Mitigating Impacts of Extreme Weather and Natural Disasters through Increased Grid Resiliency

Topic Area 1: Grid Resilience Grants (40101(c))

DOE Categories:

Hardening of facilities and substations
Adaptive Protection Technologies
Monitoring and Control Technologies

Small Utility Organization: Fort Pierce Utilities Authority
Project Location: Fort Pierce, St. Lucie County, Florida, USA
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TABLE OF CONTENTS

Project Overview 3
BACKGROUND 3
Project Goal 3
DOE Impact 4
Community Benefits Plan: Job Quality & Equity 5
Anticipated Benefits 5
Technical Description, Innovation, and Impact 6
Project Part 1: Transmission Reliability Upgrades 7
Relevance & Outcomes 7
Feasibility 8
Innovation & Impacts 8
Project Part 2: Converting Totten Substation to Ring Bus Configuration 9
Relevance and Outcomes 9
Feasibility 10
Innovation & Impacts 10
Project Part 3: Deployment of TripSaver Mounted Reclosers 11
Relevance and Outcomes 11
Feasibility 12
Innovation & Impacts 12
Workplan 13
Project Objectives 13
Objective # 1 13
Objective # 2: 13
Objective # 3: 14
Objective # 4: 14
Technical Scope Summary 14
Project Year 1 Scope 14
Project Year 2 Scope 15
Project Year 3 Scope 15
Work Breakdown Structure & Task Description Summary 15
Project Year 1 WBS & Task Description Summary 15
Project Year 2 WBS & Task Description Summary 16
Project Year 3 WBS & Task Description Summary 17
Milestone Summary 17
SOPO Task 2.0 Hartman Autotransformer Upgrades 17
SOPO Task 3.0 Distribution Substation Transformer Replacements 17
SOPO Task 4.0 Ring Bus Configuration 18
SOPO Task 5.0 TripSavers Deployment 18
Go/No-Go Decision Points 19
End of Project Goal 20
Project Schedule 20
Project Management 20

Technical Qualifications and Resources 21
Team Qualifications and Expertise 22
Existing Equipment and Facilities 23
Previous Work Efforts, Demonstrated Innovations 23
Time Commitment 24
Technical Services Provided by DOE/NNSA FFRDCs (if applicable) 24

PROJECT OVERVIEW

BACKGROUND

In 1972, the citizens of Fort Pierce voted by referendum to establish Fort Pierce Utilities Authority (FPUA). Per the resulting City Charter, FPUA is governed by an independent board, consisting of five members. Four members are appointed by the Fort Pierce City Commission with four-year overlapping terms, and the fifth member is the Mayor of Fort Pierce.

Our mission is to provide economical, reliable, and friendly service in a continuous effort to enhance the quality of life in our community. We provide multiple services to the residents of Fort Pierce and unincorporated St. Lucie County, such as Electric, Water, Wastewater, Natural Gas, and Fiber Internet. Upgrading the infrastructure for all of our utility services is therefore a priority not only to FPUA but also to the City of Fort Pierce and St. Lucie County.

FPUA is a comparatively small municipal utility provider in Fort Pierce, Florida, selling less than 600,000 MWh of electricity per year. FPUA is an all-requirements member of Florida Municipal Power Agency (FMPA). We purchase power from FMPA and sell and distribute it to our customers. FPUA also manages and operates the Treasure Coast Energy Center, which is a natural gas power plant owned by FMPA in the City of Fort Pierce.

FPUA is proud to be designated as a Reliable Public Power Provider (RP3) by the American Public Power Association. Since 2007, we were awarded and have maintained the Diamond Category. The utility that receives the Diamond designation must successfully meet 100 percent of the defined criteria. The RP3[1] program measures each of the following categories of a utility's operation: Reliability, Safety, Workforce Development, and System Improvement. These categories are ranked against standards set by the Public Power Communities across the nation.

FPUA firmly understands that building a more resilient and reliable electric utility grid requires significant improvements that will mitigate the disruptions which are caused by hurricanes, severe storms, and other natural disasters.

PROJECT GOAL

This project supports many community and regional resilience initiatives to reduce the likelihood and consequences of disruptive events on our customers.

[1] American Public Power Association. https://www.publicpower.org/rp3-designated-utilities

Specifically, by increasing the capacity of key components within the FPUA electric grid, this project ensures a more regionally resilient grid that mitigates the consequences of disruptive events to largely vulnerable populations. The State of Florida Statute 380.083(1)(2)[2] recognizes electric production and supply facilities as critical infrastructure for resiliency purposes. At the same time, Florida is actively pursuing expansion of electric vehicle infrastructure, which brings with it increased demand on the electric grid[3]. In its three-year strategic plan, St. Lucie County committed to align resources with infrastructure needs to ensure preventative maintenance and future resilience, as well as to develop a St. Lucie Regional Resilience Plan for, among other things, infrastructure[4]. St. Lucie County is also growing; its population increased an average of 1.9% every year since 2010, with a 3.7% increase between 2020 and 2021[5].4 This growth poses real challenges to an electric infrastructure that was designed for a smaller population and lesser load demand.

DOE IMPACT

DOE funding will ensure that this project is prioritized earlier than it may otherwise be carried out, and alleviate some of the otherwise detrimental financial burden of increasing electricity security, sustainability, and resilience on disadvantaged citizens in Fort Pierce. Because of the expense of the project, and competing maintenance and upgrade priorities throughout the aging system, it is unlikely that this project would be funded fully through FPUA capital budget within the next five years.

FPUA customers are especially vulnerable to disruptive events. The City of Fort Pierce in its entirety is a financially disadvantaged city with 2 times the Florida poverty rate. The median per capita income in Fort Pierce is $21,781, with 27.1% of the population living in poverty[6] according to the United States Census. In comparison, the statewide median per capita income is $35,216, with 13.1% of the population living in poverty[7].

Without DOE Funding, the substation improvements, associated transformer upgrades, and deployment of TripSavers are unlikely to occur in the near future because they would require an increase on electric utility rates at a time when our customers are already struggling due to high inflation[8]. In fact, the cost to perform the substation improvements and transformer upgrade would require funding that exceeds the previous year's entire capital budget for

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[2] "Critical asset" includes critical infrastructure, including . . . electric production and supply facilities. https://www.flsenate.gov/laws/statutes/2021/380.093

[3] Governor Ron DeSantis announces plan for expansion of Florida's electric vehicle infrastructure (July 2019). https://www.flgov.com/2019/07/24/governor-ron-desantis-announces-plan-for-expansion-of-floridas-electricvehicle-infrastructure/

[4] St. Lucie County Strategic Plan: 2021-2023. https://www.stlucieco.gov/home/showpublisheddocument/8680/638024838586870000

[5] USA Facts, https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/florida/county/st-lucie-county

[6] United States Census, QuickFacts Fort Pierce, FL

[7] United States Census, QuickFacts Florida

[8] Everything's going crazy': Fort Pierce family, business owners struggle with inflation. https://www.wpbf.com/article/everythings-going-crazy-says-fort-pierce-resident-about-inflation-numbers/39706654

FPUA's electric division and a typical budget, for the deployment of TripSavers, of $100,000 per year would only allow FPUA to reach 20% by 2045, a rate of about 15-20 TripSavers deployed per year.

In other words, funding from the DOE would provide the much-needed boost to help create a more resilient electric grid, and support economic growth, small businesses and entrepreneurship, and future private sector investment opportunities in an underserved community. In order to obtain the funding required to carry out this project without your support, FPUA will need to increase its rates, severely impacting this underserved community.

COMMUNITY BENEFITS PLAN: JOB QUALITY & EQUITY

By supporting FPUA and our proposed project, DOE would be investing in a local, municipal employer whose operational mission includes job quality and workforce continuity. Aligning with the Executive Orders on **Ensuring the Future is Made in All of America's Workers (EO 14005), Tackling the Climate Crisis at Home and Abroad (EO 14008), Boosting Quality of Federal Construction Contracts (EO 14063), Promoting Competition in the American Economy (EO 14063), and Implementing the Infrastructure Investment and Jobs Act (EO 14052),** Fort Pierce Utilities Authority strengthens prosperity by expanding good-paying, secure and safe jobs accessible to all employees.

As described in our full Community Benefits Plan, FPUA is consistently engaging with Fort Pierce residents, businesses, and local governments in order to strategically plan how to create a resilient community and has participated in at least 20 different events within the community in the last year alone. We are fully committed to serving our community in ways that both reduces the cost burden infrastructure upgrades on our customers, and also provides our community with the greatest opportunities for employment either through direct employment or contracting.

Anticipated Benefits

The benefits of this project for this disadvantaged community are:

1. Increase energy democracy in DACs – **measured by** number of citizens reached through informative events, Utility Advisory Committee results, and customer surveys
2. Decrease energy burden in DACs – **measured by** number of grant dollars directed at energy grid resilience (dollars that would otherwise be provided by community rates)
3. Increase clean energy jobs, job pipeline, and job training for individuals from DACs – **measured by** number of participants in job training programs, apprenticeship programs as well as tuition or salary paid by FPUA toward those training programs.
4. Increased reliability, resilience, and infrastructure to support reliability and resilience in our disadvantaged community – **measured by** list of completed infrastructure upgrades

Increase Energy Democracy in DACs

As mentioned above, FPUA understands the importance of community engagement, and how it contributes to increased energy democracy, especially in DACs. In the last year, not only did

FPUA launch a new Citizens Advisory Committee that meets monthly to learn and provide feedback for staff, but FPUA also participated in over 20 community and stakeholder events. FPUA will continue to engage with organizations and residents of Fort Pierce through community workshops, seminars, and other outreach opportunities. Further, FPUA will continue to educate its customers and stakeholders in order to provide the knowledge and tools to increase resiliency in the Fort Pierce community.

FPUA is a municipal utility company, specifically owned by its ratepayers. Because of this unique quality, all investments made by FPUA and its partners, contribute to the number of assets owned by the disadvantaged Fort Pierce community. For example, FPUA currently owns **5.16%** of a Florida-based solar farm, through its membership with FMEA, meaning FPUA customers own the same percentage of this clean energy source. Further, FPUA will increase its ownership as two new FMEA solar farms go live this year.

Increase Clean Energy Jobs, Job Pipeline, and Job Training for Individuals from DACs

Through its partnership with Indian River State College, a federally-recognized minority serving institution, FPUA encourages staff to further their education in order to advance their career. Through the Education Assistance Program, employees have received their degree, or will receive their degree, in Engineering, Information Technology, Cyber Security & Management, Organizational Management, Accounting, Law, and Business Administration.

As mentioned above, FPUA has invested over $190,000 since 2018, in its Education Assistance Program (EAP), which provides the opportunity for training, development and advancement at no cost to the employee. The EAP covers 100% of the cost of tuition, text books, fees, equipment, supplies and fees. To date, 17 of FPUA's current employees have graduated, 9 employees are still enrolled, and 7 employees utilized the EAP to take classes but are not currently enrolled. Of these employees, 68% are male, 32% female with 1% Hispanic, 26% Black, and 73% White.

Decrease Energy Burdens in DACs

Funding from the DOE will enable FPUA to increase its resilience and reliability in the disadvantaged community of Fort Pierce, without financially impacting its citizens by having to increase electric rates. FPUA is reliant on grant opportunities such as these to permit us to more proactively carry out grid resilience mitigation projects in our area. Without grant support, we are forced to rely on our annual budgeting process and rates revenue, which is challenging and limited due to the income demographics of our area.

Further, Downtown Fort Pierce is the historic epicenter of St. Lucie County. As such, the majority of utility infrastructure is dated (in some cases 100 years old or more) and undersized to support the unprecedented growth in our area. This lack of modern infrastructure stifles local economic growth and challenges FPUA and the City of Fort Pierce's efforts to revitalize, placing the burden on the citizens.

TECHNICAL DESCRIPTION, INNOVATION, AND IMPACT

PROJECT PART 1: TRANSMISSION RELIABILITY UPGRADES

Relevance & Outcomes

As part of our storm hardening efforts to improve grid reliability and resilience, FPUA and Florida Municipal Power Agency (FMPA) have determined that upgrading two critical substation transformers, and replacing four obsolete distribution transformers would increase capacity, reduce the likelihood of outages during peak demand and storm surges, and provide more reliability and resilience while accommodating future growth needs.

Specifically, FPUA's electric grid relies on three major transformers to bring electric power to customers: two at the Hartman substation and one at the Garden City substation**.** In its **annual Transmission Planning Assessment carried out in November 2022**, FMPA found that FPUA's Hartman transformers are forecasted to exceed their short-term emergency ratings within the 10-year planning horizon. The current transformers are sized at 100 Mega Volt Ampere (MVA) and should be upgraded to 120 MVA in order to account for increasing load demand caused by growing population and heavier load demands from technologies such as EV charging and more, including surges during storm events.

In the event of unexpected outages, disruptions may take effect if FPUA enters into an N-2 operating condition, i.e. a condition wherein two system elements within the electric grid have been eliminated or damaged. For example, in the event the Garden City transformer and one of the Hartman transformers were to become damaged or eliminated from the system, FPUA would need to shed load, causing significant brownouts, in order to ensure the safe operation of the electric system. By upgrading the two transformers located at the Hartman substation, this specific N-2 condition is eliminated, and there is no longer a risk of needing to shed load and cause brownouts.

FPUA has also identified four obsolete distribution transformers that pose a significant risk to the electric grid. Similar to transmission transformers, distribution transformers adjust the voltage so that it can be safely provide power to customers at their residences and businesses. Transformers are a critical link and when at risk of failure, can have an effect on the entire system, potentially causing widespread outages and disruptions. By replacing these 4 outdated distribution transformers, FPUA will improve its capacity, strengthen its electric grid, and drastically reduces the risk of disruptive events in the Fort Pierce Community.

Hardening the transmission system, monitoring and control technologies, adaptive protection technologies, and upgrades to substations, will allow FPUA to maintain reliable electric service while reducing impacts on the grid caused by unexpected outages, extreme weather and natural disasters.

Outcome 1.1: Increase Transformer Capacity to Accommodate Demand and Storm Surges

Upgrading the two identified Hartman transformers will allow FPUA to provide continued service without risk of overload from growing demand caused by population and innovative technologies. Overall, FPUA currently has six 69kV substations and three major transformers, one located at the Garden City substation and two located at the

Hartman substation, that loop electric service in the Fort Pierce community. The Garden City substation is currently able to support 167 MVA, and FPUA's Hartman substation supports 100 MVA. Currently, FPUA is able to cover the electric load, however, projected population growth and the influx of EV chargers and solar panels, require us to upgrade the Hartman transformers from 100 MVA to 120 MVA.

Outcome 1.2: Allow for Critical Infrastructure Maintenance without Outages

An additional benefit to the transformer upgrades comes from the need for offline maintenance on a transformer. The increased capacity provides the ability to hold peak loading conditions without the risk of power loss within the Fort Pierce community.

Outcome 1.3 Increase Distribution Transformer Capacity

Similar to the transformer upgrade benefits, replacing four obsolete distribution transformers will provide more reliability to the electric grid. Not only does this outdated infrastructure pose a threat during extreme weather events, it also poses a severe safety risk as a damaged/failed transformer can create a fire, which can be toxic and pose a health risk to the community[9].

Feasibility

FPUA currently operates and maintains six substations and twelve transformers, for transmission and distribution services, ranging from 69 kV to 138 kV. This component of the project consists of new infrastructure, the replacement of four obsolete distribution transformers and the enhancement of existing infrastructure caused by age, degradation, anticipated load growth, and reliability purposes.

FPUA is ready to move forward with this project as soon as funding is approved. Upon acceptance of the grant contract, FPUA will proceed with order for supplies. All elements of the project (transformer upgrades, transformer replacements, etc.) can commence upon receipt of the materials. FPUA plans on using contract services for the engineering, design, and construction to upgrade the transmission transformers; the contractors shall be responsible for providing their own means to perform the duties requested of them by FPUA. The transformer upgrade supplies are expected to arrive within six months of order. Once materials arrive on site, upgrading the transformers is expected to take 15-30 days to project completion.

Innovation & Impacts

FPUA is always striving to provide increased capacity for new innovative technology and more private sector investment opportunities in our growing community, alongside the City of Fort Pierce. The State of Florida has also taken a clear interest in investing in private sector growth and development in Fort Pierce, as evidenced by the recent grant funds issued to Fort Pierce from the Department of Economic Opportunity. Governor Ron DeSantis awarded $2.7 million through the Florida Job Growth Grant Fund to facilitate infrastructure improvements and the

[9] What Happens When Your Transformer Goes Bad. Don't Get Left in the Dark: What Happens When Your Transformer Goes Bad - Electrical4uonline

redevelopment of the City's historic downtown area to spur economic growth and bring jobs closer to home for the City's residents[10]. This included some funding for upgraded water and electric infrastructure, to accommodate future growth.

Fort Pierce Utilities Authority has already begun seeing an increase in demand, especially from new innovative technology. Upgrading the transformers located at the Hartman substation is the standard practice and reduces the risk of disruption caused by the increased demand for EV charges, solar panels, and other innovative technology. The increased capacity alleviates the risk of a disruption caused by the increased demand, as stated in FPUA's Transmission Planning Assessment.

While upgrading the transmission transformers will reduce the risk of disruption to the transmission system, it will not increase reliability of distribution to FPUA customers. FPUA has identified 4 distribution transformers that are obsolete. These distribution transformers specifically service residences, and businesses in the community. If the distribution transformers are not reliable, the reliability of the transmission system will not matter. By simultaneously upgrading the transmission and distribution transformers, FPUA will reduce the risk, longevity, and impact of disruptive events.

Not only do the proposed upgrades provide greater resilience for the electric grid, but they also provide an example for other grid-hardening activities in our service area. There are twelve additional substation power transformers. Utilizing the best practices from the project will provide a guideline for future hardening projects within the electric grid.

PROJECT PART 2: CONVERTING TOTTEN SUBSTATION TO RING BUS CONFIGURATION

Relevance and Outcomes

Another critical component of the electric grid is the bus configuration within each substation, which encompasses many of the protection and control elements within the grid. Currently, FPUA utilizes manual switches to separate exiting transmission line terminals instead of circuit breakers at our critically important Totten substation, which serves as a through-point to our 138 kV transmission supply system from the Hartman substation. In the unfortunate event that damage occurs to the bus within this substation, the circuit breakers protecting the outside terminals of this substation would operate leading to disruption and complete inoperability of this substation until a crew could get on-site to manually make repairs. This situation would put FPUA into the dire situation of relying entirely on its Garden City substation for service.

Outcome 2.1: Increase Resilience and Reduce Disruption by Isolating Events

> Upgrading the Totten substation to a Ring Bus configuration rather than manual switch configuration will allow FPUA to provide continued service without risk of extended outages any time that the Totten substation experiences damage to its 69kV substation

[10] Governor Ron DeSantis Awards $2.7 million to City of Fort Pierce for Infrastructure Improvements through the Florida Job Growth Grant Fund. https://www.flgov.com/2022/08/30/governor-ron-desantis-awards-2-7-million-tocity-of-fort-pierce-for-infrastructure-improvements-through-the-florida-job-growth-grant-fund/

bus. Specifically, Ring Bus configurations make the power grid more reliable by allowing staff to isolated incidents on energized buses with substations, rather than taking the entire substation offline.

Outcome 2.2: Allow for Critical Maintenance Infrastructure Without Outages

An additional major advantage to a ring bus configuration is the ability to remove one of the circuit breakers for maintenance without disrupting service continuity. This not only allows for service continuity but safety, keeping a safe method for operating while maintaining service continuity.

Feasibility

FPUA has already successfully upgraded its Hartman substation from a manual switch configuration to the ring bus configuration. Converting the Totten substation to a ring bus configuration will utilize FPUA equipment, such as line trucks and wiring, and FPUA staff will complete these upgrades.

This project is ready to launch upon contract acceptance and receipt of materials. Commencement would begin upon receipt of materials. Due to uncertain supply chain issues, materials will likely arrive within 25 months. Once materials have arrived on site, the project work is to be completed within 2 months.

Innovation & Impacts

FPUA's Hartman substation currently utilizes the ring bus configuration, which serves as a model for the Totten substation. The current manual switch configuration, at the Totten substation, leaves Fort Pierce vulnerable to extended outages during storms. FPUA's Totten substation is one of two locations where the grid's main 69kV transmission line is separated to distribute electricity throughout the entire City of Fort Pierce. The transmission lines that exit the substation are protected by circuit breakers, however, the existing infrastructure that separates the transmission lines within the substation is separated by manual 2-position switches. The existing switches must be flipped manually in order to disconnect the substation bus and do not act as protective devices for the substation bus. If damage occurs within the substation and the bus is damaged, the breakers protecting the exiting terminals of the substation will operate and place the entire substation offline, therefore cutting off service from the Hartman substation. This requires a crew to be on-site to make repairs, which can be difficult and unsafe during hurricanes, severe storms, and other natural disasters. The impact of this means that customers may be without power for an extended period of time if it is deemed unsafe for the crew to deploy.

The current configuration also creates a risk of significant stress on the remainder of the Fort Pierce electric grid, per FPUA's Transmission Planning Assessment. Currently, the Totten substation is at risk for an outage for the entire City of Fort Pierce. If damage occurs to the substation bus, FPUA will enter into a severe N-2 condition, relying entirely on the Garden City substation for service; if this Garden City line is damaged, FPUA will be entirely without power.

In contrast, the ring bus configuration would allow FPUA to utilize circuit breakers in place of the manual switches in the substation, which allows for sectionalizing the exiting terminals to de-energize damaged portions of the substation bus automatically. With the Totten substation in a ring bus configuration, only the damaged area within the substation would be placed offline, leaving the substation still in service and only the damaged area without power.

An additional benefit of the ring bus configuration is that circuit breakers can be monitored and controlled by our Systems Operations department through our SCADA (**S**ource **C**ontrol **A**nd **D**ata **A**cquisition) system. If desired they can monitor the voltages, currents, frequency, etc. flowing through the circuit breakers and can issue an "open" command manually through the SCADA system to control it. Using SCADA technology would further enable us to eliminate the risk of broad outages by isolating the incident to a specific section of the bus.

Reconfiguring the Totten station will strengthen FPUA's grid reliability which is an essential feature for attracting private sector businesses and investments to the City of Fort Pierce. Grid reliability is recognized as a public good. Installing systems like the ring bus configuration can bring smart grid features to our local grid, such as communications with the SCADA system. As stated by the Energy Information Administration, "[a] smarter grid makes the electrical system more reliable and efficient by helping utilities reduce electricity losses and to detect and fix problems more quickly[11]." Private investors who are interested in bringing their business to the City of Fort Pierce are likely to be more willing to do so if they know that the electric grid is reliable and being modernized for continuity and growth.

PROJECT PART 3: DEPLOYMENT OF TRIPSAVER MOUNTED RECLOSERS

Relevance and Outcomes

The final part of this proposed project applies adaptive protection technologies to the FPUA electric grid by installing 400 TripSaver mounted reclosers which will cover an additional 12% of the grid, with a focus on laterals that have an elevated number of yearly outages with transient causes. Though the target reach for TripSaver deployment utilizing the funding from DOE is an additional 12% of the grid, our goal is to reach 100% of FPUA protection points (e.g., fuse locations) within 20 years. FPUA has already installed 76 TripSavers out of 3,326 prospective locations, totaling about 2.3% of our electric grid.

TripSavers are self-powered, electronically controlled, single-phase reclosers with a vacuum fault interrupter that bring self-healing capabilities to overhead distribution lines. In the event of a short circuit, a TripSaver will disrupt the fault current and attempt to reclose up to three times. If the fault remains, the device will open and remain that way to provide a visible gap in the power system. This helps isolate the damaged section of the grid, making it easier for utility personnel to locate the fault and make repairs. If the fault stops, service will immediately be restored to the customer. TripSavers have a wide range of programmable settings that allow them to easily be configured to protect the system.

[11] Electricity explained. https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php

Outcome 3.1: Reduce Customer Wait Time During Faults Caused by Transient Disruptors

Almost 70-85% of faults have a transient cause that would be self-healing with the proper TripSaver installation. The benefit of utilizing TripSavers technology is that once the transient fault has cleared, power would be restored to the affected customers immediately rather than having to wait for staff to identify and close the fault.

Outcome 3.2: Reduce Utility Maintenance Costs and Restoration Man-Hours

The current restoration process during electrical faults is manual and time-consuming. For example, during and after storm events, staff "bird-dog" by driving throughout the territory to visually identify the faults in the system by driving around and looking for open faults or disruptions to the line, then calling back to the SCADA team to report the fault for manual repair. TripSaver technology will reduce the incidence of outages where lines were automatically maintained, and will reduce the number of man hours needed to identify and then manually repair the fault if the line were not equipped with TripSaver technology.

Feasibility

FPUA is familiar with TripSaver installation and all legal and physical matters are in place to allow us to proceed. FPUA has already installed 76 TripSavers out of 3,326 prospective locations, totaling about 2.3% of our electric grid. Deployment of additional TripSavers will utilize FPUA staff and equipment, such as line trucks and wiring. FPUA has a rigorous warehouse and equipment policy that tracks our existing supplies and equipment to ensure our ability to carry out maintenance as well as the projects proposed here.

This project is ready to launch within 30 days upon contract acceptance and receipt of materials. Due to uncertain supply chain issues, materials will likely arrive within 4-6 months. Once materials have arrived and the project can commence, project completion is expected to finish within 9-12 months.

Innovation & Impacts

TripSavers represent an important modernization of the FPUA electric grid that will allow us to keep pace with the quickly evolving demand on the grid. As previously mentioned, TripSavers have a large variety of programmable settings that allow them to be easily configured to protect the electrical system and its elements. These programmable settings can be adjusted to accommodate increased load caused by, among other things, the addition of EV charging, solar panels, and population growth.

Deployment of TripSavers adaptive protection technologies can serve as an example for FPUA's entire electric system. As previously mentioned, the target for this project is to bring TripSavers deployment to an additional 12% of the FPUA electric grid, with a focus on laterals that have an elevated number of yearly outages with transient causes. FPUA's goal, according to our current spending plan (without grant support) is to install TripSavers on 100% of the electric grid by

2043, replacing every first-stage fuse serving an overhead lateral in our system. Grant support will enable us to speed up this process for our community.

Installing TripSavers will enable FPUA's electric grid to be more resilient to vegetation, wildlife, hurricanes, severe storms, and other natural disasters. The added resiliency will also strengthen FPUA's grid reliability, which is essential for attracting private sector businesses and investments to the City of Fort Pierce. Installing system upgrades like the TripSavers can advance our local grid and reduce its reliance on time-consuming, manual labor that requires 60 minutes or more to restore a transient fault that could otherwise self-heal with proven TripSaver technology.

As stated by the Energy Information Administration, "[a] smarter grid makes the electrical system more reliable and efficient by helping utilities reduce electricity losses and to detect and fix problems more quickly."[12] Private investors who are interested in bringing their business to the City of Fort Pierce are likely to be more willing to do so if they know that the electric grid is reliable and being modernized for continuity and growth.

WORKPLAN

PROJECT OBJECTIVES

This project consists of construction, alterations, and maintenance of critical electric infrastructure in Fort Pierce, Florida, USA, such as hardening of substations, replacement of obsolete distribution transformers, and the installation of adaptive protection technologies. We understand relevant materials may therefore fall under the Buy America requirements.

Objective # 1: Increase grid reliability in the face of more severe storms and climate change

Metric # 1: FPUA will track the number of outages caused by severe storms and extreme weather hazards. A reduction in the number of outages is expected and will demonstrate project success.

Metric # 2: FPUA will track the duration of outages caused by severe storms and extreme weather hazards. A reduction in the duration of outages caused by severe storms and extreme weather hazards is expected and will demonstrate project success.

Objective # 2: Increase grid reliability to reduce outages caused by transient disruptors, such as animals, small tree limbs, etc.

Metric # 1: FPUA will track the number of outages caused by transient disruptors. A reduction in the number of outages is expected and will demonstrate project success.

Metric # 2: FPUA will track the duration of outages caused by transient disruptors. A reduction in the duration of outages caused by transient disruptors is expected and will demonstrate project success.

[12] Electricity explained. https://www.eia.gov/energyexplained/electricity/delivery-to-consumers.php

Objective # 3: Increase grid capacity to accommodate growing population

> **Metric # 1:** Upgraded Hartman Transformers increase capacity from 100 MVA to 120MVA

Objective # 4: Increase resilience of substations in the face of severe storms and climate change

> **Metric # 1:** FPUA will track the number of customers impacted by outages resulting from the Totten, Hartman, Lawnwood, King and Savannah Substations. A reduction in the number of customers impacted is expected and will demonstrate project success.

TECHNICAL SCOPE SUMMARY

FPUA's proposed project of Transmission Reliability Upgrades, Totten Substation's Ring Bus Configuration, and Deployment of TripSavers will take place over three years and assist in decreasing the energy burden while also increasing reliability, resilience, and infrastructure to support reliability and resilience in the underserved community of Fort Pierce.

Project Year 1 Scope

During Year 1, FPUA will upgrade 2 critical, autotransformers at its Hartman Substation, resulting in an increase in capacity, reliability and resilience of the electric grid. FPUA will utilize ILJIN Electric USA, Inc. as its contractor to perform the upgrades on the two transformers. ILJIN Electric USA, Inc. will drain the oil in the existing transformers and remove existing radiators and cooling fans. ILJIN Electric USA, Inc. will replace current radiators and cooling fans. The new radiators have an increased number of fins and additional oil will be provided due to the increase of fins for radiators. ILJIN Electric USA, Inc. will replace the miniature circuit breakers, magnet and the wires for fan lines inside of the control cabinet, as well as replace the wires between the cooling fans and the control cabinet. The upgraded transformers will increase reliability and resilience to support the rapidly growing City of Fort Pierce.

Simultaneously in Year 1, FPUA will install 200 TripSavers throughout Area 1, see Project Map: TripSaver Deployment Map, increasing the reliability and resilience of the electric grid against outages caused by transient disruptors, such as animals, vegetation, etc. Upon receipt of materials, one FPUA's Lead Line Specialist and two FPUA Line Specialists will install 100 TripSavers during the third quarter and another 100 TripSavers during the fourth quarters, resulting in a 6% increase of infrastructure that provides a reduction in the number of outages, the duration of outages, and man hours and costs occurred caused by transient disruptors.

Further, in Year 1 FPUA will complete the designs for the Totten Substation Ring Bus Configuration and the four Distribution Transformer Replacements. FPUA will use engineering firm **TBD** to assist with the design in incorporating the new circuit breakers into our system at the Totten Substation. FPUA will also utilize engineering firm **TBD** to design the plans for incorporating the new distribution transformers into the electric grid. FPUA will also order the materials necessary for these projects, including four distribution transformers for the

Lawnwood, King, and Savannah Substations and six circuit breakers for the Totten Substation Ring Bus Configuration.

Project Year 2 Scope

During Year 2, FPUA will replace two distribution transformers, both located at the Lawnwood Substation, which will decrease the energy burden, and increase reliability, resilience, and infrastructure to support reliability and resilience in Fort Pierce, a historically disadvantaged and underserved community. Hitachi Energy USA, Inc. will provide the transformers, offloading, assembly and testing of each unit. Upon receipt of materials, one FPUA Substation Foreman and four Substation Relay SCADA technicians will install one distribution transformer every two weeks, for a total of four weeks.

Further, FPUA will upgrade the Totten substation to a Ring Bus Configuration, resulting in an increased reliability, resilience and infrastructure that supports reliability and resilience. FPUA will purchase the new circuit breakers from Hitachi Energy USA, Inc. Upon receipt of materials, one FPUA Substation Foreman and four Substation Relay Technicians will remove the manual switches currently used and install the new circuit breakers, completing the Ring Bus Configuration upgrade.

Lastly in Year 2, FPUA will install 200 TripSavers in Area 2, see Figure 2: TripSaver Deployment Map, increasing the reliability and resilience of the electric grid against outages caused by transient disruptors, such as animals, vegetation, etc. FPUA's Lead Line Specialist and two FPUA Line Specialists will install 100 TripSavers in the first quarter and another 100 TripSavers in the second quarter of Year 2, resulting in another 6% increase in infrastructure that provides a reduction in the number of outages, duration of outages, man hours and costs occurred, caused by transient disruptors.

Project Year 3 Scope

During Year 3, FPUA will replace one distribution transformer at the King Substation and one distribution transformer at the Savannah substation, increasing the reliability, resilience and infrastructure to support resilience and reliability in Fort Pierce, as well as decrease the energy burden. One FPUA Substation Foreman and four Substation Relay SCADA technicians will install one distribution transformer every two weeks, for a total of four weeks.

WORK BREAKDOWN STRUCTURE & TASK DESCRIPTION SUMMARY

Project Year 1 WBS & Task Description Summary

During Year 1, FPUA will complete **Task 2.0: Hartman Autotransformer Upgrades**, including **Subtasks 2.1 – 2.4**. Initially, FPUA will submit a Requisition for Contract to its governing board, which meets the first and third Tuesday of each month, to request and obtain approval to enter into a binding contract with ILJIN Electric USA, Inc., identified as **Subtask 2.1**. Once **Subtask 2.1** has been completed, FPUA will have achieved its **Q1** milestone and, ILJIN Electric USA, Inc. will begin the design and manufacturing of the autotransformers, and upon completion, ILJIN Electric USA, Inc. will transport the materials to FPUA, identified as **Subtask 2.2**. The expected

lead time on **Subtask 2.2** is 26 weeks, upon receipt FPUA will achieve its **Q2** milestone. Once materials have arrived, ILJIN will begin upgrades to the first autotransformer, identified as **Subtask 2.3** and **Q3** milestone, and is expected to take two weeks. Finally, ILJIN Electric USA, Inc. will upgrade the second autotransformer, identified as **Subtask 2.4** and **Q4** milestone.

Simultaneously in Year 1, FPUA will begin **Task 3.0: Substation Transformer Upgrades** and **Task 4.0: Totten Substation Ring Bus Configuration** by submitting two Requisition for Contract to its governing board, requesting their approval to hire an engineering firm for the Distribution Transformer replacement designs, identified as **Subtask 3.1** and incorporating the six new circuit breakers for the Ring Bus configuration at the Totten Substation, identified as **Subtask 4.1.** Completion of these subtasks displays achievement of **Q1** milestone. Further, FPUA will submits an additional two Requisitions for Contract, requesting approval to order the materials for **Subtask 3.2** and **Subtask 4.2.** Materials for **Subtask 3.2** have an expected lead time of 25 months, and **Subtask 4.2** materials have an expected lead time of 15 to 17 months. Both **Subtasks 3.1** and **Subtask 4.1** will occur concurrently with **Subtask 3.2** and **Subtask 4.2**, due to the long lead times associated with these projects parts and to ensure project completion remains on schedule.

Finally, in Year 1 FPUA will begin **Task 5.0: Deployment of TripSavers**. First, FPUA will submit a Requisition for Contract to its governing board to obtain approval to purchase 400 TripSavers, identified as **Subtask 5.1**. Once approval has been given, FPUA will have achieved **Q1** milestone and will place an order for TripSavers to be manufactured and delivered, identified as **Subtask 5.2**, with an estimated lead time of 22 weeks. Upon receipt of materials FPUA will have achieved **Q2** milestone, and one FPUA Lead Line Specialist and two FPUA Line Specialists will begin installing TripSavers in Area 1, identified as **Subtask 5.3** and **Subtask 5.4**. FPUA will install 100 TripSavers in both the third and fourth quarter of Year 1, for a total of 200 TripSavers, achieving Year 1 Annual SMART Milestone, of increasing grid protecting infrastructure by 6%.

Project Year 2 WBS & Task Description Summary

In Year 2, FPUA will continue towards project completion of **Task 3.0: Substation Transformer Replacement**. FPUA anticipates receipt of materials in the end of Year 2. Upon delivery of materials, FPUA will have achieved **Q2** milestone, and one FPUA Substation Foreman and four Substation Relay SCADA Technicians will complete **Subtask 3.3**, the installation of two new distribution transformers at the Lawnwood Substation within 4 weeks, along with required testing by Electric Power Systems International, Inc. Completion of this task achieves FPUA's **Q4 and Year 1 Annual** milestone, increasing the reliability and resilience and decreasing the energy burden within the City of Fort Pierce.

FPUA will also complete **Task 4.0: Totten Substation Ring Bus Configuration**. As previously mentioned, FPUA anticipates receipt of design and materials 6 months into Year 2. Upon receipt, and completion of **Q2** milestone, FPUA will begin replacing the manual switches currently used with circuit breakers. One FPUA Substation Foreman and four Substation Relay SCADA Technicians will initially replace two manual switches and install two circuit breakers to establish the ring configuration, completing **Q3** milestone. Once established, FPUA will replace one manual switch with a new circuit breaker every two weeks, until the project has been

completed. Testing will occur the last 3 days of each circuit breaker installation period. Once the upgrades have been completed, FPUA will achieve the **Q4** and **Annual SMART** milestones, resulting in increased resilience, a reduction in service disruption, and the ability to perform maintenance without disrupting service continuity.

Further, during Year 2, FPUA will complete **Task 5.0: Deployment of TripSavers**. One FPUA Lead Line Specialist and two FPUA Line Specialists will install 100 TripSavers in Area 2, during the first, achieving **Q1** milestone, and second quarter of Year 2, achieving **Q2** milestone, a total of 200 TripSavers, identified as **Subtask 5.5** and **Subtask 5.6.** Upon completion of Area 1 and Area 2, FPUA will achieve its **Annual SMART** milestone, increasing grid protecting infrastructure by a total of 12% (6% for each area), and reducing the number and duration of outages caused by transient disruptors.

Project Year 3 WBS & Task Description Summary

Finally, in Year 3 FPUA will complete **Task 3.0: Substation Transformer Replacement.** One FPUA Substation Foreman and four Substation Relay SCADA Technicians will complete **Subtask 3.4**, the installation of one new distribution transformer at the King Substation within 2 weeks, along with required testing by Electric Power Systems International, Inc. Completion of this subtask achieves FPUA's **Q2** milestone. Upon completion of **Subtask 3.4,** FPUA will complete **Subtask 3.5**, the installation of one new distribution transformer at the Savannah Substation within 2 weeks, along with required testing. Completion of this subtask achieves FPUA's **Annual SMART** milestone, decreasing the energy burden and increasing reliability and resilience to support the City of Fort Pierce.

MILESTONE SUMMARY

SOPO Task 2.0 Hartman Autotransformer Upgrades

- **Year 1 Quarterly Milestone 1:** Entered into contract with ILJIN Electric USA, Inc. to complete autotransformer upgrades.
- **Year 1 Quarterly Milestone 2:** FPUA received all designs and materials from ILJIN.
- **Year 1 Quarterly Milestone 3:** Completed upgrade of both Autotransformer 1 and Autotransformer 2
- **Year 1 Quarterly Milestone 4 and Annual SMART Milestone:** FPUA increased its capacity to accommodate for future growth and new technologies, as well as reducing the likelihood of outages during peak demand and storm surges.

SOPO Task 3.0 Distribution Substation Transformer Replacements

- **Year 1 Quarterly Milestone 1:** FPUA executed contract with engineering firm **TBD** for the design plans to incorporate four new distribution transformers into the electric grid.
- **Year 2 Quarterly Milestone 2:** FPUA received all designs and materials have been ordered.

- **Year 2 Quarterly Milestone 4 and Annual SMART Milestone:** FPUA completed the replacement of Distribution Transformer #1 and #2 at the Lawnwood Substation, decreasing the energy burden and increasing reliability and resilience to support the City of Fort Pierce.
- **Year 3 Quarterly Milestone 1:** FPUA completed replacement of Distribution Transformer #3 at the King Substation.
- **Year 3 Quarterly Milestone 2:** FPUA completed replacement of Distribution Transformer #4 at the Savannah Substation
- **Year 3 Annual SMART Milestone:** FPUA completed replacement of Distribution Transformers #3 and #4, decreasing the energy burden and increasing reliability and resilience to support the City of Fort Pierce.

SOPO Task 4.0 Ring Bus Configuration

- **Year 2 Quarterly Milestone 1:** Entered into contract with Hitachi Energy USA Inc. for the manufacture and delivery of six circuit breakers.
- **Year 2 Quarterly Milestone 2:** FPUA received all designs and materials
- **Year 2 Quarterly Milestone 3:** FPUA began replacement of outdated manual switches with new circuit breakers at Totten Substation
- **Year 2 Quarterly Milestone 4 & Annual SMART Milestone:** FPUA completed replacement of outdated manual switches with new circuit breakers. Totten Substation now utilizes a Ring Bus Configuration, resulting a reduction in service disruption, increased resilience, and the ability to perform maintenance without disrupting service continuity.

SOPO Task 5.0 TripSavers Deployment

- **Year 1 Quarterly Milestone 1:** FPUA entered into contract to purchase TripSavers.
- **Year 1 Quarterly Milestone 2:** FPUA received all necessary materials.
- **Year 1 Quarterly Milestone 3:** Installed 100 TripSavers in Area 1.
- **Year 1 Quarterly Milestone 4:** Installed 100 additional TripSavers in Area 1.
- **Year 1 Annual SMART Milestone:** FPUA deployed **200** TripSavers resulting in a 6% increase in grid protection infrastructure, reducing the number and duration of outages caused by transient disruptors
- **Year 2 Quarterly Milestone 1:** Installed 100 TripSavers in Area 2
- **Year 2 Quarterly Milestone 2:** Installed 100 additional TripSavers in Area 2
- **Year 2 Annual SMART Milestone:** FPUA installed **200** TripSavers resulting in an additional 6% in grid protection infrastructure, reducing the number and duration of outages caused by transient disruptors.

GO/NO-GO DECISION POINTS

Project Year 1			
Project Task	**Go**	**Go with caveats**	**No-Go**
Task 2.0: Hartman Autotransformer Upgrades	FPUA received all designs and materials	Project can proceed as long as project can be completed in Year 1	Task delays too substantial to permit completion by end of grant.
Task 3.0: Substation Transformer Replacement	100% Design Completion and materials ordered	Project can proceed as long as it can still be completed in Year 3	Task delays too substantial to permit completion by end of grant.
Task 4.0: Totten Substation Ring Bus Configuration	100% Design Completion and materials ordered	Project can proceed as long as it can still be completed in Year 2	Task delays too substantial to permit completion by end of grant.
Task 5.0: Deployment of TripSavers	FPUA secured materials and began Phase 1 Deployment	Project can proceed as long as it can be completed in Year 2	Task delays too substantial to permit completion by end of grant.
Project Year 2			
Project Task	**Go**	**Go with caveats**	**No-Go**
Task 3.0: Substation Transformer Replacement	FPUA received all materials.	FPUA is waiting for materials, project can proceed as long as it can be completed in Year 3	Task delays too substantial to permit completion by end of grant.
Task 4.0: Totten Substation Ring Bus Configuration	FPUA received all materials	FPUA is waiting for materials, project can proceed as long as it can be completed in Year 2	Task delays too substantial to permit completion by end of grant.
Task 5.0: Deployment of TripSavers	FPUA completed Subtasks 5.1 & 5.2, installation of 200 TripSavers	FPUA installed 100 TripSavers, project can proceed as long as it can be completed in Year 2	Task delays too substantial to permit completion by end of grant.

Project Year 3			
Project Task	**Go**	**Go with caveats**	**No-Go**
Task 3.0: Substation Transformer Replacement	FPUA has replaced Distribution Transformers 1 and 2, located at the Lawnwood Substation	FPUA has received all materials, project can proceed as long as it can be completed in Year 3	Task delays too substantial to permit completion by end of grant.

END OF PROJECT GOAL

The end project goal of this project is to ensure a more regionally resilient grid that mitigates the consequences of disruptive events to largely vulnerable populations by increasing the capacity of key components and incorporating adaptive technologies within the FPUA electric grid. This can be measured through the metrics identified in the Project Objectives section on Page 13 of this Technical Volume.

PROJECT SCHEDULE

Please see Gantt Chart on page 25.

PROJECT MANAGEMENT

FPUA understands the importance of proper project management in order to achieve successful project completion for a federally funded project such as the one proposed here. Toward that end, we have diligently identified key project personnel who are committed not only to FPUA and the City of Fort Pierce, but also to the successful implementation of this federal project.

Further, FPUA has developed a clear protocol for grants management that has proven successful for our past and active grant funded projects so far. Under this protocol, named project managers lead the tasks of the project on the ground are paired with a grants department (Sustainability Program) employee with whom they share essential grant progress details and photos. The grants employee is the primary contact with the funding agency who serves as a liaison to ensure that budget tracking and project reporting are in the appropriate format and submitted in a timely manner. The grants department manager serves either as the liaison or an available point of contact should there be any concerns with grant progress. This system ensures that each key personnel can efficiently and effectively focus his or her time or energy on the tasks with which they are most adept, and access support in all directions.

Mr. Craig Crawford, the Director of Electric and Gas Systems, brings this project under the purview of the director level management in our company. He will be tasked with ensuring at the highest level that this project is equipped and staffed to succeed, and he will assist with addressing any material or political roadblocks, should any occur.

Mr. Eric Meyer will be the Project Manager in the field, overseeing the technical portions of this project, including the management of project contractors and employees, installation of new distribution transformers and circuit breakers at the substations identified in this proposal. Mr. Meyer methodically planned the timeline of this project to ensure its success. Mr. Meyer will update Mr. Craig Crawford on the status of each project component, including any changes or delays.

Mr. Thierry Sydne will oversee the Deployment of TripSavers project. Mr. Sydne has strategically identified the most vulnerable areas with the highest number of service interruptions caused by transient disruptors. Mr. Sydne will update Mr. Meyer on the status of the project, including any changes or delays.

Ms. Rachel Tennant will oversee the grant management aspect of this project. Ms. Tennant's experience gives her a unique and highly qualified understanding of the time required to manage a project of this caliber. FPUA will also utilize Sustainability Program Associate Ashley Levin, who's time is specifically used to ensure the project is scheduled to be finished on time, all deliverables are being met, and reporting.

As part of FPUA's project management procedures, FPUA's Finance Department will assign a unique project code for each project component and track the number of grant dollars. This project code is used to identify equipment, staff time, and other items involved in each project and allows FPUA to easily identify and separate the associated costs for each project.

FPUA has strategically planned this proposed project including the mitigation of risks to project performance. Due to long lead times, which can pose a risk to successful project completion, FPUA will order the materials needed, as soon as funding is awarded and contracts are approved by the FPUA Board. By ordering materials ahead of time, the risk of not receiving them on time is avoided and also ensures the project can be completed within the 3-year timeframe, if not sooner. FPUA has notified its vendors of this proposed project as an added effort to avoid extended lead times and price increases. Secondly, FPUA has already identified the timeline, man hours and equipment needed to perform these projects. FPUA's timeline ensures that project can be completed within the three years, as the last portion of the project is anticipated to be complete by the end of the second quarter in Year 3.

In the event that FPUA needs to change aspects of the proposed project, FPUA will first communicate internally among the key personnel to identify why the change is needed, and if this effects the timeline and ultimately the project's success. Second, FPUA will reach out to DOE to advise on the change and provide the reasoning along with an alternative way to achieve project completion on time.

FPUA's project team will communicate mainly through email. Mr. Meyer will provide Ms. Tennant and Ms. Levin with pictures, invoices, and other documentation to show the progress of this project, and notify of any changes that need to be made. The Grants Team will provide reports directly to the DOE.

TECHNICAL QUALIFICATIONS AND RESOURCES

TEAM QUALIFICATIONS AND EXPERTISE

The key FPUA personnel associated with this project shall consist of the following individuals:

Mr. Craig Crawford, Director of Electric and Gas Systems: Mr. Crawford has 32 years of experience in the utility industry from doing installations, inspections, project management, operations management and now directing Electric and Gas Systems. As the Director of Electric and Gas Systems, he will be responsible for higher-level oversight and ensuring that the project team is equipped with the resources and programmatic support that they need.

Mr. Eric Meyer, P.E., Supervising Engineer: Mr. Meyer will be the technical project manager. He has 13 years of engineering experience with 10 of those years in the electric utility industry. Mr. Meyer has performed activities related to power line designs including reconductoring, single-to-three phase conversions, line extensions, and new power lines; system planning including load flow studies and contingency analyses; system protection studies including circuit breaker/fuse coordination; power quality investigations with emphasis on IEEE standard interpretation, Variable Frequency Drive (VFD) troubleshooting and motor-start analyses and substation activities including P&C's (Panels and Control), circuit breaker replacement and power transformer replacement. Mr. Meyer also has experience in Project Management for electric utility improvements, developments, and overall projects with maximum budgets (on a specific multi-year project) of up to $2.2 million dollars. Mr. Meyer is familiar with the procedures and processes that go into initializing, maintaining, and closing out projects so that they stay under budget and meet utility standards.

Mr. Thierry Sydne, P.E., Mechanical Engineer: Mr. Sydné will be an associate technical project manager and oversee the TripSavors component of the proposed project. He has 3 years of engineering experience in the utility industry specializing in both Mechanical and Electrical Engineering, all with FPUA. Mr. Sydné is involved in the planning, designing and management of large overhead and underground electric and natural gas capital projects for FPUA including the construction of new facilities and the expansion and/or optimization of existing infrastructure. Mr. Sydné is also responsible for system improvement projects on the distribution network in the form of storm hardening initiatives, identifying placement of capacitor banks for VAR adjustments, and identifying placement of reclosing devices for reliability enhancements. Mr. Sydné serves as FPUA's representative for review committees on electric & gas projects with local government agencies and serves as a supervisor for FPUA's distribution design group.

Ms. Rachel Tennant, Public Affairs and Sustainability Manager: Ms. Tennant is FPUA's lead grant manager. While working for the Environmental Protection Agency Office of Groundwater and Drinking Water, Ms. Tennant graduated from the University of Maryland College Park with an MS in Sustainable Development and Conservation Biology and an MPP in Environmental Policy in 2013. After graduating, she accepted a position as the Grants Program Associate for the Amazon Conservation Association, where she oversaw project and contract implementation totaling nearly $2.5M in international grants between the Washington, D.C. office and indigenous communities in Peru and Bolivia. She successfully led project start-up negotiations between key contractors (oil company, indigenous communities, grantor, foreign government, and conflict mitigation experts) for the $1.2M USAID-funded project to Strengthen Indigenous

Capacity in Conflict Resolution and Sustainable Resource Management. She began work at FPUA's Manatee Center in 2017 where she oversaw all operations, fundraising, and grants before her new role to develop the FPUA grants department and Sustainability Program in February 2022.

Ms. Ashley Levin, Sustainability Program Associate: FPUA's Sustainability Program also employs Sustainability Program Associate, Ashley Levin, and emphasizes internal grant capacity development to ensure that the various departments and divisions understand the requirements of the grants through which their projects are funded. Her role is critical in this project as she will be tracking timelines, reporting, and on-the-ground communications with the engineers to ensure project success. If needed, FPUA also relies on contracted grant specialists for select projects, who have decades of grant management years and millions of dollars of grant management experience combined.

EXISTING EQUIPMENT AND FACILITIES

For each project activity proposed under this grant opportunity, FPUA has the demonstrated means to oversee the activities and manage the project from start to finish. As stated above, FPUA plans on using contract services for the engineering, design, and construction of Project Part 1 to upgrade the transformers and reconductor the transmission lines; the contractors shall be responsible for providing their own means to perform the duties requested of them by FPUA. Per FPUA contractual policy, the contractors are not to look to FPUA for any assistance or support for the completion of the project; this will be enforced throughout the duration of the project.

Project Part 2, Converting Totten to Ring Bus Configuration, and Project Part 3, the deployment of TripSavers, will utilize FPUA equipment, such as line trucks and wiring, and FPUA staff will complete these upgrades. FPUA has a rigorous warehouse and equipment policy that tracks our existing supplies and equipment to ensure our ability to carry out maintenance as well as the projects proposed here.

PREVIOUS WORK EFFORTS, DEMONSTRATED INNOVATIONS

Fort Pierce Utilities Authority (FPUA) was established in 1972 and is currently celebrating over 50 years of providing economical, friendly, and reliable electric service to our customers. We maintain approximately 38 square miles of electric service territory covering the municipalities of Fort Pierce, St. Lucie Village and parts of unincorporated St. Lucie County in the State of Florida. FPUA maintains two transmission substations at 138 kV and six distribution substations at 69 kV; interconnecting these substations is one 138 kV transmission line, followed by six 69 kV transmission lines in a looped configuration around the electric service territory. FPUA receives its energy from four transmission terminals on its two 138 kV substations from the neighboring transmission system owned and operated by Florida Power & Light.

The project proposed is entirely within FPUA's existing experience and technical ability to carry out. It consists of not only new infrastructure, but also the enhancement of existing infrastructure due to age, degradation, anticipated load growth, and reliability purposes. Each

proposed project part involves the knowledge, skills, and experience of previous undertakings done by FPUA in a similar scope and size.

FPUA will take a Project Management role in the completion of these projects; FPUA anticipates using contract labor for the engineering, construction, and commissioning (if required) and will serve to oversee the scheduling, budgeting, and quality-control for each individual project. The project activities proposed by FPUA for this grant are within the purview of staff selected to oversee the contractors' capable completion of the relevant project elements.

FPUA also has in-house grant management experts and support. The Sustainability Program Department provides grant management services for all of FPUA's divisions and departments and is currently managing ten active grants, as well as two ongoing FEMA reimbursement cases, totaling $23,262,527 of funding. The largest is $15 million funded through the Florida Department of Environmental Protection's Resilient Florida program to relocate FPUA's Sewer Treatment Plant off of the Indian River Lagoon. The FPUA Finance Department, in conjunction with the Sustainability Program Department, oversees all audit requirements to ensure proper grant management and finance tracking procedures.

TIME COMMITMENT

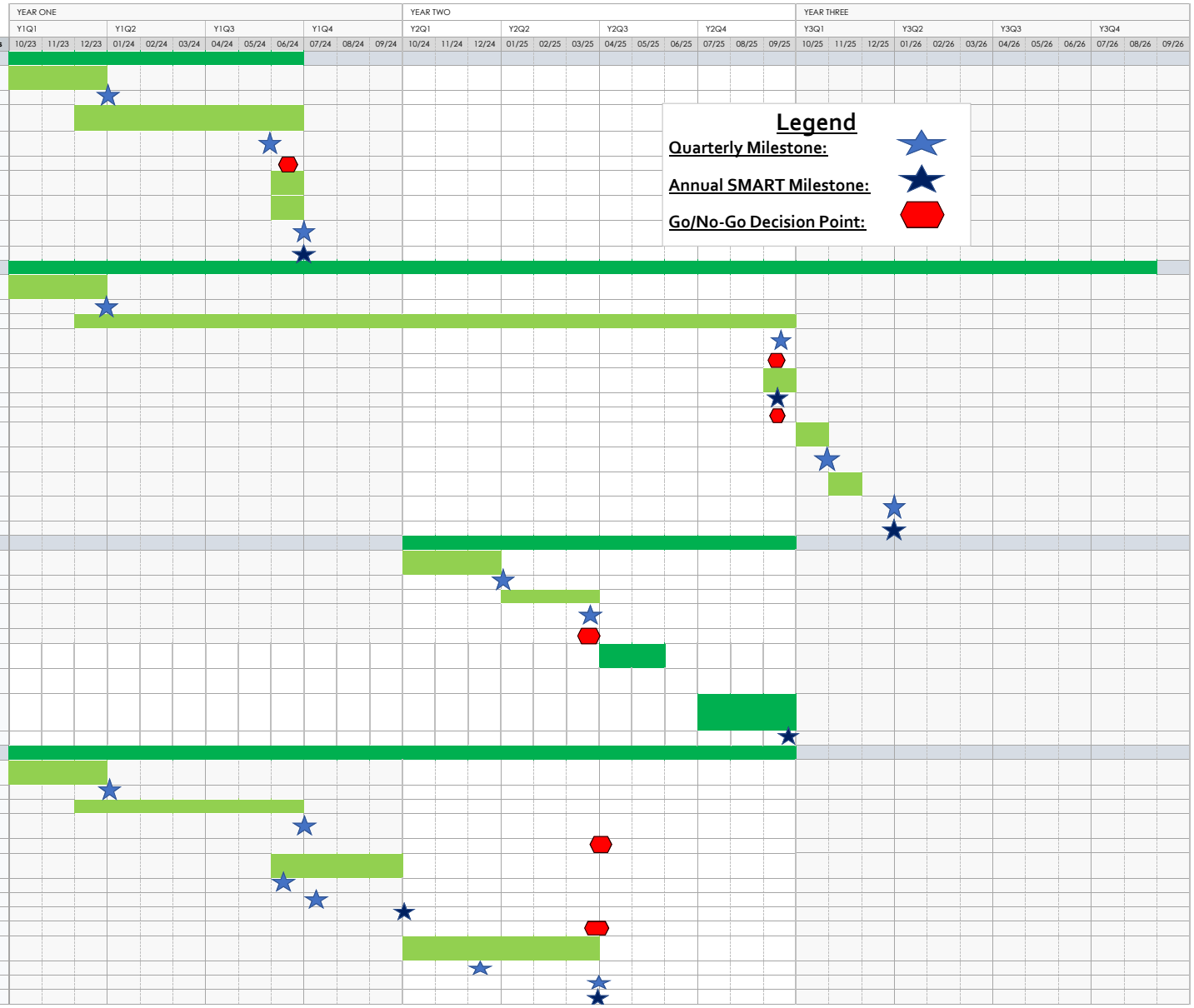
FPUA's key team members are prepared to commit the time needed to ensure this project is completed successfully and on time. FPUA's staff team will schedule regular meetings to go over project performance, and will communicate readily with the engineering teams via e-mail and phone to provide any support needed. These meetings will occur as frequently as needed to ensure successful project implementation and grant management. FPUA has an existing protocol for grants management which will be followed as described in the section on Project Management of this Technical Volume. The protocol ensures full cooperation between departments for the success of grant-funded projects such as these, while sharing the time requirement across all relevant project personnel.

TECHNICAL SERVICES PROVIDED BY DOE/NNSA FFRDCS (IF APPLICABLE)

There will be no technical services provided by DOE/NNSA FFRDCs.

TIMELINE - Mitigating Impacts of Extreme Weather and Natural Disasters through Increased Grid Resiliency

START DATE

October 01, 2023

PROJECT NAMES + TASK TITLES	START DATE	END DATE	# of Days
Task 2.0: Harlman Auto Transformer Upgrades	**10/01/23**	**06/30/24**	**195**
Subtask 2.1: Board Submission and Contract Execution	10/01/23	12/31/23	65
Q1 Milestone: Executed Contract	12/31/23	12/31/23	0
Subtask 2.2: Engineering, Materials and Transport	12/31/23	06/01/24	110
Q2 Milestone: FPUA received all designs and materials	06/01/24	06/01/24	0
Go/No-Go Decision Point:			
Subtask 2.3: Upgrade Autotransformer # 1 at Lawnwood Substation	06/01/24	06/14/24	10
Subtask 2.4: Upgrade Autotransformer # 2 at Lawnwood Substation	06/14/24	06/30/24	11
Q3 Milestone: Completed Autotransformer #1 and #2 Upgrades			0
Q4 & Annual SMART Milestone			
Task 3.0: Substaion Transformer Replacements	**10/01/23**	**09/30/26**	**783**
Subtask 3.1: Board Submission and Contract Execution	10/01/23	12/31/23	65
Q1 Milestone: Executed Contract			0
Subtask 3.2: Engineering, Materials and Transport	12/31/23	09/01/25	436
Q2 Milestone: FPUA received all designs and materials			0
Go/No-Go Decision Point:			0
Subtask 3.3: Replace Distribution Transformer #1 and #2 at Lawnwood Substation	09/01/25	09/30/25	22
Q4 Milestone and Annual SMART Milestone:			
Go/No-Go Decision Point:			0
Subtask 3.4: Replace Distribution Substation at King Substation	10/01/25	10/31/25	23
Q1 Milestone: FPUA completed replacement of Distribution Transformer #3 at King Substation			0
Subtask 3.5: Replace Distribution Transformer #4 at Savannah Substation	11/01/25	11/30/25	20
Q2 Milestone: FPUA completed replacement of Distribution Transformer #3 at King Substation			0
Year 3 Annual SMART Milestone:			
Task 4.0: Totten Substation Ring Bus Configuration	**10/01/24**	**09/30/25**	**261**
Subtask 4.1: Board Submission and Contract Execution	10/01/24	12/31/24	66
Q1 Milestone: Executed Contract			0
Subtask 4.2: Engineering, Materials and Transport	01/01/25	03/31/25	64
Q2 Milestone: FPUA received all designs and materials			0
Go/No-Go Decision Point:			0
Subtask 4.3: FPUA began installation of new circuit breakers into Totten Substation	04/01/25	05/01/25	23
Q3 Milestone: FPUA began replacement of manual switches with new circuit breakers			0
Subtask 4.3: FPUA will complete installation of new circuit breakers, completing the Ring Bus configuration	07/01/25	09/30/25	66
Q4 & Annual SMART Milestone:			0
Task 5.0: Deployment of TripSavers	**10/01/23**	**09/30/25**	**522**
Subtask 2.1: Board Submission and Contract Execution	10/01/23	12/31/23	65
Q1 Milestone: Executed Contract			0
Subtask 2.2: Engineering, Materials and Transport	12/31/23	06/01/24	110
Q2 Milestone: FPUA received all designs and materials			0
Go/No-Go Decision Point:			0
Subtask 5.3-5.4: FPUA will install 200 TripSavers, completing Area 1.	06/01/24	09/30/24	86
Q3 Milestone: FPUA installed 100 TripSavers in Area 1.			0
Q4 Milestone: FPUA installed 100 TripSavers in Area 1.			0
Year 1 Annual SMART Milestone:			0
Go/No-Go Decision Point:			0
Subtask 5.5-5.6: FPUA will install 200 TripSavers, completing Area 2.	10/01/24	03/31/25	130
Y2Q1 Milestone: Installed 100 TripSavers in Area 2			0
Y2Q2 Milestone: Installed 100 TripSavers in Area 2			0
Year 2 Annual SMART Milestone:			0