

State of Florida



Public Service Commission

CAPITAL CIRCLE OFFICE CENTER • 2540 SHUMARD OAK BOULEVARD
TALLAHASSEE, FLORIDA 32399-0850

-M-E-M-O-R-A-N-D-U-M-

DATE: June 3, 2021

TO: Office of Commission Clerk (Teitzman)

FROM: Division of Engineering (Wooten, Doehling, Ellis, King, Ramos) *TB*
Division of Accounting and Finance (Mouring) *ALM*
Division of Economics (Kunkler, Wu) *JGW*
Office of the General Counsel (Brownless) *JSC*

RE: Docket No. 20200234-EI – Petition for approval of direct current microgrid pilot program and for variance from or waiver of Rule 25-6.065, F.A.C., by Tampa Electric Company.

AGENDA: 06/15/21 – Regular Agenda – Proposed Agency Action - Interested Persons May Participate

COMMISSIONERS ASSIGNED: All Commissioners

PREHEARING OFFICER: Administrative

CRITICAL DATES: None

SPECIAL INSTRUCTIONS: None

Case Background

On October 27, 2020, Tampa Electric Company (TECO or Company) filed a petition for approval of a direct current (DC) microgrid pilot program (DC Pilot) and associated variance or waiver from the terms of Rule 25-6.065, Florida Administrative Code (F.A.C.). On December 8, 2020, staff conducted an informal meeting with the Company and interested persons. During this informal meeting, staff and interested persons made the Company aware of concerns regarding its request for a variance from Rule 25-6.065, F.A.C. In response to these concerns, the Company filed an amended petition on March 4, 2021, withdrawing its request for the variance from Rule 25-6.065, F.A.C. This recommendation addresses the amended petition.

The proposed DC Pilot program involves the installation of new DC electric microgrid technology and associated generating equipment collectively known as the Block Energy System (BES). The BES will be a TECO-owned system that interconnects battery storage and solar photovoltaic (PV) equipment at customer residences with community sited battery storage and traditional generation using an underground DC distribution system and controlled by a power management algorithm. This BES will provide up to 37 homes with power in the Hillsborough County housing development, Medley at Southshore Bay, within TECO's service area. The Company proposes the DC Pilot be implemented for a period of four years, if the Commission grants approval of the DC Pilot. As of March 1, 2021, one home is complete and occupied, with construction underway on 19 other homes.

Emera Technologies LLC (ETL) is the parent company of Emera Technologies Florida, Inc. (ETFI). ETL constructed and deployed a prototype of the BES at Kirtland Air Force Base, in Albuquerque, New Mexico in December 2019. ETL advertises its BES as a business opportunity for investor-owned utilities to own and earn a return on equipment at the customer dwelling that would otherwise be customer-owned and behind-the-meter. ETFI is an affiliate of TECO that entered into an engineering, procurement, and construction agreement (EPC Agreement) in which ETFI will design, engineer, supply, install, test and commission the BES. TECO and Metro Development Group (Metro) entered into an agreement (Developers Agreement) that allows both ETFI and TECO access to the housing development to install, operate and maintain the system. This Developers Agreement grants TECO an easement for the Community Energy Park (CEP) and AC distribution system. TECO and Lennar Homes Inc. (Lennar) entered into an agreement (Builders Agreement) in which Lennar will build the homes that will be participating in the DC Pilot. As outlined in the Builders Agreement, TECO will have access to the BES and traditional AC distribution system in the housing development for installation, operation, and maintenance.

As of April 22, 2021, there were no comments from either customers or interested parties filed in the docket. The Commission has jurisdiction over this matter pursuant to Sections 366.05, 366.06 and 366.91, Florida Statutes (F.S.).

Discussion of Issues

Issue 1: Should the Commission approve TECO's proposed DC Pilot program?

Recommendation: Yes, the Commission should approve the proposed DC Pilot program with the following modifications: 1) costs associated with the DC Pilot program should be capped at \$1.99 million, and 2) the Company should provide annual reports to the Commission as detailed in the petition as well as a survey, in year three, of the DC Pilot on the participants' willingness to pay a monthly surcharge for increased reliability. While participating customers will not realize direct energy savings similar to traditional customer-owned or leased solar installations, the participants may experience a slightly higher level of reliability when compared to other customers in the same sub-division. In addition, the potential system benefits of the DC Pilot program as proposed are dependent on participating customers' willingness to pay a premium for incremental reliability benefits. Staff recommends that the Pilot commence on the date the consummating order is issued and terminate four years from that date, if no request for hearing is timely filed. If a request for hearing is timely filed, the Pilot shall be held in abeyance pending final hearing. (Wooten, Doehling, Mouring, Wu)

Staff Analysis:

Description of Proposed DC Pilot Program

Under the proposed DC Pilot, TECO will contract with ETFI to install and operate battery storage and solar PV equipment at approximately 37 single family detached houses within a particular sub-division. The housing development will be connected by the underground DC microgrid, in addition to the traditional alternating current (AC) distribution system (AC grid). Pursuant to the Addendum included in the purchase and sale agreement, customers who purchase a home in the development will be required to participate in the DC Pilot at no additional cost. The terms of the Addendum are further discussed below.

Each house participating in the DC Pilot would have an inverter installed to convert the DC microgrid power to AC for the house, along with an average of 7.8 kilowatts (kW) of solar photovoltaic (PV) panels and 17.7 kilowatt-hours (kWh) of standard battery storage. Each house would have a device called a Block Box, which contains the inverter, battery storage, and related control equipment. The Block Box will connect the house with the solar PV array and the DC microgrid.

In addition, TECO would install 240 kWh of battery storage and a pair of reciprocating natural gas generators totaling 350 kW at a location called the CEP.¹ The housing development is also connected to TECO's AC distribution system to provide power in the event of any failure of the BES.

The Block Box control equipment and CEP are connected by fiber optic cables to the housing development's network and will automatically manage power using a control algorithm. The control algorithm seeks to optimize power generation and delivery. For example, TECO stated that if one home's Block Box battery is depleted, the BES can deliver excess power from other

¹Response to Staff's 1st Data Request, No. 12, and supplemental response to Staff's 7th Data Request, No. 3.

homes or the CEP. Similarly, the control algorithm can also dispatch the CEP natural gas generators or import power from the AC grid if the solar panels or batteries are not able to meet demand. In addition, TECO stated the algorithm could be set to prioritize exporting power from the BES to support reliable operation of the AC grid, or could isolate the BES in the event of widespread AC grid outages.

Under the DC Pilot, a participant's energy consumption will be measured by a single meter and participants will be billed under the standard residential tariff rate. As such, their bills will be no different than if they were not participating in the DC Pilot. As the solar PV arrays are owned and operated by TECO, participants would not be able to claim any higher renewable energy usage. This is because all the assets installed under the DC Pilot are front-of-the-meter (Company owned), whereas customer-owned or leased roof top solar resources are behind-the-meter. In a traditional customer-owned or leased solar PV system and behind-the-meter battery storage, the customer can offset all or part of their energy usage and receive bill credits for excess generation. Such customers are also able to claim they produced renewable energy, such as through renewable energy credits. Under the proposed pilot, any excess generation beyond what is required to charge the Block Box and CEP batteries will be exported to the AC grid for the benefit of non-participants.² However, as the DC Pilot is sized to meet the needs of the participants, staff believes this benefit to be minimal.

The proposed length of the DC Pilot is four years, if the Commission grants approval of the DC Pilot. TECO has communicated to staff that as of March 1, 2021, one home is occupied and that the BES is prepared to be energized at this time. Although the term of the DC Pilot is four years, TECO intends for the BES to be the permanent electric supply for the homes in the community and it is designed to last for decades. In the event of equipment failure or if a customer leaves the DC Pilot, TECO is building out redundant AC infrastructure in the housing development, including manual switches that would allow each house to transfer from the BES to TECO's traditional infrastructure. If TECO determines at the end of the Pilot that the DC Microgrid is not effective, the DC infrastructure will be removed and the Company will continue to utilize the CEP. Therefore, staff recommends that the DC Pilot be approved for a four year period beginning on the date the Commission's consummating order is issued.

Program Goals

TECO stated that the purpose of the DC Pilot is to test the capability of the BES to provide power to residential homes with a high level of renewable energy as well as superior reliability and resiliency. More specifically, the goals of the DC Pilot will test the ability of the BES to: (1) ride through all upstream AC distribution system disturbances with no interruption to the customer; (2) integrate high levels of renewable energy targeted to be at least 60 percent of the total energy used by the homes participating in the DC Pilot; and (3) reduce impacts on the transmission and distribution system during times of peak demand. TECO asserts that if the DC Pilot meets these objectives, then the quantifiable benefits would include: (1) increased renewable penetration, (2) reduced system losses, (3) reduced generation capacity costs, (4) reduced system transmission and distribution capacity costs, (5) reduced energy costs, and (6) increased reliability. Staff believes these goals are reasonable for the DC Pilot; however, staff

²Response to Staff's 1st Data Request, No. 14.

Date: June 3, 2021

also believes that any approval should be clear that participating customers will not realize any direct energy (kWh) savings, unlike traditional customer-owned or leased solar installations, and that the benefit of increased reliability would be marginal compared to the increased reliability resulting solely from the community being served by the underground AC distribution system.

Reporting Requirements

As described in the Company's petition, TECO will produce annual reports during the DC Pilot, to be provided to the Commission. These annual reports will describe the results as well the successes and failures to produce the expected benefits of the DC Pilot. In addition to annual reports, the Company will produce a final report to provide to the Commission. This final report will be an assessment of the overall DC Pilot and determine the merits of a possible permanent program to be presented to the Commission. Within these reports the Company intends to make both quantitative and qualitative analyses that would: (1) compare the cost of providing local distribution service from a DC microgrid to the cost of a standard AC system; (2) describe whether the system performs as expected; (3) describe whether any incremental operation and maintenance (O&M) expenses may arise; and (4) describe what benefits the microgrid provided with respect to reliability and resiliency. These reports will also include input from DC Pilot participants. In year three of the pilot, staff recommends that TECO survey the DC Pilot participants on their willingness to pay a monthly surcharge for this premium service. The results of this survey should be included in the final report.

Terms of the DC Pilot

Terms of the Agreements

The EPC Agreement with ETFI designates that the BES will initially operate under a one year test year period which TECO can suspend if certain performance criteria are not met. If the system is suspended within this one year test period, ETFI would be obligated at their expense to dismantle the system and TECO would serve the participants with the AC distribution system.³ The CEP would be kept by TECO as a generation resource to be utilized in the future.

TECO and Metro Development Group (Metro) entered into an agreement (Developers Agreement) that allows both ETFI and TECO access to the housing development to install, operate and maintain the system. This Developers Agreement grants TECO an easement for the CEP and AC distribution system. TECO and Lennar Homes Inc. (Lennar) entered into an agreement (Builders Agreement) in which Lennar will build the homes that will be participating in the DC Pilot. As outlined in the Builders Agreement, TECO will have access to the BES and traditional AC distribution system in the housing development for installation, operation and maintenance. Furthermore the Builders Agreement details that TECO will own, operate, and maintain the solar panels installed on the roofs of homes in the DC Pilot.

When a homebuyer purchases a home from Lennar, they will sign a purchase and sale agreement which includes an Addendum. The Addendum provides the terms of DC Pilot participation and states, in part, that BES equipment is located on the homebuyer's lot pursuant to a utility easement. Staff provided the Company feedback on language referring to a restriction on customer-owned or leased rooftop solar during the term of the Pilot Program in the original version of the Addendum. In response, the Company and Lennar revised the Addendum and

³Response to Staff's 7th Data Request, No. 2.

removed this restriction. A copy of this revised Addendum is included as Attachment A. As stated in the Addendum, TECO is informing participants that the program will “deliver greener and highly reliable electricity directly to your home.” As discussed above, participating customers will not realize any direct energy or bill savings. The revised Addendum also informs homebuyers that, pursuant to Rule 25-6.065, F.A.C., they have the right to install their own solar PV and net meter their excess generation. Customers who elect to install their own solar PV will be removed from the DC Pilot and instead be served by the AC grid. Regardless, TECO will still retain its easement allowing it to own, operate, and maintain the BES equipment on the homeowner’s property, including the TECO-owned rooftop solar panels.

Terms of the Pilot Suspension

If TECO suspends the system, either after the one year test period or at the end of the DC Pilot, TECO will either remove the solar panels from the roofs or sign over ownership of the solar panels to the homeowners. If the homeowners choose to take ownership of the solar panels, they would purchase the solar panels from TECO for a nominal value of \$1.00 so they could be repurposed to provide homeowners with solar power that would be subject to an interconnection agreement with TECO. Because the balance of the BES system would remain with TECO, the solar panel arrays would need an inverter installed to convert the solar PV’s DC generation to AC power to allow a proper connection to TECO’s AC distribution system. This conversion process would have an estimated cost of \$3,000 to \$5,000 per home.⁴ This conversion cost would be covered by either ETFI or TECO according to the terms set forth within the EPC Agreement.⁵

DC Pilot Costs

The estimated installed capital cost for the DC Pilot is \$1.99 million inclusive of the solar panel arrays, Block Boxes, CEP, and DC Infrastructure required for the system. The redundant AC distribution system has an estimated capital cost of \$60,000, which is similar in costs to a typically installed AC distribution system, and is separate from the \$1.99 million total.⁶ The software provided by ETFI, at no cost to TECO, to operate the system will have no capital or O&M expenses for the Company. The information learned from the DC Pilot will be applied in the development of a software maintenance agreement with ETFI that would be implemented at the DC Pilot’s conclusion. In response to a staff data request, TECO stated it will not incur O&M costs for the duration of the DC Pilot.⁷ The DC Pilot will inform TECO on how to develop an O&M plan to be implemented at the conclusion of the DC Pilot.

Revenue Requirements

The Company is seeking recovery associated with the DC microgrid system and AC distribution system to be recovered through base rates, including O&M expenses incurred by TECO. This recovery request is included in TECO’s rate increase petition filed in Docket No. 20210034-EI on April 9, 2021.

⁴Response to Staff’s 1st Data Request, No. 23.

⁵Response to Staff’s 7th Data Request, No. 2.

⁶Response to Staff’s 2nd Data Request, No. 2b.

⁷Response to Staff’s 1st Data Request, No. 2.

The two gas-fired generators at the CEP would be dispatched based on local need instead of traditional least-cost economic dispatch and will have an annual estimated fuel cost of \$11,000 in the pilot's first two years and \$10,000 for the remainder of the DC Pilot.⁸ The Company is also seeking recovery of the fuel costs associated with the CEP to be recovered through the fuel adjustment clause. The Company has estimated total program costs for both capital and fuel, absent consideration of the recovery of any potential losses from the sale of the equipment at the end of the program, would equate to approximately a \$0.01 per 1,000 kWh on a residential monthly bill.⁹

Depreciation

TECO states that the DC Pilot involves "new and innovative technologies," thus, new categories of plant assets will be installed.¹⁰ The Company indicated that if the DC Pilot is approved, it will submit a request to the Commission for establishing several new depreciation accounts/subaccounts, with corresponding depreciation rates, to record these plant assets.¹¹

Proposed Accounting Treatment

TECO has requested that the capital investment, along with O&M expenses, associated with its proposed DC Pilot be recorded above-the-line, and be approved for recovery through base rates. The Company's proposed DC Pilot offers participants the option to purchase the rooftop solar panels installed at their home for a nominal fee of \$1.00, in the event that the Company elects to discontinue the DC Pilot. As outlined in Section 4 of its proposal, the Company may discontinue the program after review of the final report. Under this scenario, the losses generated by selling the rooftop solar panels below the unrecovered net book value would also be recorded above-the-line in Account 421.2 Loss on Disposition of Property. Further, any resulting net losses would be recovered through base rates from the general body of customers. The Company stated that the proposed buyout option would help to avoid potential removal costs and allow the existing rooftop solar panels to be repurposed to allow the homeowners to produce solar power for their own needs. The Company has also stated that removing solar panels that have already been installed would subvert its goal of increasing cost-effective solar generation in its service territory.

Conclusion

While the DC Pilot is not currently projected to be cost-effective, the main benefit of the program is in the form of the data collected regarding the reliability and costs of the BES. The DC Pilot program would allow the Company to verify the incremental reliability benefits to participants and costs to TECO for the BES. This information may then enable the Company to accurately determine the level of improved reliability and the potential cost differential in order to develop a future program or tariff offering.

⁸Revised Response to Staff's 1st Data Request, No. 2.

⁹Response to Staff's 5th Data request, No. 2.

¹⁰Response to Staff's 2nd Data Request, No. 1.

¹¹Revised Response to Staff's 4th Data request, No. 1a.

As previously stated, staff believes the system benefits gained from any excess generation being exported to the benefit of non-participants to be minimal. Furthermore, as TECO has not claimed that reliability concerns are a problem in this service area, the benefit of increased reliability would be marginal compared to the increased reliability resulting from the community being served solely by the underground AC distribution system. In addition, participants would not be able to claim any higher renewable energy usage as all assets are front-of-meter installations.

ETL advertises its BES as a business opportunity for investor-owned utilities to own and earn a return on equipment at the customer dwelling that would otherwise be customer-owned or leased and behind-the-meter. In the current petition, the general body of ratepayers will be paying for the market research to gather data that could be used to potentially increase reliability for participating customers. As indicated by the Company, while current DC Pilot program participants will face no additional charges, future implementations of the BES concept may require a premium rate structure to recover an incremental cost of service from participants.¹²

As discussed above, participating customers will not realize direct energy savings similar to customer-owned or leased solar installations. However, participants may experience a slightly higher level of reliability when compared to other ratepayers in the same sub-division. As such, the potential system benefits of the DC Pilot program as proposed are dependent on participating customers' willingness to pay a premium for incremental reliability benefits. Therefore, the Commission should approve the proposed DC Pilot program with the following modifications: 1) costs associated with the DC Pilot program should be capped at \$1.99 million, and 2) the Company should provide annual reports to the Commission as detailed in the petition as well as a survey, in year three, of the DC Pilot on the participants' willingness to pay a monthly surcharge for increased reliability. Staff recommends that the Pilot commence on the date the consummating order is issued and terminate four years from that date, if no request for hearing is timely filed. If a request for hearing is timely filed, the Pilot shall be held in abeyance pending final hearing.

¹²Revised Response to Staff's 1st Data Request, No. 7a.

Issue 2: Should this docket be closed?

Recommendation: Yes. If no person whose substantial interests are affected by this proposed agency action files a request for a hearing within 21 days of the issuance of the order, this docket should be closed upon the issuance of a consummating order. If a request for hearing is timely filed, this docket shall remain open pending final hearing. (Brownless)

Staff Analysis: At the conclusion of the protest period, if no protest is filed, this docket should be closed upon the issuance of a consummating order. If a request for hearing is timely filed, this docket shall remain open pending final hearing.



TAMPA ELECTRIC COMPANY
DOCKET NO. 20200234-EI
STAFF'S FIRST DATA REQUEST
BATES PAGES: 10 - 11i
FILED: JANUARY 11, 2021
REVISED: MARCH 4, 2021

Information on Your Home and the Block Energy System

Hello Prospective Homebuyer,

Tampa Electric is the proud energy provider to all homes in the Medley development at Southshore Bay. It is exciting that you are considering one of the select homes using the BlockEnergy™ Microgrid Pilot Program.

This innovative new energy solution will deliver greener and highly reliable electricity directly to your home. It combines renewable solar energy with battery storage and local generation, located right in the Medley subdivision, to create a local energy system, called a microgrid. The microgrid includes Tampa Electric-owned rooftop solar panels on each home that supply electricity to the subdivision.

As a homeowner, you will benefit from this reliable and resilient supply of electricity in your home – while paying the same rate for electricity as other Tampa Electric residential customers.

Homes served by the BlockEnergy Microgrid Pilot Project will have a permanent easement allowing Tampa Electric to place the solar panels on the roof and the Block Box next to the home. These will remain on the property during the pilot program and afterwards, unless Tampa Electric and the Public Service Commission decide to discontinue the program. Tampa Electric will maintain this equipment during the term of the pilot project and afterwards, if the project is continued.

Homeowners in this microgrid may install additional rooftop solar panels on their home. However, Tampa Electric would disconnect the home from the microgrid and would instead serve it through a traditional electric connection. The homeowner would also need to:

- Ensure the solar panels meet Tampa Electric's technical requirements.
- Sign an "interconnection agreement" with Tampa Electric before connecting the solar panels.

If additional solar panels are installed, Tampa Electric will continue to have access to, and receive power from, the company-owned rooftop solar panels on the home.

Because of the added reliability of this new Tampa Electric energy solution, we do not expect homes in the microgrid to need alternate forms of power, such as a backup generator. However, homeowners who choose to install or use a generator should hire a licensed and qualified electrician to ensure that the generator is installed in accordance with applicable laws, codes and requirements.

The brochure provided by the builder highlights some of the additional benefits of owning a home in this community. You can also learn more about it at www.blockenergy.com/medley. If you would like to contact Tampa Electric to learn more about the BlockEnergy Microgrid Project, please call us at (813) 223-0800 or 1-888-223-0800 Monday through Friday 7:30 a.m. to 6:00 p.m. or email us at MicroGrid@tampaelectric.com.

We look forward to having you become a part of this exciting microgrid project.