

CREATING A MORE RESILIENT FLORIDA WITH PACE

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INTRODUCTION



The year 2020 has shown the unprecedented challenges Florida is facing, necessitating the state to continue to develop and foster methods to become more resilient. The 2020 Atlantic hurricane season was the most active in recorded history, with more than 30 named storms. But this need for resiliency is not new, having been called for in a recent draft 2019 report released through the Florida Chief Resilience Officer (CRO). The CRO report focuses on the efforts that are being made and the efforts that must be made to ensure a prosperous and sustainable Florida. This report could not have anticipated the COVID-19 pandemic and the multitude of problems that it has caused, and lives lost from the virus, which have only compounded the need for more resiliency. In order to best respond to the pandemic and to the resiliency needs of the state, it takes individuals doing their part, combined with systems and policies in place to ensure the success of those actions. Thus, the research team found it timely to address three of the main resiliency concerns put forth by the CRO report within the context of Florida's Property Assessed Clean Energy (PACE) program: hurricane resiliency, energy resiliency, and the widespread usage of septic tanks. This white paper should be viewed as an addendum to the current research team's recently released report, Public Impacts of Florida's Property Assessed Clean Energy (PACE) Program (2020). We found it prudent to examine these three issues through the lens of how PACE can be one of many policies that can help create a more resilient Florida.

The CRO report called for engagement with universities in order to help with the understanding of data, technology, and policy while making it very clear that communities and counties need funding in order to achieve the results of these practices. This funding must come in a consistent and sustainable fashion—especially during the COVID-19 pandemic and record hurricane season that has left communities, counties, and the state with budget constraints. Florida's PACE program is a viable source of funding which leverages private capital and generates significant public benefits. The following sections detail the current challenges Florida is facing within the areas noted above, what the future may hold, and how PACE as a policy is operating and how it can help Florida become more resilient.

HURRICANE MITIGATION



As Florida continues to experience harsher extreme weather events and an increase in billion-dollar disasters (NOAA NCEI, 2020), the usage of PACE financing for the adoption of hurricane mitigation and resiliency measures has also increased. Between 2013 and November 2019, the time scope of the research team’s previous study, Ygrene Energy Fund, Florida’s leading PACE provider, invested more than \$500 million in hurricane hardening improvements in homes and small businesses. Since November of 2019 through July of 2020, Ygrene has financed an additional \$119 million in hurricane hardening improvements. Further, while Ygrene is the market leader in Florida, there is additional PACE activity by other providers such as Fortifi, PACEFunding, and Renew Financial, equaling even greater investment in hurricane resiliency. This continued rise of PACE hurricane mitigation and resiliency investments is substantial and is meeting significant demand for home, business, and community resiliency across the state. Florida currently has \$2.86 trillion of insured property that is vulnerable to hurricanes and the ripple effects of this risk of property damage have shown how vulnerable property owners and residents are to the perils of extreme weather events (CRO Report, 2019). Hurricanes are a tangible disaster to the Florida economy, with 2018 Hurricane Michael costing Florida the loss of 49 lives and negatively impacting the state economy by \$25.5 billion. Preceding Hurricane Michael was Hurricane Irma in 2017 which cost Florida the loss of 97 lives and \$52.5 billion. With hurricanes also comes the issue of flooding which has cost Florida homeowners \$5.42 billion since 2005 (CRO Report, 2020). Due to Florida’s high exposure to the impacts of hurricanes, it remains no surprise that these improvements comprise 71% of Florida PACE investments.¹

Disaster-related economic vulnerability will continue to increase as the threat of climate change continues to increase. With the state’s reliance on agriculture and tourism to drive its economy, it is essential that these industries become more resilient to the impacts of extreme weather events. The Florida Department of Agriculture and Consumer Services (2018) has estimated that Hurricane Michael resulted in losses of \$1.48 billion to the Florida agricultural industry and \$7.4 billion in insurance losses according to the Florida Office of Insurance Regulation (2020). Some of these losses can be limited through the deployment of PACE financing, backed by private capital, for wind resistant roofing and high impact windows and doors, among other measures, that are more capable of protecting properties and lives against extreme weather events while also providing insurance savings to property owners.

¹ This is representative of Ygrene PACE investment but is indicative of the investment from other PACE administrators in the state.



Often these improvements carry high up-front cost barriers, necessitating public policy initiatives designed to overcome those cost barriers. Public-private partnership financing programs, like PACE, can help overcome up-front cost barriers and increase access to resiliency improvement measures property owners may have trouble accessing.

As the climate continues to change, Florida continues to become more vulnerable to the manifestations of these changes. The need to mitigate these changes and become more resilient is becoming increasingly necessary. These climate risks and projections continue to show how changes in the climate are making Florida more vulnerable to hurricanes as NOAA's 2020 hurricane season outlook urged increased preparedness due to predictions of an extremely active hurricane season with an 85% chance of the season being above normal. This forecast ultimately became a reality with a hyperactive 2020 hurricane season (NOAA Climate Prediction Center, 2020).


The combination of a heavily populated state that has \$2.86 trillion in insured property and a substantial housing market that are all vulnerable to more extreme weather events charts an unsustainable course toward more billion-dollar disasters, a potential housing and mortgage crisis (Colman & O'Donnell, 2020), and deaths. PACE can be one of many solutions that provides access to financing for property owners leveraging private capital for communities and the state to help mitigate this ever-increasing vulnerability. Further, Hurricane Michael, the strongest hurricane ever to strike the northern region of Florida (NOAA National Hurricane Center, 2019), showed that even this region of Florida is now very susceptible to the effects of climate change and extreme weather events. The five northern counties that utilize PACE account for just 0.24% of PACE investment since 2013 (Oliphant et al., 2020). This region and the surrounding counties can look to PACE to help mitigate vulnerabilities and become more resilient. Hurricanes will continue to be a significant concern and PACE is an effective public policy that can be leveraged to help mitigate the negative impacts that will only become more frequent and devastating.

ENERGY AND BATTERY STORAGE

Increasing temperatures, decreasing water, and sea level rise will affect the ability of Florida utilities to produce, transmit, and distribute electricity to its residents. Gas or steam turbine-based power generation facilities are at risk due to decreasing water availability, energy infrastructure located along the coasts is at risk from rising sea levels and flooding, fuel transportation may be susceptible to interruption, and electrical transmission and distribution systems are at risk from physical damage caused by high winds. Compounding factors that include persistent drought, extreme heat events, hurricanes and flooding can create peaks in demand while diminishing supply. Florida has recognized the need to respond to threats and risks to become resilient to natural disasters. Addressing these risks will require concerted efforts to deploy energy technology solutions that are climate resilient, assess vulnerabilities in the energy sector, develop adaptive planning approaches, and to implement innovative policies.

The intensity and number of Category 3 to 5 hurricanes in the Atlantic has grown significantly over the last ten years. The strength of these storms increase as global warming extends to the world's oceans. Each year Florida is under threat from these storms, and in 2017, Hurricane Irma left 7 million without power for long periods of time (several days) in the state.


Installation of solar photovoltaic (PV) power on residential roof tops could produce sufficient energy and provide reliable power for daytime use when hurricanes knock down the grid. However, because most residential solar PV systems are grid-tied and net-metered, Florida policy requires homeowners to have anti-islanding to shut down inverters to protect linemen working to restore interrupted power and are unable to use the electricity generated by the PV modules. Potential solutions include the use of gasoline or natural gas fired generators, newer advanced secure power supply inverters with features that allow for the PV system to be isolated from the grid, or the use of battery backup systems. Availability of gasoline during a hurricane can be compromised while advanced inverters only work during the day, making battery back-up systems to be an effective solution. The battery back-up system essentially islands the power within the house when the grid is interrupted and keeps the house system operating in the event of an outage. Homes with a modest PV system with battery back-up can provide enough power for essentials to make it through the evening and night with daytime charging of the electrical storage device.



Some utilities in Florida encourage the use of PV systems with energy storage. Florida utility companies should all be incentivized to encourage PV systems with distributed storage which allows them to smooth out loads under normal operation and provide maximum flexibility in managing the grid. States like California, Texas, New York, Hawaii, and Massachusetts have either competitive wholesale power markets or policies that support and encourage energy storage, or both, and are among the leaders in energy storage projects. Florida, in contrast, has virtually no energy storage projects. But that could change quickly as Florida could see significant investments in utility-owned battery systems to ensure grid reliability during natural disasters. That shift is being driven by the falling costs of battery storage technology and a heightened awareness of the need to bolster grid resilience in the aftermath of recent hurricane seasons that brought the devastation of Irma and Michael.

This shift is also being driven by the ability of battery storage to offset demand charges for utility customers. Several battery systems are already “in the money” under a variety of scenarios at the low end of current cost estimates. And, as lithium-ion battery prices fall, even more potential projects could become viable. The demand charge analysis is particularly suited for Florida because it does not require a regulatory scheme to make energy storage viable. That could be an important consideration in a state that does not even have a renewable portfolio standard.

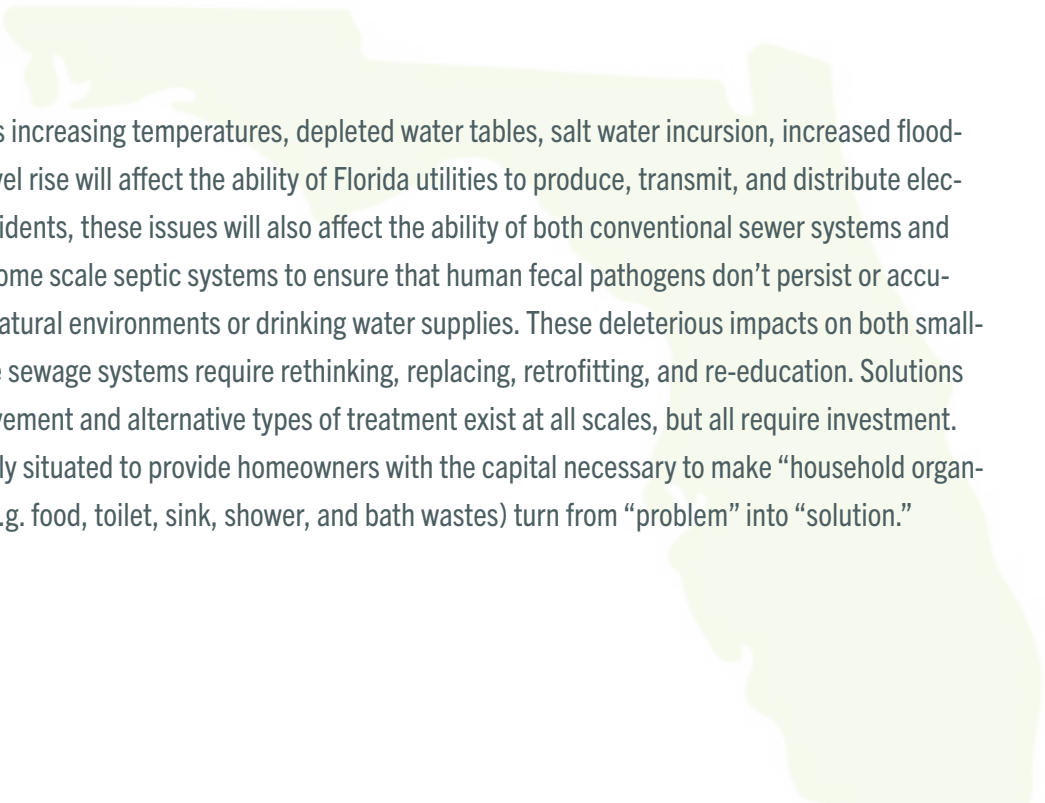
The solar tax credit was originally enacted by congress in 2006 that made solar energy affordable for Floridians. Congress passed a two year delay of the phasedown in 2020. One can save 26% of the cost of a solar installation with the federal investment tax credit (ITC) through 2022, after which it disappears for residential and steps down to 22% for commercial in 2023, and then down to 10% in 2024. The solar tax credit also applies to energy storage devices that are fully recharged by a renewable energy source. In addition to the ITC, Florida also offers property tax exemptions for residential solar and sales tax exemptions although they are not as robust as incentives offered in other states. The reduction in ITC could have a significant negative impact by discouraging homeowners or commercial entities from installing solar and energy storage systems.




Although the state’s utilities have been expanding their own production of solar power, barriers still remain for widespread solar deployment. Florida is one of eight states that prohibits the sale of solar electricity directly to consumers unless the provider is a utility. There is also a state rule, enforced by the utilities, requiring expensive insurance policies for big solar arrays on residential property. In many states where energy storage has taken off, such as California and Hawaii, electricity rates are higher than the national average. Higher rates increase the economic feasibility of broader energy storage deployment by providing capabilities such as demand charge reduction or load shifting. Rates in Florida, however, are on par with the U.S. average. That could mean that developers of energy storage projects in Florida could face more challenging conditions than developers in states with higher electricity rates. These barriers also include a lack of renewable generation mandates and state restrictions on third party electricity sales.

PACE financing provides homeowners the upfront financing necessary to overcome cost barriers and to take advantage of solar and energy storage systems to protect them from the impacts of power outages. Our prior research has shown that PACE served as a catalyst to increase the number of installations for solar projects as it enables the homeowner to spread the cost as a line item on their property tax bill over time.

SEPTIC TO ALTERNATIVE



Just as increasing temperatures, depleted water tables, salt water incursion, increased flooding, and sea level rise will affect the ability of Florida utilities to produce, transmit, and distribute electricity to its residents, these issues will also affect the ability of both conventional sewer systems and conventional home scale septic systems to ensure that human fecal pathogens don’t persist or accumulate in our natural environments or drinking water supplies. These deleterious impacts on both small- and large-scale sewage systems require rethinking, replacing, retrofitting, and re-education. Solutions for both improvement and alternative types of treatment exist at all scales, but all require investment. PACE is uniquely situated to provide homeowners with the capital necessary to make “household organic residuals” (e.g. food, toilet, sink, shower, and bath wastes) turn from “problem” into “solution.”




This can involve connecting to improved municipal or private sewage treatment systems, repairing or replacing defective septic systems, or changing over to proven alternatives like household anaerobic biodigesters (which add value to the property in terms of useful clean energy and fertilizer), composting toilets (which provide valuable fertilizer), constructed wetlands (which provide onsite treatment while improving habitat for wildlife), and “living machines” (which use biological treatment to enhance indoor growing spaces). The range of field tested, and proven solutions has now grown enormously but unfamiliarity, uncertainty, and the initial costs of adoption still deter many people from improving their waste systems with these alternatives. By providing consumers the capital to make these improvements, coupled with the programmatic oversight of registered and accredited contractors, the availability of PACE financing can make this area of innovation a “win-win” for people and the environment.

Just as PACE can help property owners with the upfront costs of hurricane mitigation and energy solutions, so too is PACE in a strong position to help homeowners and communities mitigate and adapt to the risks associated with wastewater treatment through a myriad of wastewater solutions. Further, the scale of this challenge is significant. The Florida Department of Health (2020) estimates there are 2.6 million septic systems in Florida, serving 30% of Florida’s population and representing 12% of all septic systems in the United States.

Many districts in Florida are pushing the transition from home property-based sewage treatment to municipal service hookup. This “septic-to-sewer” conversion has a rather large up-front cost, and can range from \$5,000 to \$20,000 or more, and government agencies often need to subsidize a large share of it. PACE removes this upfront cost, making the conversion more affordable and accessible.


However, as is the case with many aspects of policy, often times there is not one solution to the problem, and this is no different in the case of wastewater. “Septic-to-sewer” is just one of many solutions to this problem and as more and more home-based alternatives to traditional septic system designs prove themselves, PACE could offer Florida property owners the option of exploring a wide range of septic improvements that can satisfy both fiscal and environmental concerns.



Choices are numerous, such as next generation septic tanks that are sealed to prevent flooding and mass fabricated to be cheaper to install and maintain, leach fields that use a more sophisticated understanding of biology which improve retention time for biodegradation and replace the problematic and expensive gravel with plastic and fabric perf tubes, and actual biodigester replacements that not only treat the sewage but transform it into a safe nutrient-rich liquid fertilizer for the garden while capturing the methane all septic systems produce so that it can be used as a source of free, clean energy rather than escaping to our environment. Other systems being used successfully in Florida that PACE can help finance are professional odor free “dry toilets,” a.k.a. “Composting Toilets” that use no water at all and create great fertilizer, “constructed wetlands” which actually use the “waste-water” to create an attractive water/wildlife feature on the property, and “elevated sand mound” systems that are resistant to flooding or ground water contamination worries.

Each has its place in a diverse Florida landscape. In fact, the EPA (2020) lists a plethora of Septic Tank alternatives: Conventional Systems, Chamber Systems, Drip Distribution Systems, Aerobic Treatment Units, Mound Systems, Recirculating Sand Filter Systems, Evapotranspiration Systems, Constructed Wetland Systems, and Cluster / Community System where the neighborhood or community in effect provides its own local “sewer system” that derives many of the benefits of retaining the nutrient and energy rich slurries in the community without the worry of any individual system failing to perform. These alternatives to both wholesale septic-to-sewer conversions and conventional individual septic systems are well known around the world and throughout the United States but rarely seem to be considered in Florida homeowner’s, policy maker’s, or consumer’s choice portfolios. All of these technologies carry up-front costs that can prevent property owners from investing in these improvements. As noted above, septic-to-sewer conversions can cost between \$5,000 and \$20,000 or more. A Florida Department of Health 2015 study analyzed Passive Nitrogen Reduction System (PNRS) retrofits for onsite home sewage systems and found they could range anywhere between \$10,000 and \$32,000, with an average of \$18,000.

By promoting options, educating the consumer, guaranteeing good workmanship, and providing equitable financing, PACE can ensure Florida residents and policy makers can make the right choice for each of its diverse communities, in addition to Florida’s environment, mitigating and becoming more resilient to the issue of wastewater treatment.



However, currently, the Florida PACE statute does not include wastewater treatment and mitigation measures as PACE-eligible improvements. Just as PACE provides a catalogue of different types of hurricane mitigation solutions, it is also well-suited to include a sub-catalogue of wastewater solutions. In fact, in 2020, the Florida legislature introduced House Bill 365 and Senate Bill 770 that proposed to expand PACE financing for wastewater treatment systems. However, both bills failed to gain traction in the legislature and died in committee. Addressing the wastewater treatment issue will require a mixed-methods approach to provide tailored solutions for different areas and ecosystems around the state. If the legislature re-engaged this issue, and if PACE legislation were to be expanded to cover wastewater treatment improvements, this proven policy² could become one of the many solutions needed to confront an increasingly critical issue: wastewater.

CONCLUSION




This research, along with the previous research done on PACE clearly shows the potential this unique public policy can achieve by leveraging private capital for public good, not only to address existing policy challenges current PACE statute allows (resiliency, efficiency, and renewables), but also new challenges dealing with wastewater treatment and other areas where PACE could be expanded.

However, although a positive program on the whole and capable of achieving significant environmental, economic, and resiliency impacts across the state, PACE programs have seen some criticism recently. For example, in August 2020, Hillsborough County suspended their PACE program citing complaints from some property owners about improper behavior by contractors and program administrators. Collier County had suspended its PACE program the year before citing similar issues.³ While not the scope of this paper, the research team felt it necessary to address some of these issues.

² While not specifically called PACE, property assessment financing has been successfully utilized for septic tank improvements and retrofits in other states for decades. Examples include the Delaware Septic Rehabilitation Loan Program and the Anoka County Minnesota Agricultural Best Management Practices loan program for well and septic systems.

³ For context, over 200 cities and counties have approved PACE programs across the state with tens of thousands of property owners utilizing the program to make hurricane resiliency, renewable energy, and energy efficiency property improvements.



To better understand the scope of complaints, Ygrene Energy Fund, Florida’s leading PACE administrator, provided the research team with transparent data on the number and frequency of escalations they received since 2013. Ygrene explained that escalations range from clarifying questions about a property owner’s project to complaints about the workmanship of a contractor. In reviewing the data, the number of escalations is very low compared to the total number of projects that Ygrene financed since 2013. As of July 2020, over 97% of property owners had no escalations with just 2.59% of all completed projects having an escalation. And, of the small percentage of total escalations, the majority were related to the contractor and not the financing (68% of all escalations).⁴ As the research would suggest, this is not surprising. The 2018 “Consumer Complaint Survey Report,” by the Consumer Federation of America, noted that home improvement / construction complaints remained at the top of most common complaints by consumers second only to auto complaints. Additionally, most of the escalations received have been resolved with only 0.14% still awaiting resolution as of July 2020. Furthermore, the data shows a decline in escalations in more recent years (a high of 3.85% in 2016 compared to 1.90% in 2019). Ygrene notes this is due to the adoption of comprehensive consumer protections over time as the PACE industry has matured.⁵ Improvements could still be made in this area, just like in any industry, and further research on this topic would be helpful, not just in PACE, but the broader home improvement industry which is consistently at the top of consumer complaints.

Nonetheless, PACE has shown to be an effective local economic driver and a policy capable of mobilizing significant investment in disaster resiliency and sustainability. And, the ability to mobilize significant private capital for public good may prove particularly important during these challenging times in which the Florida budget was cut \$1 billion in June 2020 and economists are forecasting a drop of \$5.4 billion in expected state revenue over the next two years due to the COVID-19 pandemic. Programs like PACE can help fill a void in critical resiliency and sustainability investment. The pandemic has shown that individual action is not enough to tackle such large problems like climate change and the pandemic itself, but rather takes everyone doing their part paired with systemic changes and the proper tools and resources to effectuate change. PACE is simply one of many public policies that can provide the opportunities and tools for both individual and systemic change.

⁴ The complaint percentage shown here is total number of escalations received. Ygrene notes that it has a robust complaint resolution process, often helping to facilitate a resolution between the property owner and the contractor about issues such as workmanship, and that the vast majority of complaints are resolved quickly. As of July 2020, 94.7% of complaints had been resolved with open complaints still awaiting resolution representing only 0.14% of completed projects.

⁵ Examples of improved consumer protections that have been adopted by the PACE industry as noted by Ygrene include financial disclosures, a confirmation of terms phone call to property owners, improved contractor oversight, and a 3-day right to cancel, among others.

AUTHOR INFORMATION

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