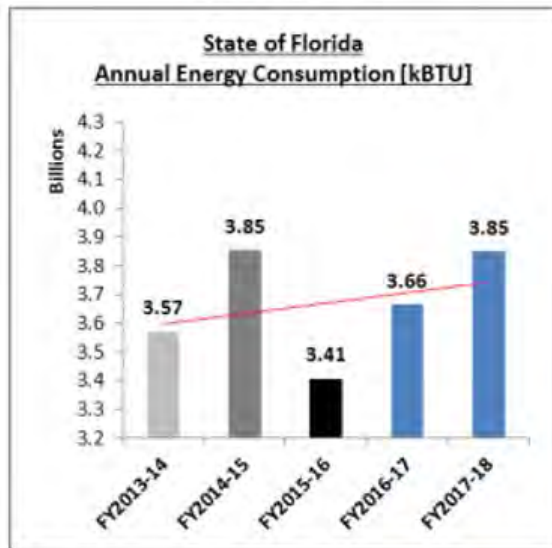
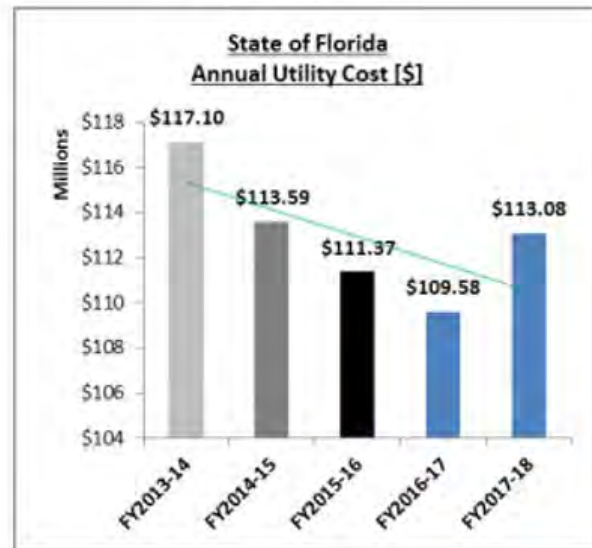


Figure 2: State of Florida
Annual Utility Cost (AUC)
5-Year Comparison



The 2018-2019 SEMP Annual Summary Report concluded that “patterns in energy production and consumption are shifting as competition for limited resources grows, environmental concerns mount, and new technologies emerge. In Florida, cost and utilization may vary based on gross square footage increases and decreases, changes in use of space, weather conditions, and agency usage demands.”¹⁴

The report indicates that current trends in both annual energy usage and operational costs are increasing. As state-owned and leased buildings continue to age, the need for EERE improvements will also continue, to appropriately budget for the state’s future operating costs. Since state funds are responsible for all operational costs at these commercial facilities, in some cases for the entire life of the building, it is in the state’s best interest to consider the effectiveness of the building’s energy consumption when budgeting for its future operational costs.

How Florida’s Hot, Humid Climate Defines Its Energy Usage

Florida is a coastal state with a hot and humid climate. We are susceptible to tropical storms, hurricanes, and sea level rise, sitting just 345 above sea level at our highest point. These factors govern our energy demand as well as construction design. To live, work, and play comfortably in Florida, our buildings must keep out the heat, wind, and water while retaining conditioned air. Each building needs a strong building envelop

¹³ Ibid, Figure 1 and 2, p.3.

¹⁴ Ibid.

(where structural openings such as doors and windows are properly sealed) to make it resilient to the outdoor climate and capable of maintaining a comfortable and healthy indoor climate.

As Florida grows, so will the demand for new construction. According to the National Association of State Energy Offices, “buildings use 40 percent of our energy and 70 percent of our electricity. More stringent building energy codes can greatly improve energy efficiency in the built environment and achieve economic, infrastructure, environmental, and energy security benefits.”¹⁵ Well-designed new homes and commercial properties constructed using stronger energy codes will ensure structural and energy resilience in future Florida communities.

After Hurricane Andrew devastated Florida in 1992, the state realized there was a need for a single, unified statewide building code for all commercial and residential buildings and created the Florida Building Code in 2002. The Florida Building Code governs the design, safety, and energy conservation standards for all new construction, and major renovations. It is also designed to make the building envelop more resilient to water intrusion, while simultaneously making them more energy efficient.

As a member of the Florida Building Commission (FBC),¹⁶ the FDACS Office of Energy holds a seat at the table where the Florida Building Code is maintained. Every three years, the FBC reviews and updates the residential and commercial construction code, using legislative guidance and public comments to incorporate the latest industry standards in safety, accessibility, structural, and energy conservation designs at the most reasonable cost to the consumer. This impacts all construction, including new hotels, senior living facilities, multifamily homes, offices, municipalities, universities, schools, and hospitals.

As mentioned, the commercial sector used 39 percent of the state’s energy consumption in 2017, but the largest sector of energy usage is Florida’s residential sector at 53 percent.¹⁷ New homes are built to current codes, but existing homes make up the large majority of the housing stock in the state – and the older the home, the greater the energy inefficiency. Addressing inefficiencies in older heating, ventilation, and air conditioning (HVAC) systems would produce a tremendous level of energy savings for consumers.

¹⁵ National Association of State Energy Officials: Board of Directors Resolution Supporting Utility Involvement in Energy-Efficient Building Codes, https://www.naseo.org/data/sites/1/documents/codes/documents/NASEO_Board_Resolution_Supporting_Utility_Cr_edit_for_Codes.pdf.

¹⁶ Pursuant to section 533.74, Florida Statutes.

¹⁷ FPSC, Review of 2018 Ten-Year Site Plans of Florida’s Electric Utilities, p. 13.

Nationwide, the average amount of energy used to cool a home is six percent of its total energy usage. By contrast, Florida households use more than 27 percent of the energy consumed for air conditioning.¹⁸ By contrast, other southeastern states use considerably less on cooling. In Georgia, 19 percent of home energy usage is attributed to indoor climate control, Texas uses 18 percent, and Tennessee uses only 10 percent.¹⁹

Education and financial incentives for energy retrofits and equipment upgrades need to be an important part of the state's policy on energy independence. Low income and disadvantaged citizens spend a greater percentage of their income on utility costs. Housing costs consume an increasing share of low-income families' take-home pay. About one million rental households in the state are considered to be low income, which is defined as those who make no more than 60 percent of the area's median income. Of these households, about 71 percent spent more than 40 percent of their total income in housing expenses (rent and utilities) in 2011.²⁰

Investing in Renewable Technology

Energy efficiency alone will never completely negate GHG emissions or electric costs. Beyond energy efficiency measures, Florida continues to invest in renewable technologies – but more is needed. Section 377.803, Florida Statutes, defines renewable energy technologies as electrical, mechanical, or thermal energy produced from a method that uses one of more of the following fuels or energy sources: hydrogen, biomass, solar energy, geothermal energy, wind energy, ocean energy, waste energy, or hydroelectric power. When speaking of residential and commercial buildings, renewable energy in Florida generally means solar, biomass, and waste energy.

Existing Florida legislation supports renewable energy through tax incentives and favorable regulations, which includes:

- Sales tax exemption for solar systems and related items;
- Property tax exemption of 100 percent of the increased value for residential renewable energy installations and 80 percent of the increased value for commercial renewable energy installations;
- Prohibits homeowners' associations and other entities from prohibiting the installation of solar energy systems; and
- Net metering requirement for Investor Owned Utilities up to 2 megawatts capacity.

¹⁸ U.S Energy Information Administration (EIA), "Household Energy Use in Florida," https://www.eia.gov/consumption/residential/reports/2009/state_briefs/pdf/fl.pdf.

¹⁹ US EIA, Residential Energy Consumption Survey (RECS), https://www.eia.gov/consumption/residential/reports/2009/state_briefs/index.php.

²⁰ University of Florida, [Florida Multifamily Efficiency Opportunities Study](#), 2015, p. 3.

Florida's Clean Energy Boom

The renewable energy technology industry is on the rise, and Florida is primed to be the national leader in employment in this field. As Florida's population and energy needs grow, the need for more well-paying careers will also grow. As clean energy technologies evolve, the clean energy job sector will grow as well. In 2018, Florida added 1,769 solar energy jobs, more than any other state.²¹ Florida should consider clean energy jobs as a primary growth industry for our citizens. Clean energy jobs can range from building code officials and building maintenance technicians, to energy auditors and home energy raters, to manufacturers of clean energy technologies. EERE innovation depends heavily on science, technology, engineering, arts and mathematics (STEAM) education. Investing in education and training in the renewable energy and energy storage sector will foster job growth and decrease demand on the electric grid.

The state must invest in training that provides our students and veterans the edge in renewable technology installation and maintenance. Today's training investments will translate into innovation, and future Florida-based companies will pave the way to a sustainable future. This will require the coordinated efforts of multiple partners across a range of sectors. Investing in our state's clean energy future will keep Florida at the forefront of this growing sector.

FDACS Office of Energy Initiatives:

- Conduct a statewide listening tour to engage citizens about the varied energy concerns in rural and urban areas so that the FDACS Office of Energy can formulate solutions to make Florida more energy efficient and a leader in renewable energy technologies.
- Develop a detailed inventory of FDACS buildings and identify those with the highest energy use per square foot for remedial action or change of lease.
- Continue to pursue policies and programs that encourage structural and energy resiliency for residential and commercial buildings including, but not limited to, multi-tenant housing, community-use public facilities, and public shelters.
- Promote STEAM training that will encourage Kindergarten through Grade 12 (K-12) students to consider clean energy jobs.
- Continue to participate on the FBC to promote the use of cost-effective energy conservation, energy-demand management, energy efficiency, and renewable energy technologies in buildings.
- Distribute energy efficiency tips and measures via monthly email to all FDACS employees, which includes energy savings articles for home and office.

²¹ The Solar Foundation, National Solar Jobs Census 2018, (<https://www.thesolarfoundation.org/national/>) p. 5.

Collaborative Actions:

- Encourage high school curriculums to incorporate more trade and technology training for clean energy jobs such as energy auditors, contractors, and building inspectors.
- Work with school districts, State Board of Education, and State University System Board of Governors to “develop training opportunities regarding contemporary flood- and wind-related design and construction issues.”²²
- Encourage FDMS to incorporate all collected building data into the annual report of the SEMP, rather than rolling up the data by state agency. Reporting energy usage, water usage, and GHG emissions at the individual building level will help identify buildings in the state’s portfolio where energy efficiency measures would be most effective in decreasing the state’s operational budget, offer greater transparency of the state’s cumulative energy usage, and highlight energy champions among state facilities.
- Work with FDMS to help all state agencies capture state-owned and leased building energy consumption data into ENERGYSTAR Portfolio Manager®, a free software benchmarking program. The state can continue to lead by example in energy efficiency by optimizing our benchmarking efforts through real-time capture and analysis.
- Work with municipalities to encourage benchmarking of large public and commercial buildings.²³
- Encourage the FDACS Florida Forest Service to work with the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) to offer native tree planting programs in storm-damaged neighborhoods to restore wind resistant native shade trees that cool homes and lower energy costs.
- Coordinate with other state agencies to develop memoranda of understanding to utilize state-owned retention basins for floating-solar projects.
- Work with the Florida Realtors® to develop training for real estate agents on the benefits of home energy ratings to buyers, sellers, and brokers.

Legislative Actions:

- Request that lawmakers establish a dedicated funding source for EERE programs targeting consumers.
- Reestablish the state-approved list of vendors for energy service companies (ESCO) that expired in 2016. Building projects take years from concept to completion. Without this list, the time-consuming process of approving a vendor

²² FEMA, Mitigation Assessment Team Report, Hurricane Irma in Florida, FEMA P-2023, December 2018, p. iii.

²³ American Council for an Energy-Efficient Economy, [Energy Efficiency: A Job Engine for Florida](#), February 2019, pgs. 8-9.

for consideration is prohibitive, taking shared-savings options off the table for state construction projects.

- Add renewable energy systems to existing state buildings and lands, and use the systems as an education program for citizens.
- Propose legislation that amends section 163.04, Florida Statutes to add further clarity that homeowners' and condominium associations cannot prohibit the installation of rooftop solar panels.

Questions for Future Engagement:

- How can the state optimize the benchmarking data that is already being collected to identify areas of energy waste?
- How can the state create incentives that encourage landlords to retrofit rental properties?
- What programs and/or incentives can the state use to encourage the upgrade of aging HVAC systems?
- Sixteen out of twenty of the top states identified by ACEEE as most energy efficient have an energy efficiency public benefits charge. Should Florida consider implementing a statewide energy efficiency public benefits charge instead of setting Florida Energy Efficiency and Conservation (FEECA) goals?

III. Encourage the Resiliency of Florida's Infrastructure



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Key Points of Discussion:

- The global sea level has risen by approximately eight inches since reliable record keeping began in 1880. It is projected to rise another one to four feet by 2100.
- The number of major electrical generation facilities and substations in Florida exposed to flooding from a Category 3 storm could more than double by 2050 and triple by 2070.
- If necessary infrastructure, including generating facilities and substations, are flooded due to climate change, this could hinder electric power restoration efforts.
- Florida has more than 83,000 electric vehicles (EVs). Proper infrastructure, including high-speed chargers along evacuation routes is necessary in case of a hurricane or natural disaster.

Priority Action Items:

- Develop a state GHG inventory to identify sectors, sources, and activities responsible for GHG gas emissions.
- Create a database of critical needs facilities and their backup power generation fuels and capacities.
- Coordinate with Florida Division of Emergency Management (FDEM) to identify long term solutions regarding disaster response and storm hardening.



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Discussion:

It is the policy of the State of Florida “that the state’s energy security can be increased by lessening dependence on foreign oil; that the impacts of global climate change can be reduced through the reduction of GHG emissions; and that the implementation of alternative energy technologies can be a source of new jobs and employment opportunities for many Floridians. The Legislature further finds that the state is positioned at the front line against potential impacts of global climate change. Human and economic costs of those impacts can be averted by global actions and, where necessary, adapted to by a concerted effort to make Florida’s communities more resilient and less vulnerable to these impacts.”²⁴

Climate Change

Climate change refers to variation in the Earth's global or regional climates over time. The span of time can range from weeks to decades to millions of years. The changes in climate can be caused by natural processes internal to the Earth, such as continental

²⁴ Section 377.601(1), Florida Statutes, 2008

drift, which affects ocean currents, or external forces, such as variations in sunlight intensity or human activities.

Human activities influence climate variability in many ways. Land use changes, such as irrigation of historically semi-arid areas for farmland, paving and development of urban areas, draining of wetlands, and emissions of GHGs are all human activities that can affect the Earth's climate system. Perhaps the most significant human influence today is the increasing levels of GHGs which contribute to the general warming of our planet.²⁵ GHGs, including carbon dioxide (CO₂), methane (CH₄), and nitrous oxides (NO_x), are gases that trap heat in the atmosphere.²⁶

Sea Level Rise and Hurricanes

One-way Floridians are already seeing the effects of climate change is through the rise in waters surrounding the state. As average global ocean temperatures increase, ocean water expands, and sea levels rise. The global sea level has risen by approximately eight inches since reliable record keeping began in 1880. It is projected to rise another one to four feet by 2100.²⁷ Rising sea levels mean greater inundation and damage from high tides and especially from storm surges during hurricanes. Not only will this affect Floridians' homes and businesses, but also their access to electricity. Electric generators are frequently located along the coast to take advantage of the water source to cool the generators. The number of major electrical substations in southeastern Florida exposed to flooding from a Category 3 storm could more than double by 2050 and triple by 2070.²⁸

Recently, the State of Florida experienced several hurricanes which highlighted the need for more resilient energy infrastructure. Great strides were taken after the 2004-2005 hurricane season. Utilities hardened their electric systems, resulting in faster electric restoration after the most recent hurricanes. As seen below, restoration times between Hurricane Wilma and Hurricane Irma decreased dramatically. However, if necessary infrastructure is flooded due to climate change, this could hinder restoration efforts.

²⁵ Climate Change Basics for the Southeast USA, Florida Climate Center, Office of the State Climatologist

²⁶ Overview of Greenhouse Gases, U.S. Environmental Protection Agency

²⁷ Climate Change Impacts in the United States, U.S. National Climate Assessment

²⁸ The Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United States, U.S. Global Change Research Program

Table 2: FPL Outage and Restoration Data for Hurricanes Wilma and Irma²⁹

	Hurricane Wilma (2005)	Hurricane Irma (2017)
Customer outages	3.2 Million	4.4 Million
Time to restore 50 percent of customers	5 days	1 day
Time to restore all customers	18 days	10 days

Electric Vehicles

Resilient energy infrastructure is critical before, during, and after a disaster. Florida currently has more than 83,000 EVs, of which 70,986 were automobiles and pickup trucks.³⁰ Some of these EV drivers experienced firsthand the lack of charging infrastructure while evacuating for Hurricane Irma. Issues included not enough high-speed chargers and lack of chargers along evacuation routes. These are critical issues for EV drivers when time is of the essence in an evacuation. As more Floridians adopt EV technologies, the issue of inadequate charging infrastructure will become even more apparent.³¹

FDACS Office of Energy Initiatives

During a disaster event, key FDACS Office of Energy personnel are stationed at the FDEM State Emergency Operations Center (EOC) supporting the functions of Emergency Support Function 12 (ESF-12), Fuels. The FDACS Office of Energy's response and recovery efforts at the State EOC include procuring fuel and propane for governments, utility crews, first responders, and mass care kitchens. In addition, staff facilitates the daily reporting of bulk fuel data for each port from private fuel vendors and reports on the fuel to be delivered in three to nine days.

The FDACS Office of Energy understands that disruptions in fuel and electric supply can be detrimental after a disaster event. Our programs not only work to reduce energy consumption and provide alternative forms of energy, but also to make Florida communities more resilient while reducing GHG emissions.

Under the Efficiency and Renewable Improvements in Commercial Aquaculture (ERICA) Program, the FDACS Office of Energy is working to make aquaculture facilities more energy efficient and resilient. ERICA provides matching grants for technologies that significantly increase energy efficiency and/or renewable energy. By using renewable energy and generators powered by alternative fuels, a commercial

²⁹ Review of Florida's Electric Utility Hurricane Preparedness and Restorations Actions, July 2018, Florida Public Service Commission

³⁰ Florida Department of Highway Safety and Motor Vehicles

³¹ Electric Vehicles and Natural Disaster Policy Implications, Energy Policy, Volume 112, January 2018

aquaculture facility that loses electricity can still pump fresh water and is no longer in danger of losing their entire harvest.

Under the FDACS Office of Energy's SunSmart Schools program, over one megawatt of solar power was installed on 86 schools that double as emergency shelters spread across Florida. These systems provide power to critical loads during disasters and emergencies, while offsetting electricity costs during normal operation. With additional funds from utilities, the program expanded to 118 schools in 46 of Florida's 67 counties.

The climate of Florida is changing – and if our state isn't prepared to meet the challenges caused by climate change, Floridians will surely pay the price. To address these challenges, it's imperative we adopt behaviors that use energy more efficiently, lessen the environmental impacts of energy production, and work collaboratively with stakeholders to find new ways to use our energy sources more wisely and more economically.

FDACS Office of Energy Initiatives:

- Set GHG reduction goals and targets for FDACS buildings and vehicle fleets.
- Develop a program to provide incentives to critical need facilities in rural areas for backup power generators.

Collaborative Actions:

- Develop a state GHG inventory to identify sectors, sources, and activities responsible for GHG emissions.
- Collaborate with Florida's local governments to combat the effects of climate change and sea-level rise.
 - Support and encourage local governments in their mitigation efforts.
 - Through education and public forums, encourage statewide conversations on positive actions with stakeholders.
 - Develop a "Best Practices" manual for local governments on actions they can take to address Climate Change.
- Create a database of critical needs facilities and their backup power generation fuels and capacities.
- Coordinate with FDEM to identify long term solutions regarding disaster response and storm hardening.
- Encourage utilities to establish a comprehensive adaptation management plan to enhance resiliency and reduce vulnerability in preparation for natural events and sea-level rise.
- Collaborate with military installations located in Florida to encourage resiliency improvements for bases in the state. The U.S. Airforce recently named six Florida bases on their top 10 critical strategic infrastructures most vulnerable to climate change.

Legislative Actions:

- Work with the Legislature to ban fracking in the State of Florida and continue the ban on off-shore drilling in state and federal territorial waters.
- Support appropriations for independent renewable energy generation at hurricane shelters (such as our SunSmart Schools program), nursing homes, assisted living facilities, and critical needs facilities.
- Support appropriations for the deployment of renewable energies and storage technologies located near strategic infrastructure such as shelters, hospital, and emergency operations centers.

Questions for Future Engagement:

- How do we protect Florida's infrastructure from sea level rise?
- How do we make Florida's infrastructure more resilient to natural disasters like hurricanes?

IV. Clean, Safe, and Sustainable Transportation for Florida



IV. Clean, Safe, and Sustainable Transportation for Florida

Key Points of Discussion:

- Excessive amounts of carbon dioxide are by-products of transport activities and carbon dioxide emissions make up approximately 81 percent of all GHG emissions released into the atmosphere.
- Florida's transportation sector is the second largest contributor of GHG emissions.
- There are several measures that Florida can take to increase the efficiency of the transportation sector while reducing its GHG emissions.
- The adoption of clean, safe and sustainable transportation practices in Florida will require greater consumer familiarity and further expansion of innovative technology.

Priority Action Items:

- Encourage state procurement to purchase alternative fuel vehicles (AFVs) to integrate more carbon efficient and environmentally friendly vehicles in Florida's communities.
- Develop and implement policies, programs, and projects that are cost-efficient, improve air quality, and reduce GHG emissions.
- Educate the public on the benefits of new innovative transportation technologies.



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Discussion:

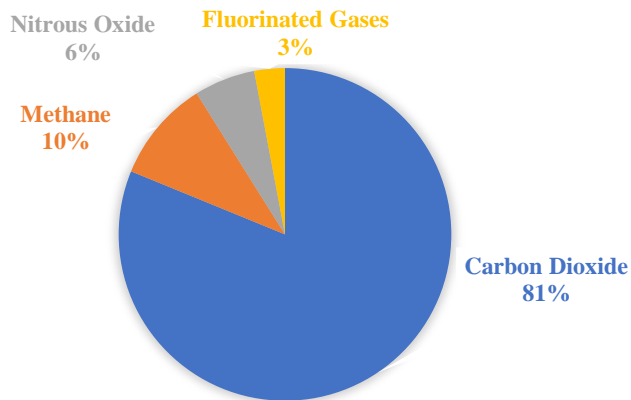
Every consumer, resident, visitor, and business in Florida relies on transportation to move people, goods, and services across our state. According to the Florida Department of Highway Safety and Motor Vehicles, Florida has over 17 million registered vehicles, including 15 million light-duty vehicles, 1.4 million heavy-duty vehicles, and 59,808 transit buses. On a national level, the average consumer drives 13,476 miles annually – that's an estimated 290 hours spent driving per year,

³² and 4.6 metric tons of carbon dioxide released per car.³³ Excessive amounts of carbon dioxide are by-products of transport activities, and carbon dioxide emissions make up approximately 81 percent of all GHG emissions released into the atmosphere.

³² (<https://www.fhwa.dot.gov/ohim/onh00/bar8.htm>) and (<https://newsroom.aaa.com/2016/09/americans-spend-average-17600-minutes-driving-year/>)

³³ <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>

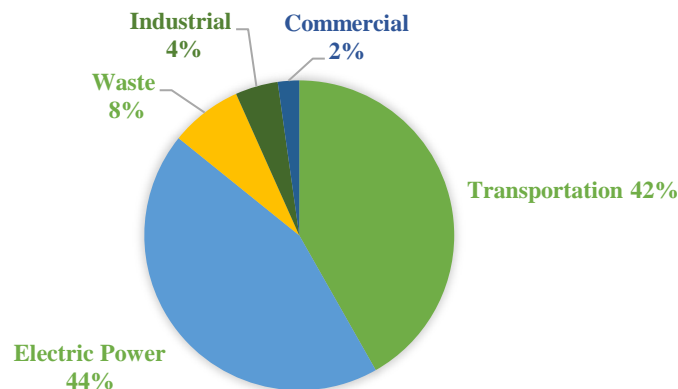
FIGURE 3. OVERVIEW OF U.S. GHG EMISSIONS IN 2017



Source: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>

Florida's transportation sector is the second largest contributor of GHG emissions behind Florida's electric generation industry.³⁴ One of the components contributing to Florida's carbon-dioxide production is the state's reliance on petroleum as a transportation fuel. According to the U.S. Energy Information Administration 2016 report on energy-related carbon dioxide emissions by fuel, Florida's petroleum carbon-dioxide emission is 114.8 million metric tons (Mt), which is equivalent to 49.9 percent of the state's total GHG emissions (230.1Mt).³⁵ Nearly 90 percent of Florida's 320.1 million barrels of petroleum are used annually for transportation – while Florida has less than 0.1 percent of the nation's crude oil reserves and production. That means Florida is a net importer of petroleum, sending significant funding out of state for transportation fuels.

FIGURE 4. OVERVIEW OF FLORIDA GHG EMISSIONS IN 2017



³⁴ 6 Charts to Understand U.S. State Greenhouse Gas Emissions- <https://www.wri.org/blog/2017/08/6-charts-understand-us-state-greenhouse-gas-emissions>

³⁵ US States by Carbon-Dioxide Emissions Per Capita- www.worldatlas.com

At face value, Florida's transportation is expensive and emissions-heavy, which makes it an ideal target for implementing carbon and cost reduction practices. While there is no one definitive solution to eliminate emissions from Florida's transportation system, there are several measures that Florida can take to increase the efficiency of the transportation sector while reducing its GHG emissions.

Commercial Fleets

Commercially-owned fleets have an opportunity to reduce their petroleum consumption and reduce GHG emissions by investing in AFVs. There are over 63,000 fleet vehicles registered in the state. According to DMS statistics, 20,260 fleet vehicles are state-owned. By encouraging state procurement to purchase AFVs, the state can boost the acquisition and integration of more carbon efficient and environmentally friendly vehicles. Investing in AFVs will also save the state ongoing petroleum costs by ensuring the most energy efficient vehicles are purchased.

In section 377.601, Florida Statutes, the Legislature directs the FDACS Office of Energy to develop and implement policies, programs, and projects that are cost-efficient, improve air quality and reduce GHG emissions. As a result, the FDACS Office of Energy advocates for public policies to encourage investments in clean, zero-emission transportation and AFVs. An AFV, as defined by the Energy Policy Act of 1992, is any dedicated, flexible-fuel, or dual-fuel vehicle designed to operate on at least one alternative fuel (e.g. compressed natural gas, methane blend, or electricity).

Section 377.810, Florida Statutes, established the Natural Gas Fuel Fleet Vehicle (NGV) Rebate Program within the FDACS Office of Energy. The NGV Rebate Program provided rebates – up to \$25,000 per vehicle and \$250,000 per applicant – to government and commercial fleets that purchased, converted, or leased natural gas vehicles for five years. Fleet vehicle, as defined in section 377.810(d), Florida Statutes, means three or more motor vehicles registered in this state and used for commercial business or governmental purposes. The NGV Rebate Program provided rebates for 1,948 NGV fleet vehicles at a total of \$20.9 million. Program participants included many of Florida's private commercial fleet owners, as well as local governments and district school boards.

Private sector entities received a total amount of \$13,243,865 in rebates, while public sector entities received \$7,738,077 (Table 1). Investments were made in different types of natural gas technologies. According to the program database, compressed natural gas (CNG) was the most utilized technology reported under the program, serving 907 vehicles, and liquified natural gas (LNG) was the least utilized technology, serving 77 vehicles. (Table 2).

Table 3. Program Benefits by Public and Private Sector Entities

	Government	Private	Total
Incremental Costs	\$16,663,117	\$28,728,658	\$45,391,775
Rebates Awarded	\$7,738,077	\$13,243,865	\$20,981,942
Total Investment	\$190,662,512	\$185,410,238	\$376,072,750
Fuel Savings (Gallons)	5,042,042	40,250,555	45,292,597
Fuel Savings (\$)	\$9,934,986	\$34,084,532	\$44,019,518
Vehicles	990	958	1,948

Table 4. Program Statistics by Type of Natural Gas Technology

	CNG	Bi-Fuel CNG	LNG	Bi-Fuel Propane	Propane
Vehicles	907	119	77	196	649

The program fostered a total investment of \$376 million in natural gas vehicles and accompanying infrastructure. This investment, coupled with \$44 million in annual fuel savings, resulted in the creation or retention of 2,406 jobs that pay an average yearly wage of \$53,328.50. The total contribution to Florida's gross domestic product as a result of the overall program is estimated at \$674 million.

Procurement of AFVs is a significant step towards reducing GHG emissions and improving Florida's air quality. However, there are other changes fleets can also take in reducing their carbon footprint. Installation of energy-efficient components such as energy efficient lighting, energy saving HVAC systems, and solar panels in facilities that house fleets can reduce energy use and energy costs associated with maintaining fleets. These types of investments can also serve existing fleet infrastructures that need repairs and/or updates.

Electric Vehicles

Through the purchase of EVs and battery electric buses (BEBs), freight and transit companies have accelerated their adoption of AFVs. As of April 7, 2019, Florida is home to over 83,000 registered fleet and residential EVs, including hybrid electric, plug-in hybrid electric, and fully electric, such as BEBs.³⁶ EVs and BEBs have a market reputation to be clean, cost efficient, and environmentally friendly. Counties such as Miami-Dade, Pinellas, Orange, and Leon Counties are undertaking efforts to electrify their fleets and increase public accessibility to the use of EVs, charging stations, and BEBs.

As with most emerging technologies, there are challenges to be overcome. With EVs some of the major concerns for the public are higher purchase price compared to an

equivalent conventional vehicle, limited range, and development of charging infrastructure. According to the Alternative Fuels Data Center, Florida has a total of 28,221 public- and private- charging stations and 76,086 charging outlets.³⁷

To address some of the concerns, the FDACS Office of Energy worked with the Electrification Coalition and the Central Florida Clean Cities Coalition to promote the Drive Electric Orlando (DEO) project. DEO offered consumers the option to rent an EV at the Orlando International Airport. The project's goal was to increase public awareness of the cost benefits, EV capabilities, and available charging infrastructures. Since October 2015, when the program launched, there have been 1,268 EV rentals with over 426,000 miles driven.

Public Education

Educating the public on the benefits related to new and innovative transportation technologies enables Florida's communities to process, understand, accept, and implement clean, safe, and sustainable transportation practices. Another component in the DEO project was training over 250 rental car company employees to help ensure renters have complete knowledge on the EV experience. Public outreach by the FDACS Office of Energy plays a significant role in educating the public, government, and other service providers on innovative transportation technologies and the role AFVs can serve to promote a clean, safe, and sustainable environment.

Implementing a program that provides the basics of maintenance and benefits of AFVs and EVs is a way to encourage the acceptance and use of advanced technology vehicles (ATVs) in the future. An ATV, as defined by the Alternative Fuels Data Center, is a vehicle that combines new engine, power, or drivetrain systems to significantly improve fuel economy. This includes hybrid power systems and fuel cells, as well as some specialized electric vehicles. The demand for vehicle technicians qualified to service ATVs, specifically EVs, is strong in Florida. Due to the high demand, Tesla launched a 12-week program at Miami Dade College, called the Tesla START Program.³⁸ The program is designed exclusively for EVs and provides education, training, and an opportunity for recruitment upon completion. This initiative is important for sustaining the future of EVs; however, engagement from other industries will provide input for designing an all-inclusive program for all AFVs and ATVs.

Florida's colleges and state universities serve as an education corridor for implementing alternative fuel technology programs. These institutions have either adopted AFVs (i.e. NGVs, EVs, and BEBs) or are in the development stages of adopting AFVs for their campus transportation system. Establishing AFV education programs as an elective course will not only provide students education, training, and recruitment upon completion, but will also create another resource for on-campus student employment. Florida State University (FSU) is a prime candidate with the promotion of "Education

³⁷ <https://afdc.energy.gov/stations/states>

³⁸ Miamiherald.com, It's a desirable job that pays well-and Tesla is willing to pay for training, published February 26, 2019.

for Sustainability” as one of four initiatives on their Sustainable Strategic Plan. The initiative focuses on outreach to the campus community through curricular and co-curricular activities.

“As the third largest university in Florida, FSU will serve as a leading example for other colleges across the country that want to prioritize zero-emission campus transportation for the next generation.”³⁹

Clean Cities Coalition

The FDACS Office of Energy has partnered with stakeholders, such as the Central Florida Clean Cities Coalition to promote clean and sustainable transportation practices in Florida. The Clean Cities Coalitions are recognized for delivering their Clean Cities training program among Florida’s colleges, industry stakeholders, and local career source centers. The Clean Cities training program teaches first responders how to safely respond to accidents involving AFVs by providing education on the important components and elements of AFVs.

Autonomous Vehicles

AFVs already utilize advanced technologies, which makes them prime candidates for the addition of autonomous vehicle technologies. Self-driving or autonomous vehicles are making inroads with industry stakeholders and drawing interest with consumers as an alternative method of transportation. Autonomous vehicle technology is still in its infancy phase; with continuous advancement, however, this technology will be available in cars as a supplement to human driving.

Adopting clean, safe, and sustainable transportation practices in Florida will ultimately require greater consumer familiarity and further expansion on innovative technology. As these improvements continue to advance and a larger base of AFV drivers are created, Florida’s air quality and environment will improve, and the emissions associated with transportation will lessen.

³⁹ INSIDEEVs.com, FSU Transitions to 100% Electric Bus Fleet, published February 17, 2019.

FDACS Office of Energy Initiatives:

- Create an alternative fuel workgroup within FDACS to increase AFVs within the department's fleet.
- Advocate public policy for investments in clean, zero-emission transportation and other AFV technologies.
- Encourage more municipalities to move their light-duty vehicles and bus fleets to AFVs.

Collaborative Actions:

- Engage in projects and programs that promote facilitating clean and sustainable transportation practices.
- Provide support on projects that promote the growth of AFV and EV ownership and the accompanying infrastructure.
- Implement programs that educate on the basics of maintenance and benefits of AFVs, EVs and ATVs.

Legislative Actions:

- Reinforce state procurement options to purchase AFVs for government fleets and private contractors under contract with public entities.
- Develop programs that promote career education for servicing AFVs, EVs, and ATVs.

Questions for Future Engagement:

- How can the state help small- and medium-sized local governments and school systems increase the use of AFVs and reduce emissions?
- Should the state offer incentives to residents to encourage the use of AFVs?
- Should the state offer incentives to stimulate the development of an AFV fueling infrastructure to assist residents and tourists?

V. Advance the Energy-Water Nexus



V. Advance the Energy-Water Nexus

Key Points of Discussion:

- Water is integral to all phases of energy production, and energy is required to move and treat water before it is released back into the environment or used by a consumer.
- Florida's population growth has led to increased water demand, thereby increasing the energy used to move water to homes and businesses, as well as to move and treat wastewater before it is released in the environment.
- Without proper planning, Florida's current fresh water supply will not meet the growing needs of Floridians in the future.
- Florida is a national leader in the reuse of reclaimed water. Reclaimed water projects in the state are expected to produce the largest amount of additional water by 2035.

Priority Action Items:

- Determine the current energy and water usage in all state managed buildings and set goals to reduce such consumption.
- Identify a dedicated funding source that will assist agricultural producers to implement the results of energy and water audits.
- Work with water and wastewater plant directors to develop best practices for energy savings and the development of renewable energy generation at their facilities.



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- Work with water and wastewater plant directors to develop best practices for energy savings and the development of renewable energy generation at their facilities.

Discussion:

Water resources and energy production rely on each other – one cannot exist without the other. Water is used in all phases of energy production, and energy is required to move and treat water before its release back into the environment or used by consumers.

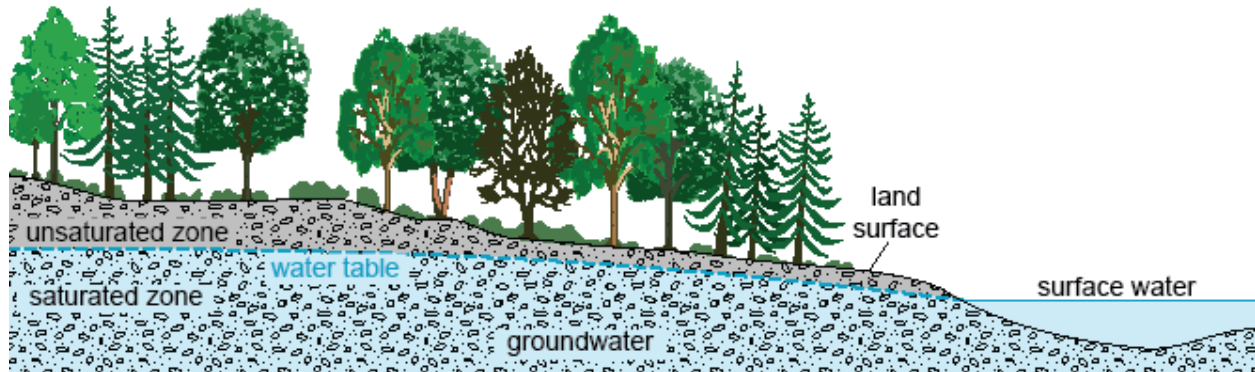
Dangers of Depleting Ground Water Sources

Groundwater has traditionally been the primary fresh water supply source in many areas of the state. However, without proper planning, Florida's current fresh water supply will not meet the growing needs of Floridians in the future.

⁴⁰ Withdrawing water from aquifers is not only problematic if too much is removed, it also becomes more energy intensive. The energy needed to pump groundwater increases further if water tables deepen due to overuse from irrigation, drought, heat waves, or other climate variations.

⁴⁰ Florida Department of Environmental Protection, Water Supply

Figure 5: Groundwater Diagram



Source: United States Geological Survey

Since 1895, annual total rainfall in the Southeast has increased approximately 10 percent. However, much of the rainfall is from tropical storms. Despite the increase in rainfall, our lands are becoming drier. As the Earth's temperature increases, more water evaporates from the soil into the atmosphere, which then has the potential to turn into heavy rain.⁴¹ These heavy rains are jeopardizing our ability to use and store freshwater. When freshwater moves at a faster pace than the soil can absorb it, the freshwater goes into the oceans, reducing our ability to store or use it.⁴²

Florida's population growth has led to increased water demand, thereby increasing the energy used to move water to homes and businesses, as well as to move and treat wastewater before it is released in the environment. Changes in the agricultural and industrial sectors also affect demand for water. Changing crop and livestock composition and production practices affect water demand and the amount and nature of effluents released to the environment.⁴³

Alternative Water Sources

As Florida's demand for freshwater continues to grow, some water utilities have started using alternative water sources, like saltwater and reclaimed water. Desalination removes dissolved salts in water to make it fit for human consumption, as well as agricultural and industrial use. As of 2018, South Florida has 38 brackish and two

⁴¹ *The long dry: Why the world's water supply is shrinking*, University of New South Wales, ScienceDaily, December 13, 2018

⁴² *How will climate change impact on fresh water security?*, Dr. Neil McIntyre, Department of Civil and Environmental Engineering and Grantham Institute for Climate Change, Imperial College London, in collaboration with the Guardian, November 2020

⁴³ *Beneath the Surface, Opportunities and Strategies to Improve the Energy Performance of State Water Conveyance, Treatment, and Irrigation Systems*, National Association of State Energy Officials

seawater desalination plants. The brackish and seawater desalination plants have the capacity to produce 282 million gallons of potable water per day.⁴⁴

The Tampa Bay Seawater Desalination facility provides up to 25 million gallons of drinking water per day. The desalination plant is located next to Tampa Electric's Big Bend Power Station, which withdraws and discharges up to 1.4 billion gallons of seawater a day from Tampa Bay to keep the power station at optimal temperature. 44 million gallons of the 1.4 billion gallons of seawater goes to the desalination plant. The desalination plant separates the seawater into drinking water and concentrated seawater. The concentrated seawater is then diluted with discharge water from the power station before returning to the bay.⁴⁵

With all the benefits to desalination, there are some drawbacks. In the United States, the cost to desalinate seawater is significantly higher than traditional treatments. It costs an average of \$2.50 to \$5 to convert one thousand gallons of saltwater to water suitable for human consumption, while treating one thousand gallons from a conventional freshwater source costs \$2. The process also requires four to ten times the amount of energy to produce the same amount of water.⁴⁶

Another alternative water source, reclaimed water, is water from a domestic wastewater treatment facility that has been treated for use for a beneficial purpose. It is commonly used for irrigation of lawns, landscapes, cemeteries, and golf courses, as well as for agricultural irrigation in certain situations, groundwater recharge, and industrial processes. Florida is a national leader in the use of reclaimed water. Reclaimed water projects in the state are expected to produce the largest amount of additional water by 2035.⁴⁷ Using water on site or nearby reduces the energy needed to move water longer distances or pump water from deep within an aquifer. Tailoring water quality to a specific water use also reduces the energy needed to treat water.

FDACS Office of Energy Initiatives

Recognizing the need for more alignment between energy and water, the FDACS Office of Energy has worked with various stakeholders to develop programs and initiatives that reduce energy use in water systems, increase end use water and energy efficiency, and educate school-aged children on the interconnectedness of water and energy.

The Farm Energy and Water Efficiency Realization Program (FEWER) was a popular and successful pilot program in Suwannee County that provided on-site energy and water audits to farms. The pilot program provided a 75 percent cost share, up to \$25,000, to area agriculture producers who participated in the audit and implemented some of the recommendations. The 132 Suwannee County agriculture producers who

⁴⁴ South Florida Water Management District

⁴⁵ Tampa Bay Water

⁴⁶ *Desalination is an expensive energy hog, but improvements are on the way*, Brian Bienkowski, Public Radio International

⁴⁷ 2017 Annual Report, Regional Water Supply Planning, Florida Department of Environmental Protection

implemented recommendations from their water and energy audits are saving \$1.5 million collectively on their utility bills every year.

Based on the popularity and success of the FEWER program, the FDACS Office of Energy created the Farm Renewable and Efficiency Demonstration (FRED) Program. FRED provided free energy evaluations valued up to \$4,500 to Florida agricultural producers. FRED also provided Florida agricultural producers grant reimbursement for 80 percent of the cost to implement the recommendations from the free energy evaluation up to \$25,000. Examples of eligible projects for reimbursement included energy-efficient lighting and water pumps and renewable energy generation, such as solar or biomass.

FDACS Office of Energy worked with the FDACS Division of Aquaculture to develop the previously-mentioned Efficiency and Renewable Improvements in Commercial Aquaculture Program (ERICA). The program funding of \$1,002,103 increases energy efficiency, reduces energy usage, and lowers operating costs at commercial aquaculture facilities in Florida. ERICA provides grant reimbursement for technologies that significantly increase EERE for eligible commercial aquaculture facilities and farms located in Florida.

FDACS Office of Energy also worked with the FDACS Office of Agricultural Water Policy to develop and administer a program for agricultural producers in the Apalachicola and Suwannee River Basins. Using \$2.5 million of RESTORE Act (Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast Act) funds, this program provides free energy and water audits as well as grant reimbursement for 75 percent of the cost to implement the recommendations from the free energy and water audit up to \$25,000.

Using a \$75,000 competitive award from the U.S. Department of Energy, the FDACS Office of Energy is working with stakeholders to determine the current energy landscape of water and wastewater treatment facilities in the state. The survey will document facilities that need updating, as well as facilities that have already performed energy efficient improvements, and whether those improvements resulted in energy and money savings. Water and wastewater facilities use a significant amount of energy, representing an estimated three to four percent of total U.S. electricity consumption.⁴⁸ This is a crucial first step for Florida to identify opportunities to save money, energy, and water. FDACS Office of Energy will complete the survey in 2019.

FDACS Office of Energy also worked with the FDACS Division of Food, Nutrition and Wellness and the FDACS Division of Aquaculture to install an aquaponics display at the Holland Building Wellness Garden in Tallahassee that provides hands-on demonstrations to school aged children on how energy, water, and food are integrated.

⁴⁸ *Energy Efficiency Strategies for Municipal Wastewater Treatment Facilities*, J. Daw and K. Hallett, National Renewable Energy Laboratory, J. DeWolfe and I. Venner, MacLome Pirnie, the Water Division of ARCADIS

The work being done to protect our water sources and lower the energy impacts on the environment is laudable. However, there is still much work that needs to be done. All water and energy stakeholders need to work together to establish cohesive policies and programs to ensure there is enough quality freshwater for future generations.

FDACS Office of Energy Initiatives:

- Improve agricultural water efficiency through continued joint energy and water audits.

Collaborative Actions:

- Determine the current energy and water usage in all state managed buildings, then set goals to reduce energy and water consumption.
- Work with water and wastewater plant directors to develop best practices for energy savings and the development of renewable energy generation at their facilities.

Legislative Actions:

- Increase consumer awareness of the interconnectedness of water and energy by creating an annual Energy Star and Water Sense tax holiday weekend.
- Appropriate a dedicated funding source to assist agricultural producers with implementation the results of their audits.
- Create a research and development grant program to further renewable energy and/or energy efficient technologies that also reduce water consumption, increase water system efficiency, and/or increase water quality.

Questions for Future Engagement:

- Energy and water are interconnected, yet the permitting processes for energy and water tend to be separate. Should the state look at these permitting processes and consider a more comprehensive process?
- How can the state encourage alternative water technologies and help lower the cost?

VI. Expand Energy Education, Vocational Training, and Workforce Development



VI. Expand Energy Education, Vocational Training, and Workforce Development

Key Points of Discussion:

- Create workforce development programs that meet industry needs and have sustainable enrollment.
- Provide schools and teachers with the tools needed to provide quality STEAM education.
- Foster collaboration between relevant agencies to leverage energy education, vocational training, and workforce development activities.
- Provide information on the benefits of renewable energy and energy efficiency while offering tools to protect consumers against scams and unscrupulous sales.

Priority Action Items:

- Increase the FDACS Office of Energy's collaboration with other FDACS divisions – such as the Division of Marketing and Office of Communications – to more effectively disseminate educational information concerning EERE to Florida consumers.
- Develop Consumer Services education materials with an emphasis on seniors, veterans, and vulnerable communities.
- Collaborate with the Florida Department of Education, non-profits, and state universities to promote STEAM education through energy education programs. This will be accomplished through a variety of programs, including the Energy Education Kit Program.
- Work with Florida Solar Energy Center (FSEC) to expand EnergyWhiz Events so that regional events can culminate at one statewide event in Cocoa.
- How can Florida engage industry to develop relevant workforce development programs?
- How can we encourage students to pursue STEAM education earlier?



VI. Expand Energy Education, Vocational Training, and Workforce Development

Key Points of Discussion:

- Create workforce development programs that meet industry needs and have sustainable enrollment.
- Provide schools and teachers with the tools needed to provide quality STEAM education.
- Foster collaboration between relevant agencies to leverage energy education, vocational training, and workforce development activities.
- Provide information on the benefits of renewable energy and energy efficiency while offering tools to protect consumers against scams and unscrupulous sales.

Priority Action Items:

- Increase the FDACS Office of Energy's collaboration with other FDACS divisions – such as the Division of Marketing and Office of Communications – to more effectively disseminate educational information concerning EERE to Florida consumers.
- Develop Consumer Services education materials with an emphasis on seniors, veterans, and vulnerable communities.
- Collaborate with the Florida Department of Education, non-profits, and state universities to promote STEAM education through energy education programs. This will be accomplished through a variety of programs, including the Energy Education Kit Program.
- Work with Florida Solar Energy Center (FSEC) to expand EnergyWhiz Events so that regional events can culminate at one statewide event in Cocoa.

Discussion:

Energy will continue to be a critical issue for Florida's large and growing population, and education is key to introducing new and innovative technologies that reduce electric consumption and produce renewable energy. To be effective, energy education initiatives must cover many areas including K-12 students, workforce development, vocational training, and consumer awareness.

The current policy of the State of Florida, as described in section 377.601, Florida Statutes, is to “develop and promote the effective use of energy in the state, discourage all forms of energy waste, and recognize and address the potential of global climate change wherever possible; include the full participation of citizens in the development and implementation of energy programs; and promote energy education and the public

dissemination of information on energy and its environmental, economic, and social impact.”

Consumer Education Initiatives

FDACS Office of Energy continues to host and expand the Florida Energy Clearinghouse in accordance with section 570.0741, Florida Statutes. The Florida Energy Clearinghouse helps consumers make more informed decisions about the energy choices they make every day. Through the online platform, users can compare energy saving technologies, learn more about renewable energy technologies and energy usage and production, and browse research being conducted at Florida’s state universities. A major component of the clearinghouse is the My Florida Home Energy tool that identifies energy efficient products, services, and potential energy and monetary savings for a Florida homeowner based on information provided by the homeowner, as well as publicly accessible data.

FDACS Office of Energy also uses other avenues to reach out to consumers and stakeholders – the biennial Florida Energy Summit is one such example. These summits are held in different cities throughout the state, with Fort Lauderdale hosting the most recent summit in 2017. The Florida Energy Summit brings together industry leaders, academia, stakeholders, and federal, state, and local officials to discuss a wide range of energy topics of importance to Florida. Under Commissioner Nikki Fried, the 2019 summit expanded into the Florida Energy and Climate Summit, becoming the first state-level conference to address climate change since 2008.

In addition to the Florida Energy and Climate Summit, FDACS Office of Energy staff regularly attends and speaks at conferences, workshops, and meetings. These are valuable opportunities for staff to engage with stakeholders and learn about new trends in the energy industry. The Energy Clearinghouse and conferences help the FDACS Office of Energy connect with consumers and stakeholders, K-12 and vocational education requires a different approach.

Importance of Energy Education and Workforce Development

The shortage of STEAM graduates is a real concern for Florida and the nation as a whole. STEAM education is important because STEAM occupations, as a group, hold the most patents and “help drive our nation’s innovation and competitiveness by generating new ideas and companies.”

⁴⁹ STEAM jobs have outpaced all other occupations; between 2007 and 2017, employment in STEAM occupations grew 24.4 percent compared to just 4 percent for non-STEAM occupations.⁵⁰ Examples of STEAM occupations include computer

⁴⁹ U.S. Department of Commerce Economics and Statistics Administration, Office of the Chief Economist STEM Jobs: 2017 Update

⁵⁰ U.S. Department of Commerce Economics and Statistics Administration, Office of the Chief Economist STEM Jobs: 2017 Update

programming, electrical engineering, and forestry. To keep up with demand for these higher wage jobs, Florida needs to ensure a steady pipeline of STEAM-ready students. Only 24 percent of 8th graders are enroll in Algebra I, which is considered the “gate keeper” for STEAM education.⁵¹

Additionally, as highlighted during the 2018 Florida elections, vocationally trained students are in high demand and are key to a vibrant energy industry. STEAM occupations lead to innovation, while vocational occupations implement those new ideas. Both STEAM and vocational education needs to be emphasized and enhanced to increase Florida’s competitiveness. FDACS Office of Energy has worked on these issues in the past, and will continue to find new ways to encourage STEAM and vocational training.

The energy and transportation industries are rapidly changing. AFVs, renewable energy technologies, and smart grid technologies are becoming increasingly prevalent. For example, solar employment in Florida grew by 21 percent in 2018. Florida is now second in the nation for solar jobs.⁵² These technologies are disruptive, and the traditional workforce related to legacy industries are vulnerable to being left behind during this transition. Workforce development will become more important as these new technologies replace older technologies in the energy and transportation industries.



At least two-thirds of STEM workers have a college degree or higher, whereas about one-third of non-STEM workers hold a college degree.

26%

STEM workers tend to earn about 26% more than non-STEM workers.

2x

Yearly growth for STEM jobs is projected to be almost double that of non-STEM jobs.

Figure 6. Florida State University, College of Education

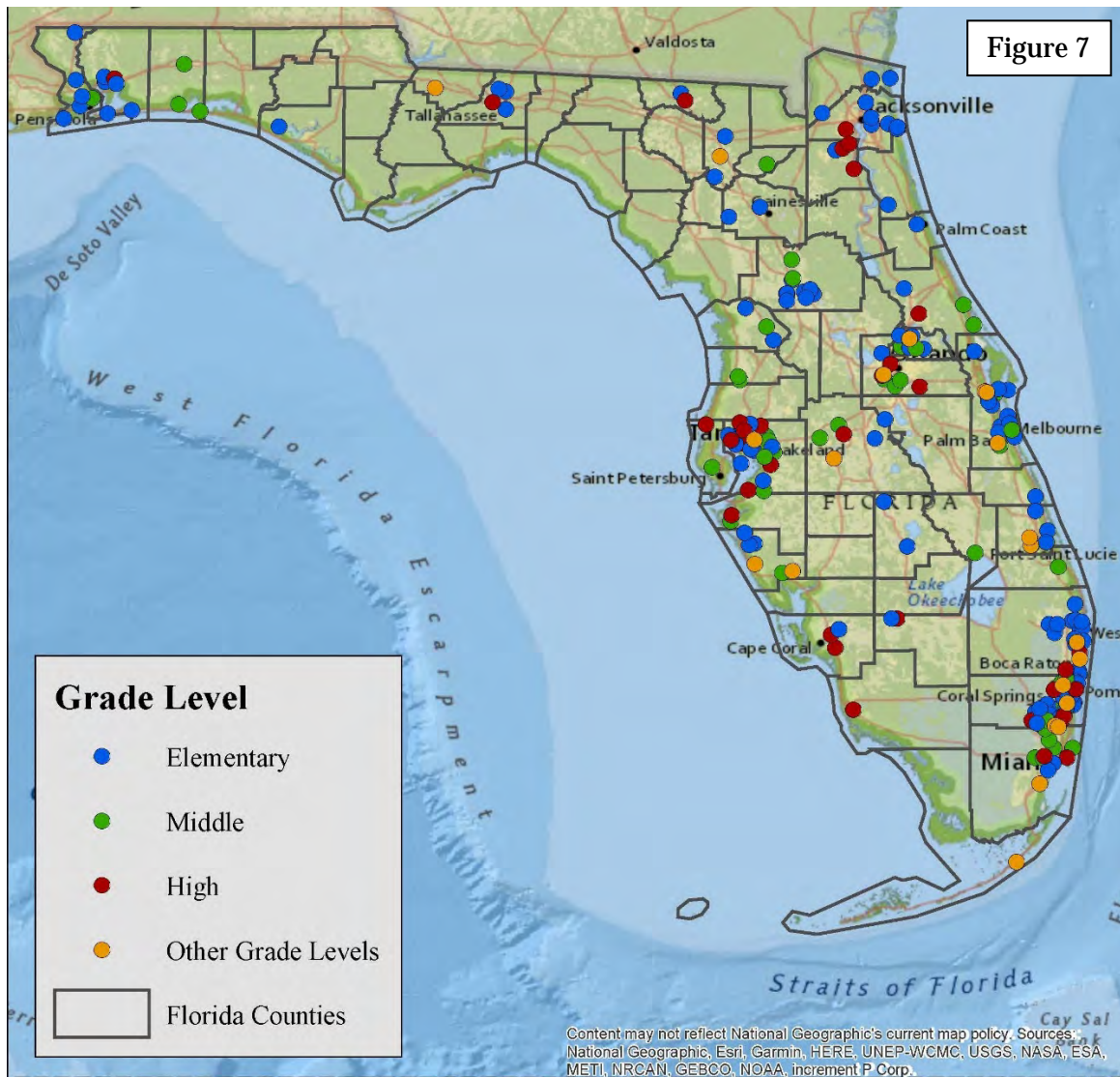
⁵¹ U.S. Department of Education

⁵² The Solar Foundation, Solar Jobs Census 2018: Florida

FDACS Office of Energy Education & Workforce Development Initiatives

Recognizing the issues regarding STEAM, vocational education, and workforce development, the FDACS Office of Energy has provided programs in the past aimed at encouraging these career paths. The SunSmart Schools program provided 10kW solar energy systems with battery backup capabilities to schools that were also designated as emergency shelters, and each school received education kits that focus on hands-on STEAM. The program also included teacher workshops to provide training for teachers regarding energy activities.

To build on this success, the FDACS Office of Energy created the Energy Curricula and Learning Kits program for Florida schools. Each kit targets a specific grade range and includes enough materials for students to work in lab groups. In Spring 2019, the FDACS Office of Energy made a total of 677 Energy Curricula and Learning kits available to public schools (Figure 7). The energy education kit program builds upon the previous SunSmart Schools program, which ties into EnergyWhiz Events.



The FSEC hosts the EnergyWhiz Event every year in May and regularly attracts over 1,000 students, parents, and volunteers. There are seven separate STEAM events, including Energy Innovations, Junior Solar Sprint (JSS) Challenge, Energy Transfer Machine, Hydrogen Horizon Automotive Challenge, Bright House Solar Cook-Off, Critter Comfort Cottage, and Electrathon. The most popular competitions are the JSS Challenge and the Solar Cook-Off. FDACS Office of Energy works with FSEC in several ways to support the EnergyWhiz Events, such as encouraging FSEC to add a “Fresh From Florida” component for the Solar Cook-off event, assisting with event judging, and providing event sponsorship. More recently, the FDACS Office of Energy has worked closely with FSEC to expand the EnergyWhiz event by hosting regional competitions.

In addition to these programs, the FDACS Office of Energy is continually seeking opportunities to implement the state’s policy on energy education, with a goal of improving quality of life for Floridians, both financially and environmentally, through energy education.

FDACS Office of Energy Initiatives:

- Increase the FDACS Office of Energy's collaboration with other FDACS divisions – such as the Division of Marketing and Office of Communications – to more effectively provide educational information concerning EERE to Florida consumers.
- Develop consumer protection education materials with the emphasis on seniors, veterans, and vulnerable populations.
- Develop educational booklets on renewable energy and energy efficiency similar to the Florida Agriculture in the Classroom Program (www.faitc.org).

Collaborative Actions:

- Collaborate with the Florida Department of Education, non-profits, and state universities to promote STEAM education through energy education programs. This will be accomplished through a variety of programs including the Energy Education Kit Program.
- Work with FSEC to expand the EnergyWhiz Events so that regional events can culminate at one statewide event in Cocoa.
- Work with Florida's public colleges and state universities to provide teacher workshops throughout the state. These workshops would focus on EERE activities and curriculum that reinforce STEAM skills.
- Work with the Florida Department of Education, industry, colleges, state universities, and other relevant stakeholders to identify deficiencies in workforce readiness and use this information to build quality vocational programs that prepare Florida's students for the energy workforce.

Legislative Actions:

- Continue to host the Florida Energy Clearinghouse and explore ways to expand its use, such as offering resources in Spanish.
- Work with industry and the Florida Department of Economic Opportunity to identify gaps in workforce skills and create workforce development programs that target those gaps, such as programs focusing on veterans and ex-offender re-entry.

Questions for Future Engagement:

- How can Florida engage industry to develop relevant workforce development programs?
- How can we encourage students to pursue STEAM education earlier?

VII. Research, Development, Demonstration, and Deployment



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Key Points of Discussion:

- Recognize Research, Development, Demonstration, and Deployment's (RDDD) role in innovation and economic development.
- Support state level RDDD to guide solutions for Florida.
- Support state level RDDD to leverage federal funding opportunities.
- Increase prestige amongst Florida's state universities through increased RDDD.

Priority Action Items:

- Support funding for Florida-specific climate research that addresses Florida's unique vulnerabilities.
- Reorganize the Florida Energy Systems Consortium (FESC) so that state research funding would flow through the FDACS Office of Energy to ensure coordination at the state level. FESC would be used to coordinate state university and industry research as it relates to energy.
 - Create a dedicated funding source, guided by FESC, to provide matching funds for state universities seeking federal grant funds for Energy RDDD projects.
 - Create a dedicated funding source, guided by FESC, for RDDD projects that address Florida-specific energy related innovation and solutions.



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Discussion:

Research, Development, Demonstration, and Deployment in relation to Economic Growth

RDDD plays a pivotal role in economic development while addressing the future challenges of the State of Florida. According to the U.S. Chamber of Commerce Foundation, "innovation drives economic growth." To quantify this statement, the Enterprising States report says that economists attribute 50 percent of U.S. annual Gross Domestic Product growth to increases in innovation.

⁵³ Yet, Florida ranks 35th in Bloomberg's innovation index. Additionally, investing in research and development supports post-secondary students as they pursue STEAM-related careers.

⁵³ U.S. Chamber Foundation

Florida spent \$9.5 billion in federal and state funding on research and development in 2015.⁵⁴ As of 2017, Florida ranked fourth in total research and development spending by state agencies.⁵⁵ However, Florida agencies only spent \$717,000 on energy-related research and development out of nearly \$203 million in total research and development spending.⁵⁶ RDDD spending is a driver of innovation, so it's important that our state provides funding opportunities to accelerate innovation.

North Carolina has invested in their state universities and, according to a statewide analysis conducted by Economic Modeling Specialist International, state universities and colleges together created \$63.5 billion in added economic value during fiscal year 2012-13 for that state.⁵⁷

Venture capital businesses capitalize on innovation by bringing these new technologies to market. In 2016, Florida spent \$1.5 billion on venture capital investment.⁵⁸ Spending on venture capital is an important indicator, as states with high venture capital spending generate new business and economic growth. Florida excels in this area, as venture capital expenditures have outpaced the national average by approximately \$1.3 billion.⁵⁹ Florida also succeeds in generating startup – but a pipeline of innovation is needed to continue this trend.

The new energy technologies that will enable this transformation must be created in our distinguished state universities and research centers. To ensure these technologies ultimately reach consumers, we must foster an environment that encourages technology professionals to advance their research and development efforts from the lab to the marketplace. Florida consumes more energy than it produces, making it a net energy importer of natural gas, coal, uranium, and petroleum products.⁶⁰ Commercializing new technologies would not only lessen our dependence on out-of-state energy sources, but also create new economic opportunities in Florida while keeping money in-state.

Promotion of RDDD

Section 377.703, Florida Statutes, directs the FDACS Office of Energy to “coordinate efforts to seek federal support or other support for state energy activities, including energy conservation, research, or development, and is responsible for the coordination of multiagency energy conservation programs and plans” and promote “the commercialization of renewable energy resources.”

⁵⁴ National Science Board, Science and Engineering Indicators, Florida 2018

⁵⁵ National Center for Science and Engineering Statistics, InfoBrief December 2018 NSF 19-305

⁵⁶ Ibid

⁵⁷ (2015, February 18). Impact of Higher Education in NC Totaled \$63.5 Billion in 2012-13: UNC System Office. Retrieved from <https://www.northcarolina.edu/news/2015/02/impact-higher-education-nc-totaled-635-billion-2012-13>

⁵⁸ National Science Board, Science and Engineering Indicators, Florida 2018

⁵⁹ Ibid

⁶⁰ U.S. Energy Information Administration, Florida State Profile and Energy Estimates

There are two main approaches that the FDACS Office of Energy has taken to promote RDDD.

First, the FDACS Office of Energy supports RDDD initiatives through state funding mechanisms such as the Renewable Energy and Energy Efficient Technologies (REET) Grant Program. Since its inception in 2006, the REET Grant Program has funded various projects from biomass to bi-facial solar cells. Some of these projects have moved on to the deployment (commercialization) phase. Florida Atlantic University's Ocean Current Energy project and the University of Florida's Southeast Partnership for Advancing Renewable from Carinata project are examples of projects moving towards commercialization. As the REET program concludes, the FDACS Office of Energy must pursue new programs that encourage innovation and drive the future of Florida's economy.

Second, the FDACS Office of Energy collaborates with and supports stakeholders within Florida when seeking federal funding opportunities. One such project is the Florida Alliance for Accelerating Solar plus Storage Technology Readiness (FAASSTeR). The FAASSTeR project has brought together a coalition of utilities, state entities, and national labs to address the issues of ever-increasing intermittent renewable energy resources on the electric grid. This a proactive step towards modernizing Florida's electric grid to accept new and innovative technologies. FDACS Office of Energy will continue to pursue federal funding opportunities to advance Florida's goals.

Florida Energy Systems Consortium (FESC)

FDACS Office of Energy works with Florida's twelve public universities through the FESC. Created by section 1004.648, Florida Statutes, FESC combines all of the state's university resources into one statewide center to advance energy research, technology transfer/commercialization, energy education, and outreach in this rapidly changing and critically important field. The initial \$38 million state appropriation in 2008 was leveraged to obtain an additional \$425 million in funding from third parties and resulted in the creation of 14 spin-off companies that are still active today.

RDDD is an important component to the economic development and environmental wellbeing of the state. RDDD solves problems and leads to innovation, new jobs, and more advanced clean energy technologies. Private industry does invest in RDDD, however costs and the associated risk mean that investments are generally short term and focused on applied research. State funding for RDDD allows for basic research into early stage ideas, feeding the pipeline of innovation and commercialization of new technologies.

To address the challenges and opportunities facing Florida, we must learn to change our behavior by applying new technologies to use our energy more efficiently and economically, and to lessen the environmental impacts of energy production.

FDACS Office of Energy Initiatives:

- Provide support to state universities as they apply for federal funding opportunities.

Collaborative Actions:

- Build a network of industry, state university, and public stakeholders to collaborate on applying for and securing federal funding for research initiatives.

Legislative Actions:

- Develop an RDDD program focused on creating research hubs, funded at \$10 to \$20 million per hub, to capitalize on the state's unique opportunities. This will help establish RDDD hubs based at Florida's state universities, with emphasis on public-private partnerships, and focused on specific strengths around the state, such as ocean current energy, biomass, bioenergy, or solar.
- Collaborate with other state agencies, such as the Florida Department of Environmental Protection and the Florida Department of Transportation, to identify underutilized state-owned lands for use as clean energy test beds.
- Support funding for Florida specific climate research that addresses Florida's unique vulnerabilities.
- Support funding for research into the usefulness of hemp as a bioenergy crop.
- Reorganize FESC so that state research funding would flow through the FDACS Office of Energy to ensure coordination at the state level, including coordination of state university and industry research as it relates to energy.
- Create a dedicated funding source, guided by FESC, to provide matching funds for state universities seeking federal grant funds for Energy RDDD projects.
- Create a dedicated funding source, guided by FESC, for RDDD projects that consider Florida-specific energy related innovation and solutions.

Questions for Future Engagement:

- How do we assist in the commercialization of new technologies created in Florida's state university system?
- What is the best way to foster collaboration between industry and state universities?
- What is the best way to leverage and engage federal resources, including the national labs?

VIII. Electric Industry Infrastructure



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Key Points of Discussion:

- Addressing the critical electrical needs of the state requires balancing between spending for needed infrastructure investments to propel Florida into the future, while keeping rates low and affordable.
- The state must ensure all utilities have the charging infrastructure to match the growth of EVs that is expected over the next 10 years.
- Investments in these new technologies allow utilities to stay ahead of cyber security crimes and reduce outage frequency and length, providing better service to its customers.
- It's critical that Florida's utilities be strongly encouraged to continue modernizing the State's infrastructure to accommodate future changes to the industry, including new renewable energy technologies, storage devices, electric vehicles, and microgrids.

Priority Action Items:

- Release a Request for Proposal to conduct an updated study on Florida's Renewable Energy Potential Assessment, the infrastructure upgrades needed to accommodate that growth, and the least cost alternatives to implement – the last update was in 2010.
- Initiate the voluntary Performance Excellence in Electricity Renewal (PEER) rating system in Florida to assist entities with modernization of their electric grid services. The PEER rating system focuses on resilient, efficient, and reliable power systems.



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Discussion:

Section 377.601 (1), Florida Statutes, states in part that "...there is significant value to Florida consumers that comes from investment in Florida's energy infrastructure that increases system reliability, enhances energy independence and diversification, stabilizes energy costs, and reduces GHG emissions."

Technology Changes and Florida's Electric Grid

The electric grid in Florida was largely designed and built over 70 years ago to deliver electricity in one direction – from the generation facility to the customer. The use of the grid has changed dramatically over the past two decades as technology advances, and Florida's utilities are upgrading and adapting the grid to accommodate the changes. Yet the fundamental grid design has not been altered. To incorporate and expand renewable energy in Florida, the electric grid will need to be modernized to allow for a two-way flow of energy.

It has long been a goal of the State of Florida to ensure a safe, secure, reliable, and resilient energy system. In the past, those efforts focused on a diverse fuel supply and adequate electrical generation. Today, with the major changes occurring in the electric industry and other industries that impact the electric grid, Florida's utilities must also address:

- Cybersecurity;
- Modernizing the electric grid through the installation of intelligent equipment and controls to produce a "smart grid;"
- The addition of the two-way flow of renewable energy and battery storage; and
- The addition of EVs increasing demand on the electric grid.

Addressing the critical electrical needs of the state is a balancing act between spending for needed infrastructure investments that will lead the state into the future and keeping rates low and affordable. In addition, the state must also balance siting needed infrastructure, such as transmission and distribution lines, to ensure resiliency, and address the state's environmental concerns. A balance must be met between all divergent priorities to ensure Florida has the needed attributes to ensure environmental quality and economic growth.

Florida's Changing Fuel Mix

Florida generates more than 90 percent of the electricity it uses in-state; however, we rely on imported fossil fuels to power over 90 percent of its electric generators.

⁶¹ This reliance on out-of-state fuel leaves Florida in a vulnerable position to fuel shortages or great fluctuations in fuel prices. In the past, to alleviate potential economic harm from this dependence on out-of-state fuel, Florida utilities attempted to maintain a balanced fuel mix of one third coal, one third nuclear, and one third natural gas – should the state experience a shortage of any one fuel source, two-thirds of the state's electric generation would remain stable.

With worldwide fuel demand increasing and technological changes in the electric industry, the utilities must migrate faster towards a new fuel mix. In 2008, Florida's utilities relied on natural gas to power 40.08 percent of its electricity; by the end of 2018, that dependence grew to 68.18 percent.⁶² Currently, Florida's utilities are reducing their dependence on nuclear, and are growing their mix of renewable energy – although more progress remains to be made.

⁶¹ Statistics of the Florida Electric Utility Industry, October 2018, Florida Public Service Commission.

⁶² 2008 and 2019 Florida Reliability Coordinating Council Load and Resource Plan, FRCC Form 9.2 Energy Sources.

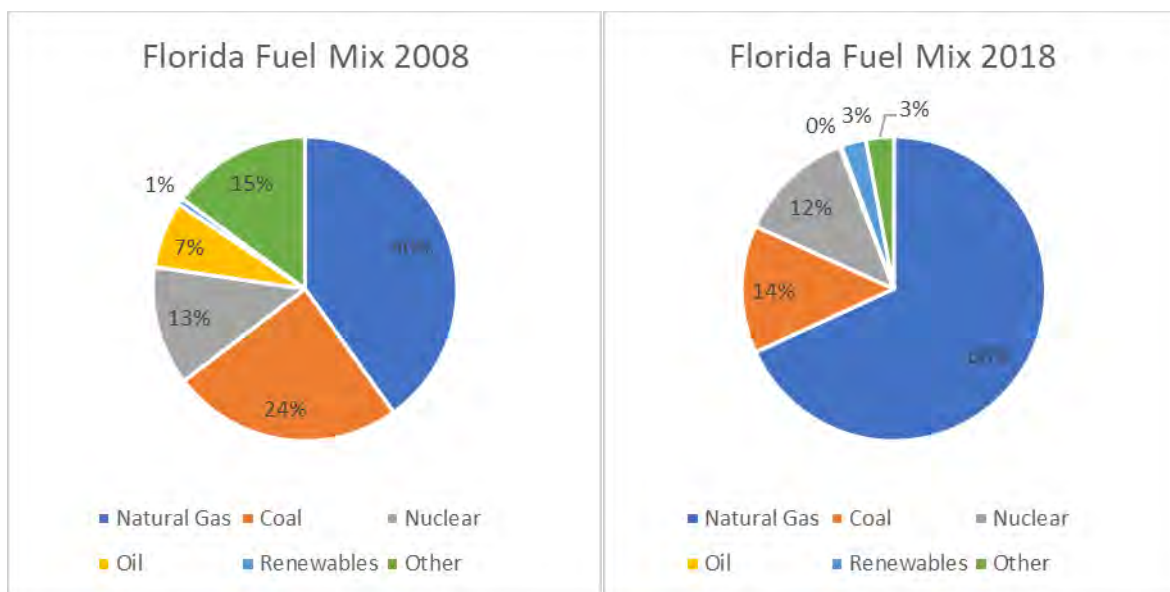


Figure 8 - Florida Electricity Energy Sources Load and Resource Plan - Florida Reliability Coordinating Council FRCC Form 9.2. Percentages rounded to next whole number.

This migration is being encouraged by nationwide economic trends, including:

- Less expensive natural gas generation facilities;
- Reduced costs of renewable energy technologies;
- The high cost and lengthy permitting and construction time of nuclear power; and
- The phasing out of coal generation due to its high environmental consequences.

The recent development of cost-effective energy storage devices and the lower cost of solar energy have created market incentives for utilities, businesses, and consumers to invest in solar generation. In 2017, renewable energy represented 4.3 percent of Florida's overall installed generation capacity – and Florida's electric utilities are projecting renewable energy to grow to 13.7 percent over the next decade.⁶³ This amount of renewable energy is comprised of a mix of utility-scale solar generation, biomass, municipal solid waste, waste heat, wind, landfill gas, and customer-owned renewables.

FDACS Office of Energy has coordinated with the FAASSTeR project to encourage the deployment of solar energy and storage technology. As previously mentioned, FAASSTeR is a multi-partner, statewide effort to catalyze acceptance and strategies for

⁶³ Review of the 2018 Ten-Year Site Plans of Florida's Electric Utilities, Florida Public Service Commission, November 2018, Figure 3: State of Florida – Current and Projected Installed Capacity by Fuel, Source: 2018 FRCC Load & Resource Plan and TYSP Data Responses.

the deployment of solar plus storage technologies, including the necessary infrastructure, in a cost-effective way.

Electric Vehicles and Its Impact on the Grid

Finally, an influx of EVs over the next decade will have a great impact on Florida's electric infrastructure. At the end of 2018, Florida had more than 82,000 registered EVs⁶⁴ -- a number that's expected to grow to 420,000 in the next 10 years.⁶⁵ Florida's utilities will need to address the impact of this new demand for energy on the distribution system and generation capacity.

This large increase in new consumers of electricity in Florida presents two infrastructure concerns at the local level: the distribution grid may not be sufficient to accommodate huge spikes in power demand, and within local power transformers, if multiple EV owners use the same distribution transformer, they may cause damage or outages from overloading the equipment or by shortening their normal cool-down.⁶⁶

The state must ensure all utilities have the charging infrastructure to match expected EV growth over the next 10 years. Therefore, the FDACS Office of Energy is leading the way with an EV infrastructure analysis. This analysis will work with the state's utilities to determine what impacts EV charging stations might have on the electric grid, and develop solutions for any potential negative impacts. It will also assess EV charging from a transportation perspective (i.e. evacuation corridors, highways, etc.). These will be combined to determine focus areas for EV infrastructure development and provide guidelines on how best to implement these infrastructure upgrades.

New Technology and Cyber Security

Florida's utilities continuously upgrade their electric infrastructure for numerous reasons including storm hardening expanding transmission and distribution lines to provide new or enhanced service, adding smart equipment on existing lines to address storm outages, and provide quicker response times. In automating the electric grid, utilities are placing an increasing amount of internet-connected technologies on the grid infrastructure. With this strong connection to the internet, cybersecurity becomes increasingly important to protect the electric grid.

Investments in these new technologies allow utilities to stay ahead of cybersecurity crimes and reduce outage frequency and length, providing better service to customers. It's critical that Florida's utilities be encouraged to continue modernizing infrastructure to accommodate future changes, including new renewable energy technologies, storage devices, and microgrids.

⁶⁴ Florida Department of Highway Safety and Motor Vehicles

⁶⁵ Review of the 2018 Ten-Year Site Plans of Florida's Electric Utilities, November 2018, Florida Public Service Commission, page 17.

⁶⁶ Eric Schmidt, The Impact of Growing Electric Vehicle Adoption on Electric Utility Grids, August 28, 2017, Electric Utility.

FDACS Office of Energy Initiatives:

- Release a Request for Proposal to conduct an updated study on Florida's Renewable Energy Potential Assessment, the infrastructure upgrades needed to accommodate that growth, and the least cost alternatives to implement.
- Initiate the voluntary Performance Excellence in Electricity Renewal (PEER) rating system in Florida to assist entities with modernization of their electric grid services. The PEER rating system focuses on resilient, efficient, and reliable power systems.
- Utilize available state, federal, and private grant funds to promote expansion of alternative fuels and technologies.

Collaborative Actions:

- Work with the Florida Public Service Commission (FPSC) and Legislature to strongly encourage utilities to design and upgrade Florida's electric grid, becoming more resilient and adaptable to new technologies.
- Explore and encourage utility partnerships with state universities and colleges to train for and conduct research on renewable energy manufacturing, distribution, installation, and financing efforts to enhance Florida's research and development for renewable energy.
- Work with the FPSC and Legislature to encourage utilities to integrate distributed energy resources (DERs) within their system.
- Continue participation in the FAASSTeR program to encourage cost-effective solar and storage technologies.

Legislative Actions:

- Provide policy recommendations to the Governor and Legislature in support of strengthening utilities' infrastructure through modernization and expansion.

Questions for Future Engagement:

- How do we protect Florida's electric infrastructure from sea level rise?
- Where is the rate balance between building an electric infrastructure to secure Florida's economy for the future and keeping rates affordable?
- How do we encourage the commercial and industrial deployment of renewable energy and keep basic electric rates affordable for low income and fixed income residential customers?

IX. Agriculture



IX. Agriculture

Key Points of Discussion:

- In the last 70 years, Florida has lost over seven million acres of farmland, which prevents Florida from absorbing additional carbon dioxide.
- Methane – a type of GHG – can have detrimental effects if left in the environment. However, methane from manure and organic waste can be captured and turned into renewable energy through a process called anaerobic digestion.
- Certain farming practices, like cover cropping, have the potential to reduce GHGs at a lower cost than other emission reduction efforts in other sectors.

Priority Action Items:

- Improve agricultural water efficiency through continued joint energy and water audits.
- Identify a dedicated funding source that will assist agricultural producers to implement the results of their audits.
- Create a per acre incentive for farmers to grow a biofuel crop that doubles as a cover crop. This helps produce renewable energy, reduce GHG emissions, and increase water quality. If the program is undersubscribed, remaining funds would go into research and development of Florida specific bioenergy crops.



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Discussion:

Florida's landscape has changed greatly in the last 70 years. Since 1950, 18.2 million more people call Florida home.

⁶⁷ With this increase in population also come more homes, businesses, and roads. This urbanization comes at a cost, with over seven million acres of Florida farmland lost in the past 70 years.⁶⁸ Losing precious farmland is important to all Floridians, as this land feeds the state and country, employs 2 million people, and acts as critical carbon sinks.

Reducing GHGs with Cover Cropping

Oceans and plants, including farmland, absorb more carbon dioxide than they emit, and are known as carbon sinks. Carbon sinks have helped to slow the gradually accelerating emission rate by removing 57 percent of carbon dioxide emitted from human activities from 1958 to 2008.⁶⁹ Unfortunately, our current carbon sinks cannot keep up with the continual addition of more carbon dioxide now accumulating in the atmosphere at an

⁶⁷ United States Census Bureau

⁶⁸ Florida Agriculture Overview and Statistics, Florida Department of Agriculture and Consumer Services

⁶⁹ Climate.gov, Carbon Dioxide: Earth's Hottest Topic is Just Warming Up, 2009

increasing rate. However, farm, ranch, and forest lands can further increase carbon absorption through practices such as conservation tillage, cover cropping, and changes in species composition. These types of farming practices have the potential to reduce GHGs at a lower cost than other emission reduction efforts in other sectors.⁷⁰

One cover crop gaining attention in the southeastern United States is carinata (Ethiopian mustard). Under the FDACS Office of Energy's Research and Development Bioenergy Grant Program, the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) was awarded a grant to study the feasibility and best management practices for growing carinata. Carinata is a dedicated feedstock for renewable jet fuel, diesel, and other bioproducts.

Due to the success of the project, the U.S. Department of Agriculture's National Institute of Food and Agriculture awarded UF/IFAS a \$15 million grant to further study carinata and develop the supply chain to commercialize the crop. Today, carinata is at the forefront of advanced biofuel alternatives, making it competitive with petroleum. In addition, the meal from carinata seed can provide a high-protein feed source for livestock. These characteristics make carinata a promising cool season crop that provides agronomic, environmental, and economic benefits to producers.

Hemp is another promising crop. In addition to the well-known benefits of hemp – such as textiles, biocomposite building materials, and human and animal wellness products – hemp also has environmental benefits. Hemp is one of the best plants for removing heavy metals from contaminated soil and has been used at sites near the Fukushima and Chernobyl nuclear power plant accidents.⁷¹ In addition to remediating the land, hemp's deep taproot aerates and enriches the soil for future crops. Hemp has also been scientifically proven to absorb more carbon dioxide per hectare than any other forest or commercial crop, making it an ideal carbon sink.⁷² With all the benefits associated with hemp, it has the potential for positive impacts on the state's economy, agricultural industry, and environment.

Waste-to-Energy or Anaerobic Digestion

In agriculture practices there are competing priorities, especially for unconventional issues. For example, livestock wastes can be important sources of nutrients for crops, but manure must be managed properly to prevent loss of nutrients to the environment. However, even some of the current best management practices do not address the methane released from manure decomposition. Methane sources include the production and transport of coal, natural gas, and oil – and also comes from livestock and the decay of organic waste in solid waste. If methane is left in the environment, it can have detrimental effects. However, methane from manure and organic waste can be

⁷⁰ United States Department of Agriculture, Economic Research Service, Agriculture Production and Mitigation

⁷¹ Hemp could clean up — if people stop mistaking it for pot, Dylan Brown, E&E News, Wednesday, October 18, 2017

⁷² The Role of Industrial Hemp in Carbon Farming, James Vosper BSCHons, FRGS, GoodEarth Resources PTY

captured and turned into renewable energy through a process called anaerobic digestion.

Harvest Power Orlando uses anaerobic digestion to converting organic waste – primarily yard trimmings and food scraps – into renewable electricity and natural fertilizers. Located at the wastewater treatment plant in the Reedy Creek Improvement District, Harvest Power Orlando is the first facility of its kind in the United States that produces enough energy to operate the facility and helps eliminate odors associated with processing organic waste. When operating at full capacity, the facility processes more than 120,000 tons of organic materials annually and produces 5.4 megawatts of combined heat and power. Even with the multiple benefits of anaerobic digestion, this technology has not been widely adopted in the United States because of the large upfront investment.

FDACS Initiatives

Like any other industry, agricultural producers use fossil fuels and electricity as part of the production process. The FDACS Office of Energy recognized the great opportunities within the agricultural community, and has worked with producers across the state to increase energy efficiency, expand renewable energy production, and limit environmental impacts.

The Farm Energy and Water Efficiency Realization Program (FEWER) was a popular and successful pilot program in Suwannee County that provided on-site energy and water audits to farms. The pilot program provided a 75 percent cost share, up to \$25,000, to area agriculture producers who participated in the audit and implemented some of the recommendations. The 132 Suwannee County agriculture producers who implemented recommendations from their water and energy audits are saving \$1.5 million collectively on their utility bills every year.

Based on the popularity and success of the FEWER program, the FDACS Office of Energy created the Farm Renewable and Efficiency Demonstration (FRED) Program. FRED provided free energy evaluations valued up to \$4,500 to Florida agricultural producers. FRED also provided Florida agricultural producers grant reimbursement for 80 percent of the cost to implement the recommendations from the free energy evaluation up to \$25,000. Examples of eligible projects for reimbursement included energy-efficient lighting and water pumps, and renewable energy generation such as solar or biomass.

FDACS Office of Energy worked with the FDACS Division of Aquaculture to develop the Efficiency and Renewable Improvements in Commercial Aquaculture Program (ERICA). The program funding of \$1,002,103 increases energy efficiency, reduces energy usage, and lowers operating costs at commercial aquaculture facilities in Florida. ERICA provides grant reimbursement for technologies that significantly increase EERE for eligible commercial aquaculture facilities and farms located in Florida.

FDACS Office of Energy worked with the FDACS Office of Agricultural Water Policy to develop and administer a program for agricultural producers in the Apalachicola and Suwannee River Basins. Using \$2.5 million of RESTORE Act (Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast Act) funds, this program provides free energy and water audits as well as grant reimbursement for 75 percent of the cost to implement the recommendations from the free energy and water audit up to \$25,000.

FDACS Office of Agricultural Water Policy is also redoubling efforts to enroll agricultural producers into the best management practices (BMP) program and verify the effectiveness of BMPs being implemented and is also undertaking review of the manuals governing BMPs to ensure the latest scientific and technical research recommendations related to water resources protection. This office also continues to partner with academic institutions, with particular research emphasis being placed on the role of legacy nutrients within impaired watersheds, and encourages prioritized funding of cost share projects within areas of need and innovation.

Throughout all of Florida's history, agriculture has been at the forefront. Today, the agriculture industry has a \$132 billion economic impact, and is the state's second largest industry – and first largest in times of economic downturn.⁷³ Not only are our agricultural producers feeding our state, nation, and world, their farmlands are absorbing carbon dioxide. By working together with the agricultural community, we can leverage policies and programs to support their efforts to conserve energy, increase renewable energy, reduce GHGs, and improve our environment.

FDACS Initiatives:

- Improve agricultural water efficiency through continued joint energy and water audits.
- Collaborate with the FDACS Office of Agricultural Water Policy to develop policies that will improve water infrastructure performance in the agriculture sector.
- FDACS Office of Agricultural Water Policy to increase enrollment of agricultural producers into the BMP program, verify effectiveness of implemented BMPs, and review BMP manuals to ensure latest scientific and technical recommendations.

Legislative Actions:

- Create a research and development grant program to further renewable energy and/or energy efficient technologies that also reduce water consumption, increase water system efficiency, and/or increase water quality.

⁷³ 2017 Annual Report, Florida Department of Agriculture and Consumer Services

- Appropriate a dedicated funding source to assist agricultural producers to implement the results of their audits.
- Create a per acre incentive for farmers to grow a biofuel crops that double as a cover crops, helping produce renewable energy, reduce GHG emissions, and increase water quality. If the program is undersubscribed, remaining funds would go into research and development of Florida specific bioenergy crops.
- Allocate funding for the Rural and Family Lands program to encourage conservation of agricultural lands, providing environmental benefits while preventing ecological degradation from development and urban sprawl.

Questions for Future Engagement:

- How can the state encourage alternative technologies like anaerobic digestion, and help lower the cost?
- How can the state prevent continuation of urban sprawl?
- As the population continues to increase, how can the state support agriculture producers to produce more crops with less GHGs?

X. Decreasing the Energy Burden for Low Income Communities



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Key Points of Discussion:

- Low income residents pay a higher percentage of their income on electric bills, mainly powering HVAC, water heaters, and kitchen appliances, the age of which increases the energy burden substantially.
- Reducing energy waste caused by older home equipment lowers the overall demand on Florida's electric grid, thereby reducing the base rate for all consumers.

Priority Action Items:

- Create incentive programs for upgrading older HVAC systems.
- Educating rental consumers about the hidden costs of older appliances to help people make informed decisions about where their next home will be and what it will cost them to operate.



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Discussion:

Florida's median household income is \$50,883, while a household of four making less than \$37,650 is classified as low-income.

⁷⁴ The U.S. Census Bureau estimates 14 percent of Florida's 21.5 million residents – roughly three million citizens – live in poverty.⁷⁵ For purposes of housing, Florida defines low-income or moderate-income residents as families and people who cannot afford to pay for decent, safe, and sanitary housing that is provided by the free market.⁷⁶

The Critical Concern for Low-Income Households

As a general rule, personal finance dictates that housing costs (mortgage/rent and utilities) should not exceed thirty percent of a household's income. However, the percentage of housing costs for low-income households ranges between 30 and 50 percent, disproportionately larger than higher earning individuals. Almost one million low-income Floridians pay more than 50 percent of their income on housing.⁷⁷

One of the highest monthly expenses for low-income residents is the electric bill. The three largest drains on a household's total energy consumption are the HVAC, water heater, and kitchen appliances, such as the refrigerator and stove. Combined, these

⁷⁴ U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates.

<https://www.census.gov/programs-surveys/acs/?intcmp=serp>

⁷⁵ US Census Bureau, Percentage of People in Poverty by State Using 2- and 3-Year Averages: 2014-2015 and 2016-2017. <https://www.census.gov/data/tables/2018/demo/income-poverty/p60-263.html>.

⁷⁶ Section 420.102, Florida Statutes, on Housing.

⁷⁷ Sadowski Housing Coalition, Facts Page, <https://www.sadowskicoalition.org/facts/>

three items contribute to well over half the cost of every Florida electric bill.⁷⁸ Older homes tend to operate older HVACs and appliances that use more energy than necessary. Compounding the use of inefficient HVAC systems in low-income homes are older windows, doors, and insulation that are less effective at keeping the indoor climate comfortable and healthy.

To better serve low-income customers, utilities must build electric generators to produce excess power to serve old and inefficient appliances. This increased energy production means all utility customers pay higher rates to generate energy being used inefficiently. Education and incentives are two important drivers for change in implementing energy efficiency upgrades for low-income or fixed income residents. Therefore, the State of Florida and its utilities must do more to improve energy efficiency in low- to moderate-income sectors, which will benefit all energy consumers.

Homeowners versus Renters

Low-income homeowners face different obstacles than low-income renters in making energy efficiency upgrades. When faced with a failing appliance or HVAC system, homeowners must decide between maintenance, replacement, or discontinued use, each of which poses its own set of hurdles. For low-income homeowners, the expenses of home repair and maintenance can be too costly to make the investment.

Low-income homeowners, or homeowners on a fixed income, are likely to maintain HVACs and appliances beyond their durable life, until the product completely stops working. Then they may purchase used equipment, which is no better regarding energy efficiency than their old appliance. Also, homeowners may run their HVAC at a temperature that is not comfortable (running the thermostat higher for air conditioning or lower for heating) to save money. This can put health at risk for vulnerable consumers, such as seniors.

Whether the decision is conscious or not, renters choose their level of efficiency upon signing a lease. After that, they are limited in their ability to maintain or replace equipment that does not belong to them. Renters are dependent upon landlords for most energy efficiency upgrades, which tend to occur only when the equipment fails – and even then, the landlord is likely to purchase the cheapest option available. Limited access to affordable housing further restricts the level to which low-income renters can upgrade to apartments with energy efficient HVACs, water heaters, and kitchen appliances.

Thirty-five percent (or 7.5 million) of Florida residents rent.⁷⁹ A portion of these low-income renter households (238,000) live in assisted and public housing units, more than three quarters of which (183,000) are multifamily rental units. In order to reduce their electric bill, renters can choose to run the HVAC or not, but do not have ownership to repair an outdated system or make other energy efficiency improvements. For

⁷⁸ According to __, Florida's average home electric bill is a combination of approximately 50 percent appliances, electronics and lighting, 27 percent air conditioning, 14 percent water heating, and 9 percent space heating.

⁷⁹ U.S. Census Bureau, Florida QuickFacts. <https://www.census.gov/quickfacts/geo/chart/US/HSG445217>

landlords, repairing or replacing HVAC units is a business decision. When replacing equipment in rental properties, a landlord most likely will make the decision based on price, not energy efficiency or the comfort of its use. Landlords of apartment complexes or multifamily units have little financial incentive to make energy efficiency improvements to their multiple properties, as most economic benefits resulting from energy efficiency improvements of rental units would accrue to the renter, not the owner. This causes a “split incentive.” Strict building codes on HVAC minimum requirements help to improve the efficiency of their units and overall quality of life for residents and tenants.

In 2015, the FDACS Office of Energy conducted a Multifamily Housing Retrofit Demonstration Project in two of Florida’s Housing Authorities. One served low-income large families, and the other served low-income senior citizens and the disabled. Retrofits targeted the most inefficient equipment, such as lighting, insulation, ceiling fans, and water heaters, and in some cases, HVAC systems. Energy data was tracked from one year before and after the retrofits. The project measured significant savings resulting from the retrofits. The most significant savings were found in units where the HVAC systems were upgraded. Average energy cost savings ranged between 25 and 38 percent in multifamily units where the HVAC systems were replaced.

Energy Retrofits and ENERGY STAR

Energy efficiency retrofits are an important strategy to reduce energy bills for all customers and specifically ease housing cost burdens for low-income customers.⁸⁰ Higher energy efficiency products, such as ENERGY STAR appliances, are constantly being developed that reduce the amount of energy used per appliance. However, the need for upfront costs to replace inefficient equipment can prevent people from investing in energy efficiency improvements that would help decrease their monthly energy usage.

Energy efficient products such as ENERGY STAR water heaters, HVACs, and refrigerators are readily available on the market. An ENERGY STAR certified central air conditioner uses eight percent less energy than conventional new models,⁸¹ and an ENERGY STAR certified electric storage water heater uses less than half the energy of a standard water heater, saving a family of four up to \$330 per year in energy bills.⁸² Meanwhile, an older refrigerator that is not ENERGY STAR certified could add up to \$125 per year to an electric bill.⁸³

Low- to moderate-income consumers will likely elect to purchase the most affordable product, not necessarily the highest quality one. Yet, lower-priced alternatives like base

⁸⁰ FDACS OOE, The Florida Multifamily Efficiency Opportunities Study, January 2015, online at http://freshfromflorida2072238849.us-east1.elb.amazonaws.com/content/download/60388/1263496/Florida_Multifamily_Efficiency_Opportunities_Study_January_2015.pdf.

⁸¹ ENERGY STAR, https://www.energystar.gov/products/heating_cooling/air_conditioning_central.

⁸² ENERGY STAR, https://www.energystar.gov/sites/default/files/asset/document/HPWHs_FactSheet_021518.pdf.

⁸³ ENERGY STAR, <https://www.energystar.gov/products/appliances/refrigerators>.

models or used appliances, are exponentially less efficient. Few consumers research the lifetime cost-effectiveness of every available product. Being provided with information on energy efficient appliances, energy efficient repairs to homes, and the lifetime energy costs of larger ticket items may help all consumers save on their electric bills and decrease the demand on the electric grid.

The U.S. Department of Energy's Weatherization Assistance Program (WAP) is a national program designed to reduce the energy costs of low-income households by increasing the energy efficiency of their homes, while ensuring their health and safety.⁸⁴ The program has helped over seven million families nationwide since its inception in 1976. WAP is a federally funded program with a high level of participant restrictions; state programs could be more targeted and allow for improvements that may be prohibited by the federal WAP program. Through weatherization improvements and upgrades, households can save an average \$283 or more each year.⁸⁵ In our state, the Florida Department of Economic Opportunity (FDEO) uses WAP funds to assist low-income residents in improving the efficiency of their homes. However, the waiting list to receive these services is often years, and there are limited funds available for energy efficiency improvements.

Senior Citizens

Twenty percent of Floridians are age 65 or older.⁸⁶ When Floridians enter retirement, their lifestyle is increasingly determined by their fixed income. There is a significant social benefit to aging in place, which is "the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level."⁸⁷ Even though energy efficient home improvements would decrease their energy bills, make their homes more resilient, and improve their comfort and health, many of Florida's seniors living in their own homes cannot afford to invest in expensive energy efficient upgrades. Energy efficiency improvements to a home also provide storm resiliency and lower homeowners' insurance costs. The State of Florida needs to bolster its support of weatherization programs that help Florida's elderly, veterans, vulnerable communities, and low-income residents stabilize their energy costs. WAP helps seniors age-in-place so they can live their fullest life in the comfort of their own homes.

Rural and Urban Low-Income Communities

When hurricanes and flooding impact rural and urban low-income communities, resources are depleted and job opportunities are lost – but the utility bills continue to add up. During the rebuilding phase, there is an opportunity to install high efficiency HVAC systems and other household appliances. However, without incentives, replacing

⁸⁴ USDOE Weatherization Assistance Program website, <https://www.energy.gov/eere/wipo/weatherization-assistance-program>.

⁸⁵ Lost reference – looking for it now / sorry 'bout that

⁸⁶ US Census Bureau, Florida QuickFacts, as of July 1, 2018, <https://www.census.gov/quickfacts/fact/table/US/PST045218>.

⁸⁷ US Centers for Disease Control and Prevention, <https://www.cdc.gov/healthypplaces/terminology.htm>.

damaged equipment with higher-priced energy efficiency equipment tends to be too expensive for those struggling to recover. State and local governments must therefore focus on programs and incentives that address the needs of those rebuilding, so that energy savings are captured.

Also, low-income populations often utilize mobile homes. There are approximately 840,000 mobile homes in Florida.⁸⁸ These homes do not fall under the regulations of the Florida Building Code, and many were built prior to a time when federal requirements mandated energy efficiency features. These mobile home owners and renters often experience poor insulation and drafty doors and windows.

In urban low-income communities, there are additional energy efficiency concerns. For urban low-income residents, large-scale multifamily buildings may be the only affordable housing available. Not only do these buildings need improvements to their building envelope but older multifamily structures may go for generations without any attempts to retrofit the HVAC systems, water heaters and kitchen appliances. These buildings, full of older equipment, perpetuate the high utility bill drain on low-income residents. Building new, energy efficient multifamily construction can help alleviate the high cost of utilities and provide residents a level of savings not seen before.

Separate from utility bills, another energy concern for urban low-income residents is that they depend heavily on public transportation to access work, food markets, and other daily needs. The cost of transportation is a further drain on their basic income.

FDACS Office of Energy Initiatives:

- Pursue funding to study the impacts of the energy burden within the state, as well as programs to address energy equity.
- Pursue funding to establish financial incentives to help retrofit multifamily housing projects serving low-income, elderly, disabled, and military veterans for energy efficiency and conservation.
- Work with FDACS Division of Marketing and Office of Communications to develop cost-effective public service announcement (PSA) campaigns to promote energy efficiency tips for renters and new homeowners, utilizing information already housed on the Energy Clearinghouse.
 - A “Know Before You Rent” campaign can encourage renters to explore the energy costs of various rental properties, as well as help renters determine how the age of appliances in a rental unit impacts the amount they will pay on their monthly electric bill.
 - Other campaigns may focus on energy efficiency and conservation tips for small businesses, the hospitality industry, and agriculture, helping educate Floridians about simple, everyday changes to decrease costs, lower energy usage, and decrease GHG emissions.

⁸⁸ U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates.

Collaborative Actions:

- Encourage the state's housing authorities to consider conducting simple in-house energy audits in their units to prioritize energy efficient upgrades and optimize the performance of existing equipment.
- Work with the University of Florida to develop a mobile-friendly version of MyFloridaHomeEnergy.com, either as a mobile-optimized website or stand-alone mobile app, which can be included as a curriculum tool to educate high schoolers about energy efficiency in their homes.
- Help develop a statewide coalition of weatherization partners across Florida.

Legislative Actions:

- Request that lawmakers create cost effective incentives for individuals and rental property owners to make new and existing buildings healthier, more resilient, and more energy-efficient.⁸⁹
- Introduce legislation that adds an energy efficiency component to the state's high school curriculum, including the long-term cost savings of energy efficient products, and the cost of inefficiency to consumers and utilities.

Questions for Future Engagement:

- How can multifamily green building construction be incentivized to encourage more energy efficient living space for low-income communities?
- How can the State of Florida work with utilities to identify and promote energy efficiency upgrades for low-income communities?

⁸⁹ National Housing Coalition, <https://www.nhc.org/about-policy/policy-agenda/>.