Maria J. Moncada
Senior Attorney
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408-0420
(561) 304-5795
(561) 691-7135 (Facsimile)
E-mail: maria.moncada@fpl.com

March 2, 2018

-VIA ELECTRONIC FILING -

Ms. Carlotta S. Stauffer
Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Re: Docket No. 20180001-EI

Dear Ms. Stauffer:

I enclose for electronic filing in the above referenced docket (i) Florida Power & Light Company's ("FPL") Petition for Approval of Solar Base Rate Adjustment To Be Effective 2019; and (ii) the prepared testimony and exhibits of FPL witnesses William F. Brannen and Juan E. Enjamio in support of the Solar Base Rate Adjustment.

Please contact me if you have or your Staff has any questions regarding this filing.

Sincerely,

s/ Maria J. Moncada
Maria J. Moncada

Enclosures
cc: Counsel for Parties of Record (w/encl.)

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Fuel and purchase power cost recovery clause with generating performance incentive factor	Docket No: 20180001-EI Date: March 2, 2018

FLORIDA POWER & LIGHT COMPANY'S PETITION FOR APPROVAL OF SOLAR BASE RATE ADJUSTMENT TO BE EFFECTIVE 2019

Florida Power & Light Company ("FPL" or the "Company"), pursuant to the Stipulation and Settlement approved by this Commission in Order No. PSC-16-0560-AS-EI, dated December 15, 2016 (the "FPL Rate Settlement" or "Settlement"), hereby requests that the Florida Public Service Commission ("Commission") find that the proposed new solar generation described herein satisfies the requirements for a solar base rate adjustment ("SoBRA"). The proposed solar generation, which consists of four universal solar energy centers scheduled to be placed in service by March 1, 2019 (the "2019 Project"), meets the cost requirements established in the FPL Rate Settlement and is cost-effective. FPL further requests that the Commission authorize FPL to implement a SoBRA upon the commercial operation date of the 2019 Project.

In support of the Petition, FPL states as follows:

1. The name and address of the Petitioner is:

   Florida Power & Light Company
   700 Universe Boulevard
   Juno Beach, Florida 33408

Any pleading, motion, notice, order or other document required to be served upon the petitioner or filed by any party to this proceeding should be served upon the following individuals:

William P. Cox
Senior Attorney
will.p.cox@fpl.com
Maria J. Moncada
Senior Attorney
maria.moncada@fpl.com
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408-0420
Phone: (561) 304-5662
Fax: (561) 691-7135

Kenneth A. Hoffman
Vice President, Regulatory Affairs
ken.hoffman@fpl.com
Florida Power & Light Company
215 South Monroe Street, Suite 810
Tallahassee, FL 32301
Phone: (850) 521-3919
Fax: (850) 521-3939

2. The Commission has jurisdiction pursuant to Sections 366.04, 366.05 and 366.06, Florida Statutes.

3. FPL is a corporation organized and existing under the laws of the State of Florida and is an electric utility as defined in section 366.02(2), Florida Statutes.

4. This Petition is being filed consistent with Rule 28-106.201, Florida Administrative Code. The agency affected is the Florida Public Service Commission, located at 2540 Shumard Oak Boulevard, Tallahassee, Florida 32399. This case does not involve reversal or modification of an agency decision or an agency's proposed action. Therefore, subparagraph (c) and portions of subparagraphs (b), (e), (f) and (g) of subsection (2) of that rule are not applicable to this Petition. In compliance with subparagraph (d), FPL states that it is not known which, if any, of the issues of material fact set forth in the body of this Petition may be disputed by any others who may plan to participate in this proceeding. The discussion below demonstrates how the petitioner's substantial interests will be affected by the agency determination.

5. The FPL Rate Settlement resolved all of the issues in the consolidated proceeding that included Docket Nos. 160021-EI, 160061-EI, 160062-EI and 160088-EI. Pursuant to the Settlement, FPL may construct up to 300 megawatts ("MW") of solar photovoltaic ("PV") generation annually through 2021. To the extent that FPL receives approval for less than 300 MW in a year, the surplus capacity can be carried over to the succeeding years. FPL is authorized to recover the costs of the solar generation project through a SoBRA when the generation is placed in service if the project is determined to be cost-effective and the costs are reasonable and do not exceed $1,750 per kilowatt alternating current ("kW_{AC}"). Pursuant to the FPL Rate Settlement, the issues for determination are limited to (i) the cost effectiveness of the project, (ii) the amount of revenue requirements and (iii) the appropriate percentage increase in base rates needed to collect the estimated revenue requirements.

6. Pursuant to this mechanism, FPL constructed a 298 MW solar project in 2017 and another 298 MW solar project in 2018, and it received approval to implement a SoBRA when each project entered commercial service. *See* Order No. PSC-2018-0028-FOF-EI. As contemplated by the FPL Rate Settlement, the Company is undertaking construction of four additional centers totaling 298 MW that will be placed into commercial operation in 2019, each one generating enough energy to serve the annual energy needs of about 14,500 homes. Accordingly, FPL files this Petition, along with the testimony and exhibits of William Brannen and Juan Enjamio, to demonstrate that the costs of the 2019 Project are reasonable and fall well below $1,750 per kW_{AC} and that adding this solar generation to FPL's system is cost-effective. FPL will include in its projection filing in this docket (scheduled to be filed August 24, 2018) testimony to support the revenue requirement and appropriate percentage increase in base rates associated with the 2019 Project.

The 2019 Universal Solar Energy Centers

Technology and Equipment

7. The solar energy centers that comprise the 2019 Project will be located at four sites and will collectively generate a total of 298 MW_{AC} (nameplate capacity). The designs described in this Petition and in the accompanying testimony are not yet final but rather reflect base-line designs. FPL will continue to evaluate optimization opportunities, with the final designs differing from that presented in this docket only if the changes are projected to result in greater customer benefits.

8. At each center, FPL will install highly efficient PV panels that convert sunlight to direct current ("DC") electricity. In total, about 1.28 million PV panels will be installed. The panels will be tied together electrically in groups and connected to an electronic device called a power conversion unit ("PCU"), which includes inverters that transform the DC electricity produced by the PV panels into alternating current ("AC") electricity, all at a 1.52 ratio of DC to AC capacity. The high quality equipment and design selection result in high levels of output and reliability that will benefit customers.

9. Each center will have its own point of interconnection. At the site for each center, FPL will construct new collection substations with power step-up transformers that will increase the AC voltage from 34.5 kV to the voltages at the transmission point of interconnect. Each of the new collection substations will be connected to the bulk transmission system at the corresponding point of interconnection by generation tie lines less than one mile in length. No upgrades to the existing FPL bulk transmission system are required to accommodate the proposed solar generation.

Capital Costs

10. The overall cost for the 2019 Project is $413 million or $1,386/kW$_{AC}$.[1] The Project is comprised of four solar energy centers scheduled to enter commercial operation by March 2019. Those centers are: (i) Miami Dade (located in Miami-Dade County), (ii) Interstate (located in St. Lucie County), (iii) Pioneer Trail (located in Volusia County) and (iv) Sunshine Gateway (located in Columbia County).

11. More than 99% of the costs for all of the surveying, engineering, equipment, materials and construction services were established through competitive bidding processes specific to the 2019 Project. Specifically, FPL solicited proposals for the supply of the PV panels, PCUs and power step-up transformers, as well as the engineering, procurement and construction for the solar facilities, substations and interconnection facilities. FPL has secured or is in the process of securing arrangements with the lowest cost bidders for each of these components.

The 2019 Project is Cost-Effective

12. The FPL Rate Settlement provides that SoBRA-eligible projects must be cost-effective, and it defines cost-effective as having a lower projected system cumulative present value revenue requirement ("CPVRR") with the project compared to the system CPVRR without it. As explained more fully by FPL witness Enjamio, adding the 2019 Project's 298 MW$_{AC}$ of solar generation to FPL's fleet is cost-effective.

13. To evaluate cost-effectiveness, FPL compared a resource plan that excludes the 2019 Project to a plan that includes it: the "No Solar Plan" and the "2019 Solar Plan," respectively. Both plans use the same major system assumptions, including the Company's load,

[1] The cost for each center ranges from $1,289/kW$_{AC}$ to $1,460/kW$_{AC}$.

fuel price and carbon dioxide ("CO_2") price forecasts, the same forecasts that will be used in FPL's 2018 Ten Year Site Plan. As its name indicates, the No Solar Plan does not include any new solar generation beyond that already in service as of March 2018, and it assumes that future resource needs are met by combined cycle units, short-term power purchase agreements and FPL's proposed new nuclear units. The second resource plan adds the four solar energy centers that comprise the 2019 Project. Because the solar PV installations – existing and future – are assumed to provide firm capacity, adding the 2019 Project defers the timing of a future combined cycle addition.

14. Based on the assumptions for each Plan, FPL determined the variable system costs, consisting primarily of fuel, variable operations & maintenance ("O&M") and emissions, using the hourly production costing model, UPLAN. The output of each UPLAN modeling run is imported into FPL's Fixed Cost Spreadsheet ("FCSS") Model, which adds fixed costs such as capital, capital replacements and fixed O&M. The FCSS model was used to calculate the CPVRR for each resource plan. To determine the cost impact of the proposed solar generation, FPL subtracted the CPVRR of the No Solar Plan from the CPVRR of the 2019 Solar Plan.

15. Based on the economic analysis, the 2019 Project is projected to be cost-effective. FPL customers are projected to save $40 million CPVRR.

Additional Benefits of the 2019 Project

16. The addition of the 2019 Project also provides non-economic advantages in the form of system, environmental and community benefits.

17. *System and environmental benefits*. The solar energy from the 2019 Project will displace fossil fuel generation at a level that is equivalent to removing approximately 52,000 cars from the road annually. More specifically, on an average annual basis, the Project is projected to reduce the use of natural gas by 4,463 million cubic feet, the use of oil by 6,224 barrels and the

use of coal by 1,838 tons. The reduced use of fossil fuel will, in turn, reduce CO_2 emissions by an average of 271,000 tons annually. Sulfur dioxide ("SO_2") and nitrogen oxide ("NO_x") emissions also are projected to decline by an annual average of 14 tons and 45 tons, respectively.

18. *Community benefits*. Construction of the 2019 Project will create about 800 jobs in total, providing an economic boost to local businesses. This construction in Florida will increase annual tax revenue for the counties where the sites are situated, thus contributing to the funding of public services that benefit those communities.

Conclusion

19. The 2019 Project satisfies the SoBRA cost requirements established in the FPL Rate Settlement and is projected to generate customer savings as well as system and environmental benefits. The estimated cost of the 2019 Project falls well below $1,750 per kW_{AC} and is reasonable, with FPL having solicited bids for the major equipment components, as well as the engineering and construction. Further, adding the 2019 Project to FPL's system is estimated to save customers approximately $40 million CPVRR and will improve FPL's fuel diversity. Finally, it will also reduce CO_2, SO_2 and NO_x emissions, providing cleaner air for all Florida residents to enjoy for years to come.

20. Accordingly, the Commission should enter a final order determining that FPL's 2019 Project satisfies the requirements for SoBRA approval set forth in the FPL Rate Settlement and authorizing FPL to recover the annualized revenue requirements for the 2019 Project when it enters commercial operation. The amount of revenue requirements and the appropriate percentage increase in base rates needed to collect the estimated revenue requirements will be presented in FPL's subsequent projection filing in this docket.

WHEREFORE, for the foregoing reasons and as more fully set forth in the supporting testimony and exhibits filed with and incorporated in this Petition, Florida Power & Light Company requests that the Commission authorize FPL to implement a solar base rate adjustment when the 2019 Project enters commercial service.

Respectfully submitted,

William P. Cox
Senior Attorney
Maria J. Moncada
Senior Attorney
Florida Power & Light Company
700 Universe Boulevard
Juno Beach, FL 33408
Telephone: (561) 304-5795
Facsimile: (561) 691-7135
Email: maria.moncada@fpl.com

By: *s/ Maria J. Moncada*
Maria J. Moncada
Florida Bar No. 0773301

CERTIFICATE OF SERVICE
Docket No. 20180001-EI

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished by electronic service on this 2nd day of March 2018 to the following:

Suzanne Brownless, Esq.
Danijela Janjic, Esq.
Division of Legal Services
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850
sbrownle@psc.state.fl.us
djanjic@psc.state.fl.us

J.R. Kelly, Esq.
Patricia Christensen, Esq.
Charles Rehwinkel, Esq.
Erik L. Sayler, Esq.
Office of Public Counsel
c/o The Florida Legislature
111 West Madison Street, Room 812
Tallahassee, Florida 32399
kelly.jr@leg.state.fl.us
christensen.patty@leg.state.fl.us
rehwinkel.charles@leg.state.fl.us
sayler.erik@ leg.state.fl.us

Paula K. Brown, Manager
Tampa Electric Company
Regulatory Coordinator
Post Office Box 111
Tampa, Florida 33601-0111
regdept@tecoenergy.com

James D. Beasley, Esq.
J. Jeffrey Wahlen, Esq.
Ausley & McMullen
P.O. Box 391
Tallahassee, Florida 32302
jbeasley@ausley.com
jwahlen@ausley.com
Attorneys for Tampa Electric Company

Andrew Maurey
Michael Barrett
Division of Accounting and Finance
Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, Florida 32399-0850
amaurey@psc.state.fl.us
mbarrett@psc.state.fl.us

Matthew R. Bernier, Esq.
106 East College Avenue, Suite 800
Tallahassee, Florida 32301
matthew.bernier@duke-energy.com

Dianne M. Triplett, Esq.
299 First Avenue North
St. Petersburg, Florida 33701
dianne.triplett@duke-energy.com
Attorneys for Duke Energy Florida

Jeffrey A. Stone
Rhonda J. Alexander
Gulf Power Company
One Energy Place
Pensacola, Florida 32520-0780
jastone@southernco.com
rjalexad@ southernco.com

Russell A. Badders, Esq.
Steven R. Griffin, Esq.
Beggs & Lane
P.O. Box 12950
Pensacola, Florida 32591-2950
rab@beggslane.com
srg@beggslane.com
Attorneys for Gulf Power Company

:6418902

Mike Cassel
Director, Regulatory and Governmental Affairs
Florida Public Utilities Company
1750 S.W. 14th Street, Suite 200
Fernandina Beach, Florida 32034
mcassel@fpuc.com

Beth Keating, Esq.
Gunster Law Firm
215 South Monroe St., Suite 601
Tallahassee, Florida 32301-1804
bkeating@gunster.com
Attorneys for Florida Public Utilities Company

Robert Scheffel Wright, Esq.
John T. LaVia, III, Esq.
Gardner, Bist, Wiener, et al
1300 Thomaswood Drive
Tallahassee, Florida 32308
schef@gbwlegal.com
jlavia@gbwlegal.com
Attorneys for Florida Retail Federation

James W. Brew, Esq.
Laura A. Wynn, Esq.
Stone Mattheis Xenopoulos & Brew, PC
1025 Thomas Jefferson Street, NW
Eighth Floor, West Tower
Washington, DC 20007-5201
jbrew@smxblaw.com
law@smxblaw.com
Attorneys for PCS Phosphate - White Springs

Jon C. Moyle, Esq.
Moyle Law Firm, P.A.
118 N. Gadsden St.
Tallahassee, Florida 32301
jmoyle@moylelaw.com
Attorneys for Florida Industrial Power Users Group

s/ Maria J. Moncada
Maria J. Moncada

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

TESTIMONY OF WILLIAM F. BRANNEN

DOCKET NO. 20180001-EI

MARCH 2, 2018

Q. Please state your name and business address.

A. My name is William F. Brannen. My business address is NextEra Energy Resources, LLC ("NEER"), 700 Universe Boulevard, Juno Beach, Florida, 33408.

Q. By whom are you employed and what is your position?

A. I am employed by NEER as a Senior Director for Project Engineering and Due Diligence.

Q. Please describe your duties and responsibilities in that position.

A. I manage the development and implementation of engineering, technology selection, and execution strategies for universal solar and distributed generation projects for NextEra Energy, Inc., the parent of Florida Power & Light Company ("FPL") and NEER. I am responsible for coordinating the activities of project team members to optimize the value of projects by leveraging technology advances, market dynamics, and supplier relationships during the early stage due diligence, permitting, engineering, and execution phases of these projects. My goal is to ensure that development projects meet

or exceed reliability and performance requirements while maintaining reasonable costs.

Q. Please describe your education and professional experience.

A. I earned both a Bachelor and Master of Science in Civil Engineering from the University of New Hampshire. Additionally, I hold a Master of Business Administration from Nova Southeastern University. I have been a licensed professional engineer in the State of Florida since 1981. I have worked for FPL and NEER since 1979. During that time, I have held a variety of technical, operational, commercial, and management positions in areas related to power generation, engineering, and construction. I have experience in a wide range of power generation technologies including nuclear, combined cycle, wind and approximately 3,360 MW of photovoltaic ("PV") and concentrated solar thermal facilities. Since 2009, I have been responsible for key aspects of the design and construction of all fourteen of FPL's universal solar energy centers. The total capacity of these centers is approximately 930 MW, which is made up of one 74.5 MW solar thermal facility and approximately 855 MW of PV generation at 13 solar energy centers. In addition to these FPL facilities, I have served the same function for 350 MW of solar thermal generation in California and Spain, as well as approximately 2,080 MW of universal solar PV generation throughout North America outside of Florida.

Q. What is the purpose of your testimony?

A. The purpose of my direct testimony is three-fold. First, I discuss FPL's

experience designing, building, and operating universal solar. Second, I describe the four universal solar energy centers currently being constructed by FPL, which are expected to begin commercial operation by March 1, 2019 ("2019 Project"). I provide a description of the centers, the technology, engineering design parameters, construction, operating characteristics, and overall costs and schedules. Third, I demonstrate that the cost of the components, engineering, and construction estimated for the 2019 Project is reasonable and falls well below $1,750 per kilowatt alternating current ("kW_{AC}"), the cost cap approved by the Commission as part of FPL's 2016 rate case settlement.

Q. Please summarize your testimony.

A. My testimony demonstrates that the estimated cost to build the 2019 Project -- $1,386/$kW_{AC}$ -- is reasonable and falls well below the $1,750 per kW_{AC} cost cap. Additionally, I testify that the universal solar energy centers will deliver high levels of efficiency and reliability to serve FPL customers.

Q. Are you sponsoring any exhibits in this case?

A. Yes. I am sponsoring Exhibits WFB-1 through WFB-6. The titles to each exhibit are shown below, and they are all attached to my direct testimony.

Exhibit WFB-1	List of FPL Universal PV Solar Energy Centers in Service
Exhibit WFB-2	Typical Solar Energy Center Block Diagram
Exhibit WFB-3	Renderings of 2019 Solar Energy Centers
Exhibit WFB-4	Specifications for 2019 Solar Energy Centers

Exhibit WFB-5 Property Delineations, Features and Land Use of 2019 Solar Energy Centers

Exhibit WFB-6 Construction Schedule for 2019 Solar Energy Centers

Q. Does FPL have experience in designing and building universal PV solar facilities?

A. Yes. FPL's extensive experience designing and building universal solar generation facilities places it among the leaders in the U.S. Since 2009, FPL has completed thirteen universal solar centers totaling approximately 855 MW_{AC}. The existing FPL universal solar energy centers range in size from 10 MW_{AC} to 74.5 MW_{AC}. Exhibit WFB-1 provides a list of the FPL universal solar energy centers in service.

Q. Please describe FPL's track record in building universal solar PV.

A. The thirteen universal solar energy centers FPL has constructed and placed into operation were completed an average of 28 days early, at a total cost of $1.5 billion, about 5.8% or nearly $90 million below the cumulative budget. In addition, each individual center was also completed below budget.

Q. Please describe FPL's history of operating universal solar generation.

A. FPL has been operating universal solar generation since 2009. Over that time, FPL developed and continues to improve advanced monitoring technology and performance analysis tools. These tools optimize plant operations, drive process efficiencies, and facilitate the deployment of technical skills as demand for services grows. For example, the Company's Fleet Performance and Diagnostics Center ("FPDC") in Juno Beach, Florida, provides FPL with

the capability to monitor every plant in its system. The FPDC uses advanced technology to identify potential problems, often before they can be detected by traditional methods, and allows the operating teams the opportunity to prevent or mitigate the effects of failures. FPL compares the performance of like components on similar generating units and determines how to make improvements, which often avoids problems before they occur and improves service reliability for FPL customers. Live video links can be established between the FPDC and plant control centers to immediately discuss challenges that may arise, thus enabling FPL to prevent, mitigate, or solve problems.

Additionally, FPL has recently established the Renewable Operations Control Center ("ROCC"), which serves as the centralized remote operations center for all FPL PV solar and energy storage facilities. The ROCC provides a mechanism to efficiently manage daily work activities and ensure effective deployment of best operating practices at all of FPL's renewable energy centers.

The FPL team has leveraged these capabilities along with its broad range of experience to develop robust and industry-leading operating plans that deliver high levels of reliability and availability at low cost. Each of the solar energy centers that FPL has placed in operation since 2009 is meeting or exceeding performance expectations.

Q. Please identify the centers that comprise 2019 Project.

A. FPL will place four solar energy centers in service by March 1, 2019. These are the Miami-Dade Solar Energy Center in Miami-Dade County, the Interstate Solar Energy Center in St. Lucie County, the Pioneer Trail Solar Energy Center in Volusia County, and the Sunshine Gateway Solar Energy Center in Columbia County. Each center will have a nameplate capacity of 74.5 MW_{AC}. The centers are more fully described and depicted in Exhibits WFB-2, WFB-3, WFB-4 and WFB-5.

Q. Has FPL finalized the site layouts and designs for the solar centers?

A. No, not at this time. FPL used base-line designs to establish the cost and performance projections for the centers. However, FPL is continuing to evaluate potential optimization opportunities. My testimony and the analysis presented in Witness Enjamio's testimony are predicated on the base-line designs. Details of the final designs for the solar centers would differ from the base-line only if such changes result in a greater benefit to FPL's customers.

Q. Please describe the solar PV generation technology that FPL plans to use.

A. The 2019 Project will utilize approximately 1,280,000 silicon crystal solar PV panels that convert sunlight to direct current ("DC") electricity. The panels utilized at the solar energy centers have an average conversion efficiency of approximately 17.7%. This simply means that 17.7% of the solar energy reaching the surface of the panels is converted into DC electrical energy. The efficiency of the panels that will be used on the 2019 Project is among the

highest for universal solar applications in the U.S. market and is even higher than the efficiency for the panels used in FPL's 2017 and 2018 solar projects.

The panels will be mounted on fixed-tilt support structures and will be linked together in groups, with each group connected to an inverter, which transforms the DC electricity produced by the PV panels into alternating current ("AC") electricity. The voltage of AC electricity coming out of each inverter is increased by a series of transformers to match the transmission interconnection voltage for each solar center site. The inverters are paired with a single medium voltage transformer on a common equipment skid to form a power conversion unit ("PCU"). Twenty-six PCUs are required to produce a capacity of 74.5 MW_{AC} at each of the four centers. The ratio of the total installed DC capacity of PV modules to the AC capacity of each energy center (the "DC/AC Ratio") is 1.52.

Q. What is the significance of the DC/AC Ratio?

A. Design optimization activities established that the 1.52 DC/AC Ratio coupled with fixed-tilt support systems and careful selection of other major components yields high levels of output, availability and reliability, and the highest overall benefit to customers. The result is lower cost and optimized generation for the solar energy centers compared to other options. Exhibit WFB-2 provides a typical block diagram depicting the basic layout of major equipment components.

Q. How will the solar energy centers be interconnected to FPL's transmission network?

A. As noted earlier, each of the four centers has an individual point of interconnection to the FPL transmission system. The overall transmission interconnection schemes to be implemented at each center are similar although the specific details vary from center to center, based on the most cost-effective options. New collection substations with step-up power transformers will be constructed for each of the centers. The step-up power transformers increase the AC voltage from 34.5 kV to the voltages at the transmission point of interconnect. The interconnection voltages for the centers range from 115 kV to 230 kV. Each of the new collection substations will be connected to the bulk transmission system at the corresponding point of interconnection by generation tie lines that vary in length from a tenth of a mile to just under a mile.

Q. Does FPL's cost estimate include the costs associated with transmission interconnection?

A. Yes. The estimated capital construction cost for each of the centers includes the cost for its unique interconnection configuration. No upgrades to the existing FPL bulk transmission system are required to accommodate the proposed solar energy centers.

Q. Are upgrades to the existing FPL bulk transmission system required to accommodate the proposed solar energy centers?

A. No. As a result, there are no costs associated with upgrading FPL's transmission system.

Q. Can you explain how FPL acquired the property and optimized the land use for each of the centers?

A. Yes. FPL identified candidate parcels available for purchase for the four centers through a review of real estate listings and public land records. FPL screened the list of candidate parcels by using criteria including the property's proximity to a transmission system interconnection point and whether the property provides sufficient acreage to accommodate the permitting requirements and the construction of the solar centers. Because the landowners sell the parcels as a whole, FPL evaluated the features of each property – such as the presence of wetlands and flood plains, environmental constraints and cultural restrictions – and developed designs that optimize the land use for each parcel. Exhibit WFB-5 depicts the features and land use associated with each parcel.

Q. What is the proposed construction schedule for the 2019 Project?

A. As noted earlier, it is expected that the Project will be placed into service by March 1, 2019. The period necessary to complete engineering, permitting, equipment procurement, contractor selection, construction, and commissioning will exceed twelve months. This construction period includes the time necessary to prepare each of the sites, construct roads and drainage

systems, install solar generating equipment and fencing, and build the interconnection facilities. The construction schedules support the proposed commercial in-service dates. Exhibit WFB-6 provides more details regarding the construction schedules.

Q. As of March 2, 2018, what is the status of the certifications and permits required to begin construction for the centers?

A. The Florida Department of Environmental Protection ("FDEP") has issued the required permits for all four of the centers. Two of the four sites also require approval from the U.S. Army Corps of Engineers; one of these permits has been issued, and the remaining site is expected to receive approval well in advance of the date required to support the construction schedule. Finally, applications for the required county zoning, special exceptions, and site plan approvals have been submitted. All four sites have received all county level approvals.

Q. What is FPL's estimated cost for the 2019 Project?

A. FPL estimates the cost of the 2019 Project will be $413 million or $1,386/kW$_{AC}$. The cost of each center ranges from $1,289/kW$_{AC}$ to $1,460/kW$_{AC}$. FPL is in the final stages of securing fixed pricing for the supply of all the required equipment and materials, as well as for engineering and construction of the solar centers the interconnection facilities.

Q. Are the cost estimates for equipment, engineering, and construction for the proposed solar generation reasonable and prudent?

A. Yes.

Q. What is the basis for your conclusion?

A. The costs for 99.6% of all the surveying, engineering, equipment, materials and construction services necessary to complete the centers were established through competitive bidding processes specific to the 2019 Project. The balance was the result of leveraging existing agreements for engineering services, which themselves were the result of a separate competitive bidding process. Therefore, 100% of these costs were subject to competitive solicitations.

Q. Please describe the competitive solicitations associated with the 2019 Project.

A. In late 2017 and early 2018, FPL solicited proposals for the supply of the PV panels, PCUs and step-up power transformers as well as the engineering, procurement and construction ("EPC") services required to complete the proposed solar energy centers. The scope of services for the engineering, procurement and construction solicitations included the supply of the balance of equipment and materials.

FPL requested proposals for PV panels from fourteen large, industry-leading suppliers. Eight suppliers submitted bids that satisfied the requirements of the request for proposals. The eight conforming bids were evaluated. Due to the

volume of panels required for the 2019 Project, FPL contracted with more than one supplier. FPL was able to secure panels from the lowest cost bidders. In addition to offering the lowest cost and highest efficiency, these suppliers demonstrated that they have among the highest product quality programs in the industry and were able to provide strong financial performance security.

FPL solicited proposals from seven PCU suppliers. All of the proposals met the requirements of the request for proposals and were evaluated. FPL is finalizing its evaluation of inverter supply options.

FPL solicited proposals for step-up power transformers from nine industry-leading manufacturers, one of which declined to submit a proposal. FPL evaluated the proposals and selected the lowest cost transformers.

EPC proposals for the Project were solicited from four industry-recognized contractors. All of the bids met the requirements of the request for proposals. Accordingly, all the proposals were evaluated. FPL is finalizing a contract with the EPC contractor that submitted the lowest and most competitive proposal for the construction of the 2019 Project.

Proposals for the construction of the substation and interconnection facilities were solicited from ten industry-recognized contractors. Four contractors did

not submit bids. The remaining six bids satisfied the requirements of the request for proposal and were evaluated. The lowest cost bidder has been selected to construct the substation and interconnection facilities.

The bids from the PV panel, PCU, and step-up power transformer suppliers, as well as those received from the EPC contractors, were high quality and extremely competitive.

Q. Are there other benefits associated with the 2019 Project?

A. Yes, there are a number of other benefits associated with the Project. For example, approximately 200 individuals will be employed at each of the centers at the height of construction, creating about 800 jobs. The contractors building the solar energy centers are required to exercise reasonable efforts to use local labor and resources. The jobs associated with the construction of the centers will therefore provide a secondary benefit by boosting the economy of local businesses. Additionally, the local communities will benefit from increased property tax revenues following the completion of the solar centers.

Q. How does the cost of the 2019 Project compare to the cost of FPL's 2017 and 2018 Projects?

A. The estimated cost for FPL's 2017 Project was $\$1,405/kW_{AC}$ and the estimated cost for the 2018 Project was $\$1,485/kW_{AC}$. At $\$1,386/ kW_{AC,}$ the estimated cost of the 2019 Project is lower than the estimated cost for both the 2017 and 2018 Projects.

Q. Are FPL's projected costs and construction schedules reasonable and below the cost cap of $1,750/kW$_{AC}$?

A. Yes. The estimated cost for the 2019 Project is well below the prescribed cost cap, and the competitive bidding process provides assurance that costs for equipment, engineering, and construction for the 2019 Project are reasonable as previously discussed. The construction schedule for the Project also is reasonable.

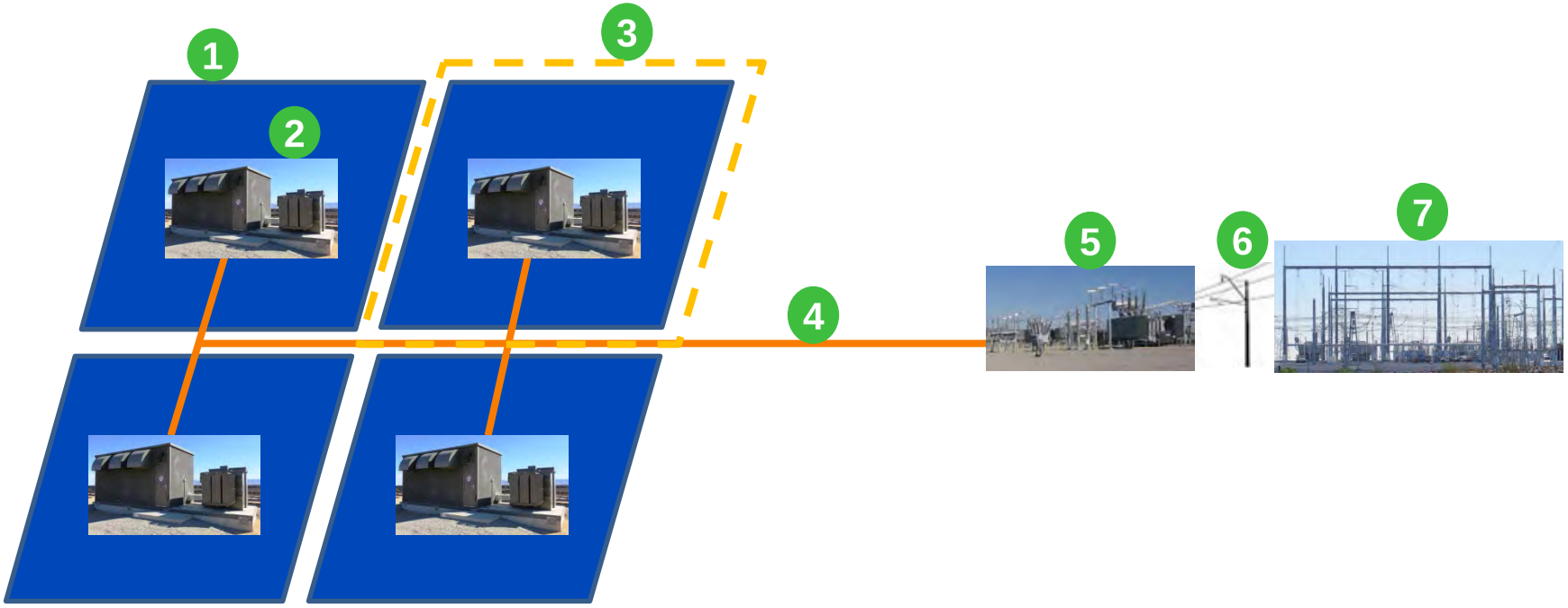
Q. Does this conclude your testimony?

A. Yes.

List of FPL Universal PV Solar Centers in Service

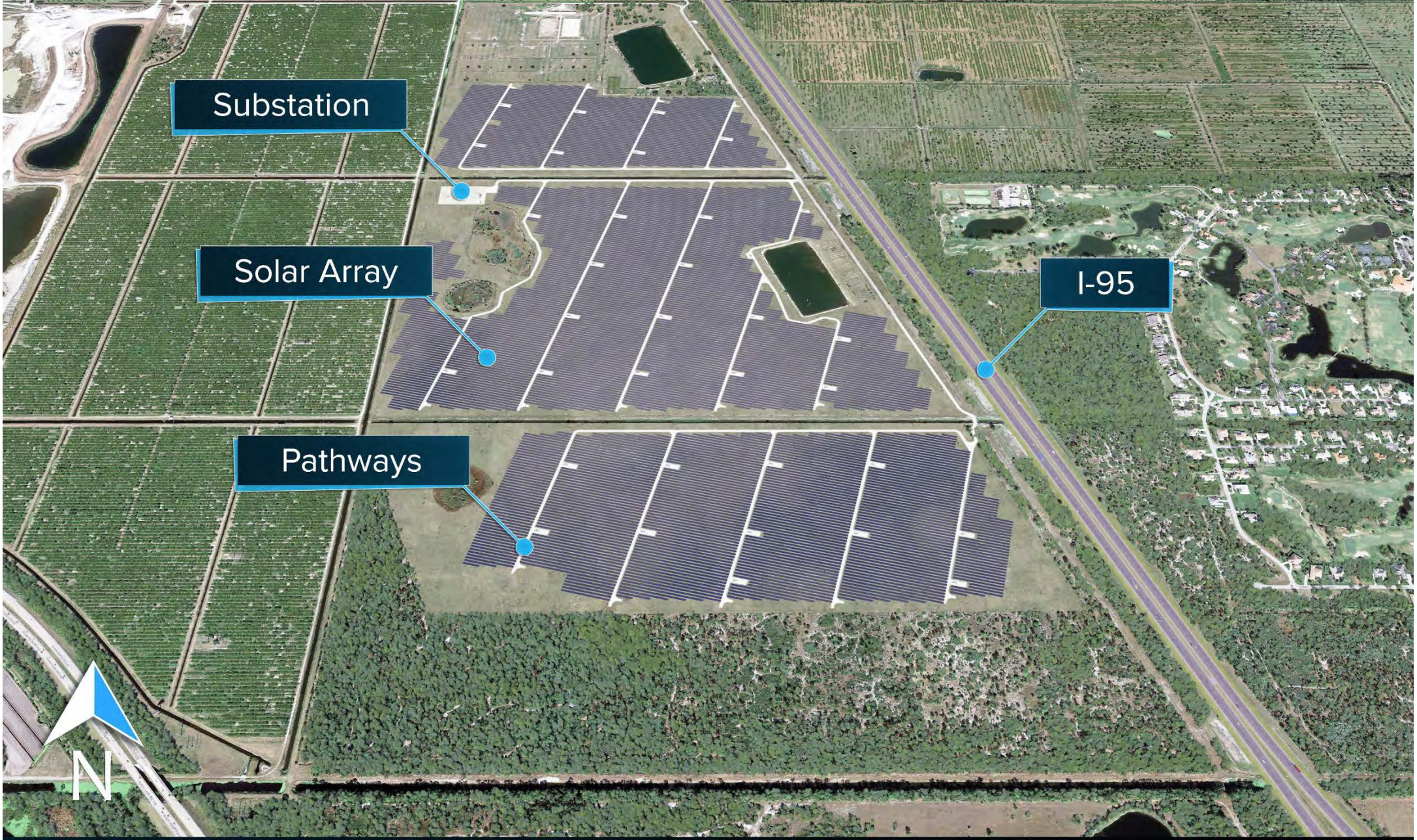
Solar Energy Center	Capacity (MW_{AC})	In-Service Date
DeSoto	25.0	October 27, 2009
Space Coast	10.0	April 16, 2010
Babcock Ranch	74.5	December 31, 2016
Citrus	74.5	December 31, 2016
Manatee	74.5	December 31, 2016
Coral Farms	74.5	January 1, 2018
Horizon	74.5	January 1, 2018
Wildflower	74.5	January 1, 2018
Indian River	74.5	January 1, 2018
Loggerhead	74.5	March 1, 2018
Barefoot Bay	74.5	March 1, 2018
Hammock	74.5	March 1, 2018
Blue Cypress	74.5	March 1, 2018
FPL Total	**854.5**	

Typical Solar Energy Center Block Diagram



1. Array of PV Panels
2. Inverter/Medium Voltage Transformer
3. Inverter Block
4. AC Collection System
5. Switchyard and Power Step-up Transformer
6. Generation Tie Line
7. Interconnection Substation

Docket No. 20180001-EI
Typical Solar Energy Center Block Diagram
Exhibit WFB-2, Page 1 of 1



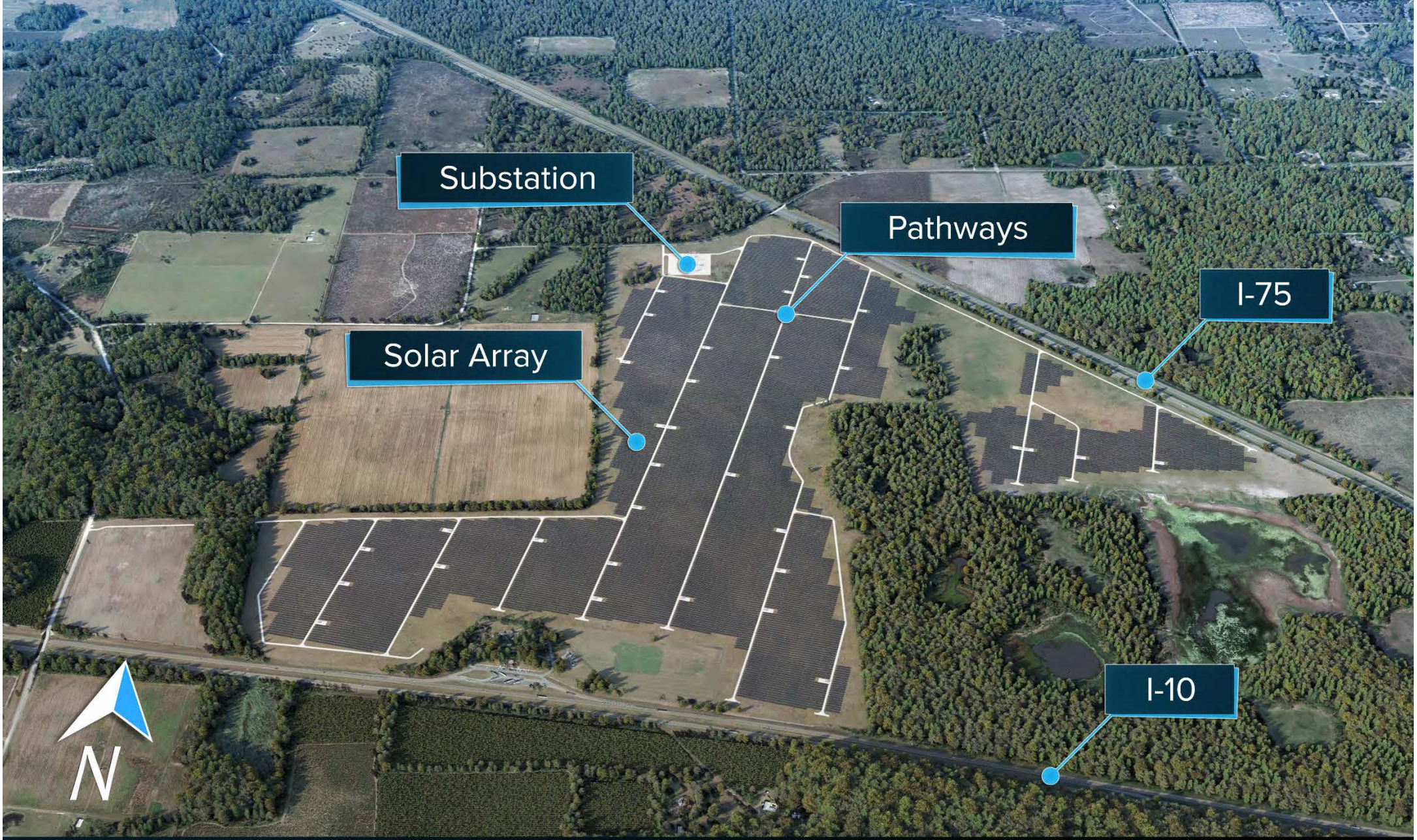
FPL Interstate Solar Energy Center

St. Lucie County, Florida

Artists impression only
Subject to final engineering

Truescape

Docket No. 20180001-EI
Renderings of 2019 Solar Energy Centers
Exhibit WFB-3, Page 1 of 4



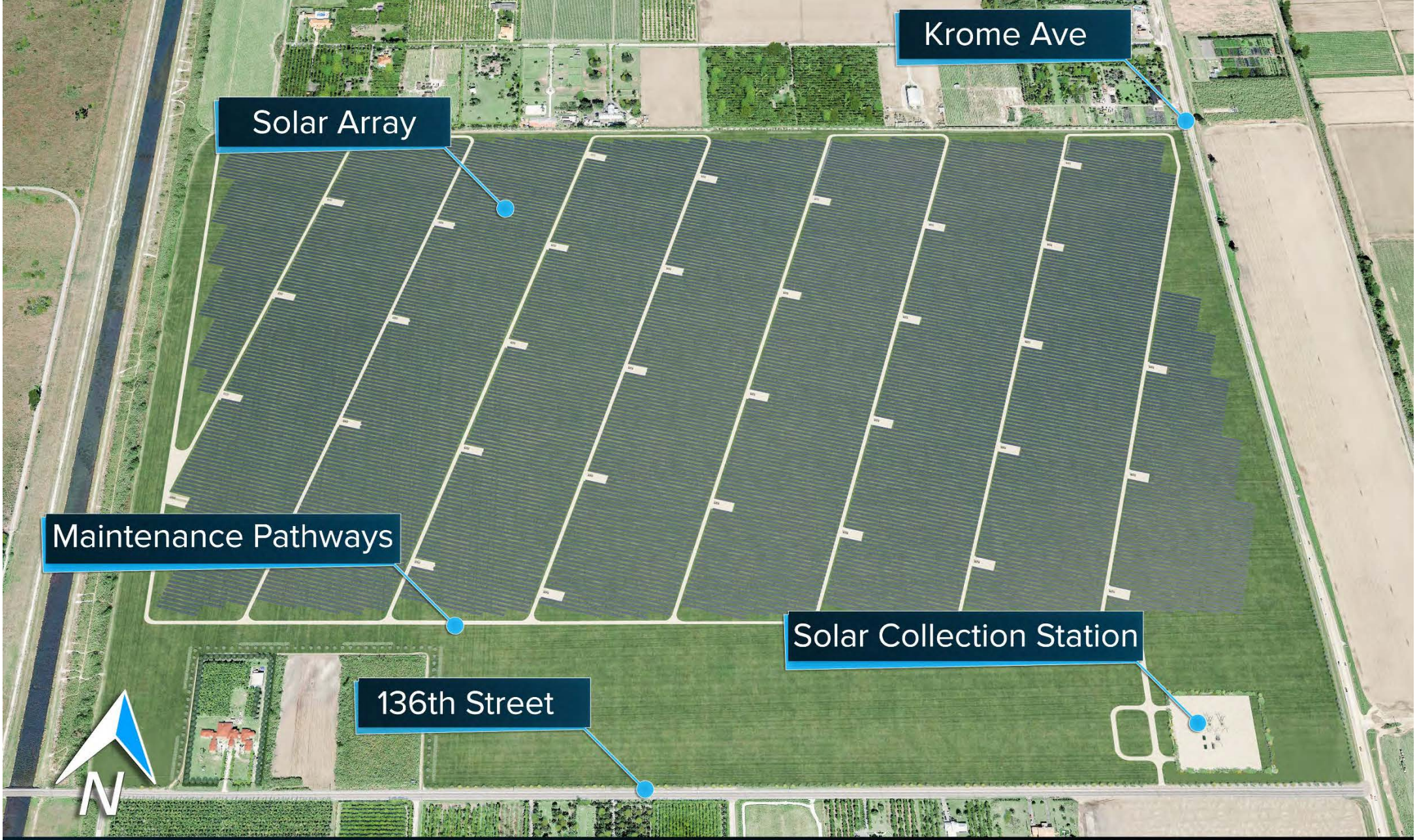
FPL

FPL Sunshine Gateway Solar Energy Center

Columbia County, Florida

Artists impression only
Subject to final engineering

Truescape

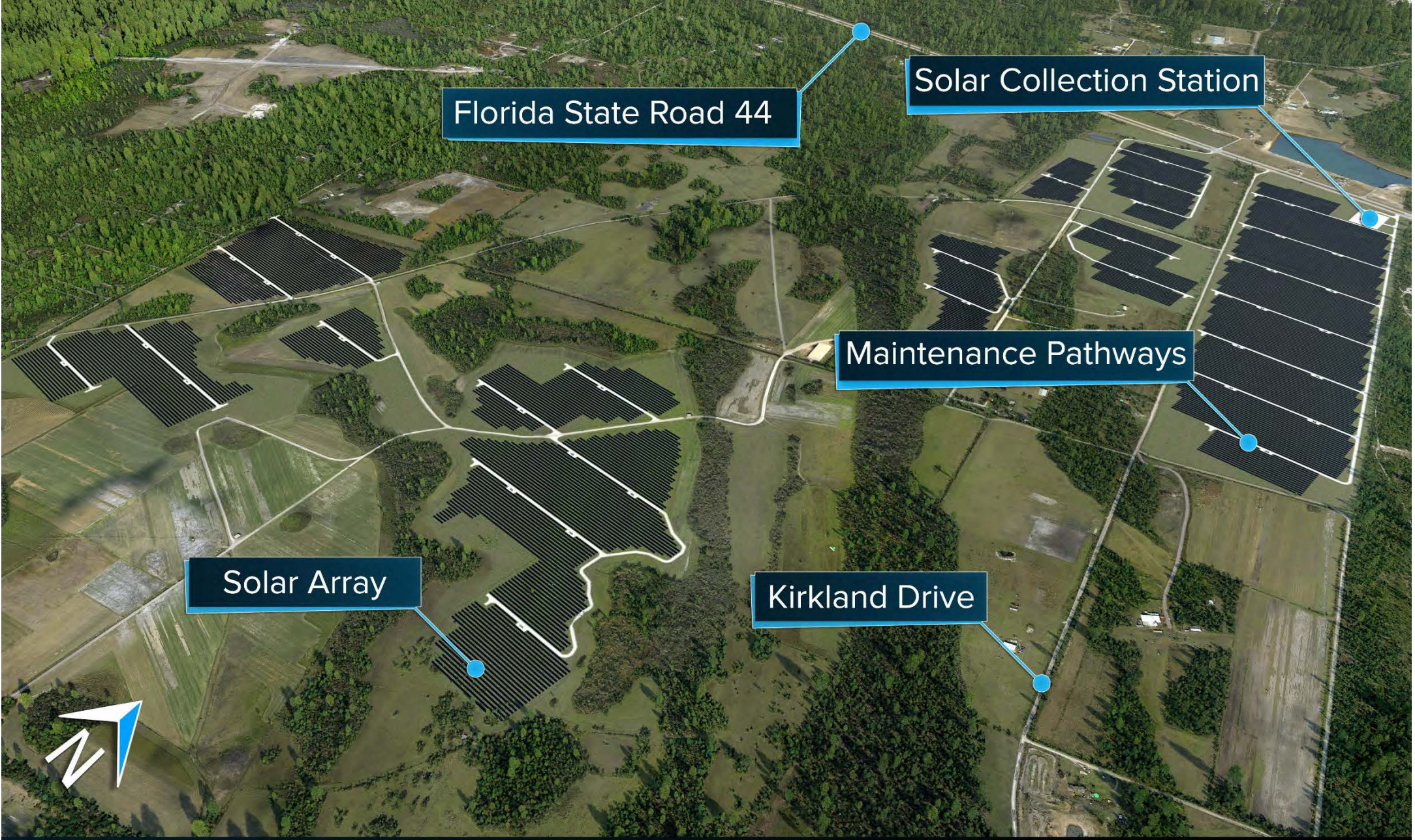


FPL Miami-Dade Solar Energy Center

Miami-Dade County, Florida

Artists impression only
Subject to final engineering

Truescape



FPL

FPL Pioneer Trail Solar Energy Center

Volusia County, Florida

Artists impression only
Subject to final engineering

Truescape

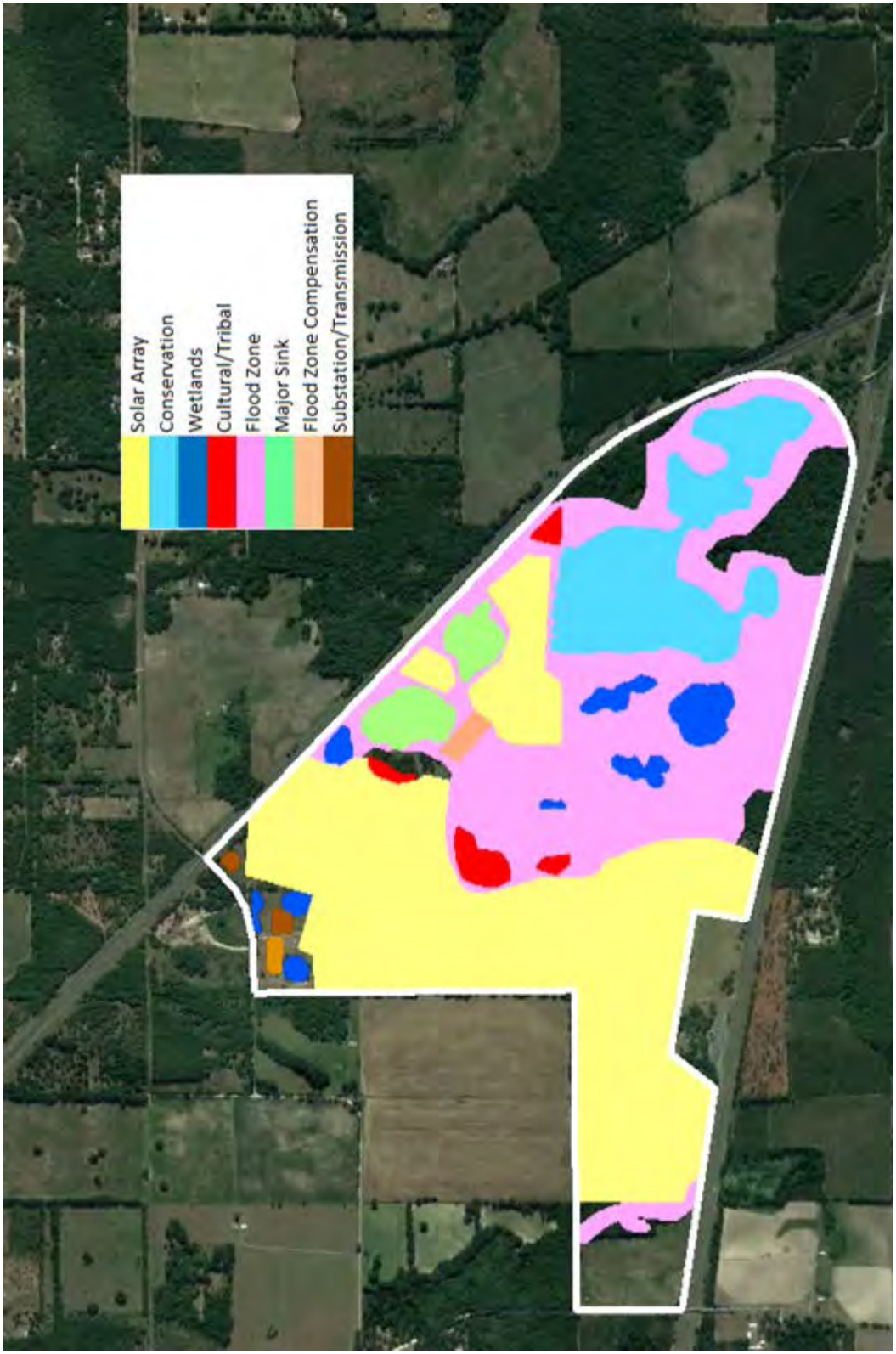
Docket No. 20180001-EI
Renderings of 2019 Solar Energy Centers
Exhibit WFB-3, Page 4 of 4

Specifications for 2019 Solar Energy Centers

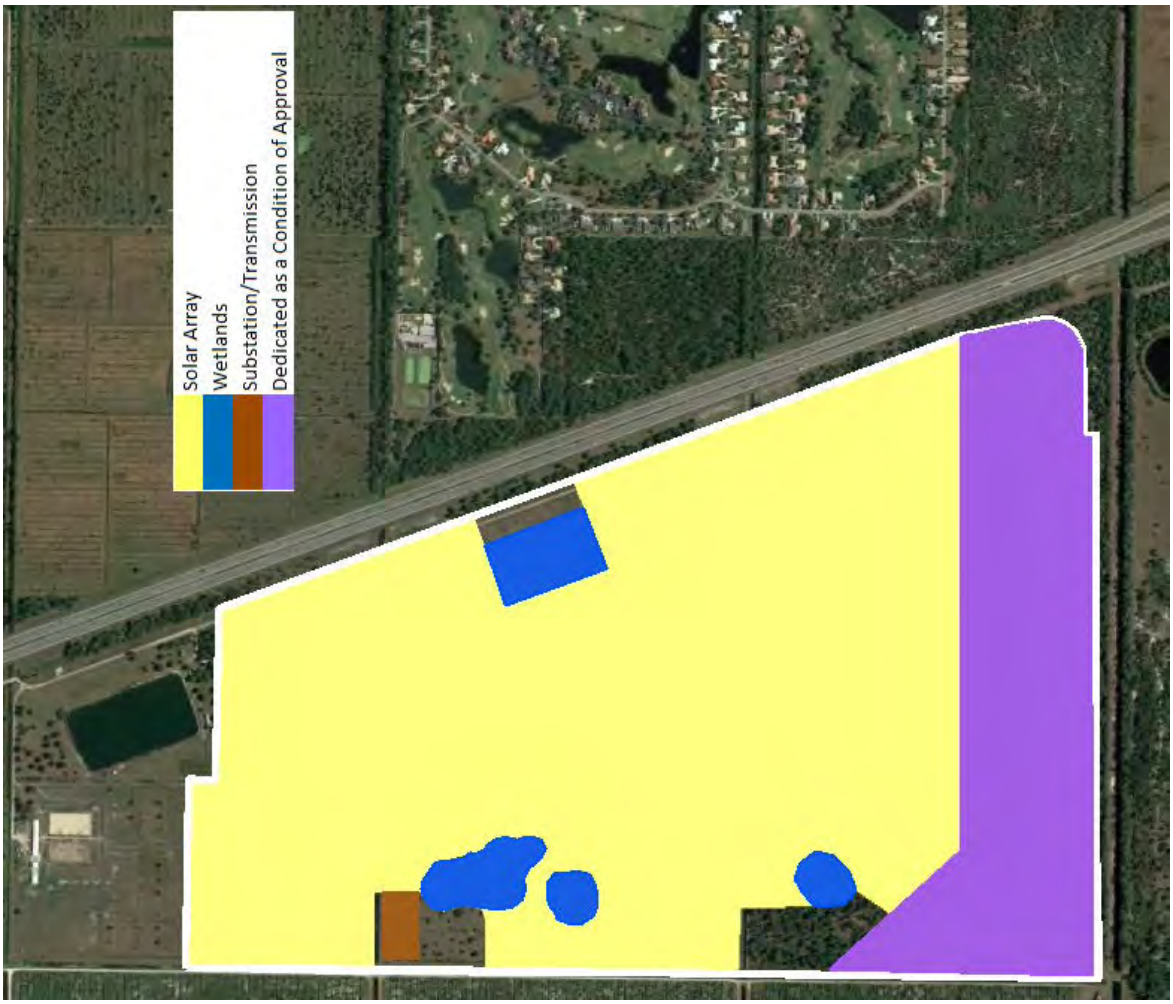
The following table sets forth the base-line specifications used to develop the estimated installed cost for the 2019 Project.

Specifications for FPL 74.5 MW_{AC} Solar Energy Center	
Peak Alternating Current Output	74.5 MW_{AC}
Total Installed Direct Current Capacity	113.24 MW_{DC}
PV Panel Suppliers	• Jinko (Miami-Dade & Interstate) • BYD (Pioneer Trail) • Risen (Sunshine Gateway)
PV Panel Technologies	• 72-cell, poly-silicon (BYD and Risen) • 144-half-cell, mono-silicon PERC (Jinko)
PV Panel Voltage (V)	1,500
Average PV Panel Power Ratings (W_{DC})	353
Number of Panels (Average)	321,000
Inverter DC Input (MW_{DC})	113.24
DC/AC Ratio	1.52
Number of Power Conversion Units (PCU)	26
PCU Supplier	Power Electronics
Inverter Type	HEM FS3000M
Inverter Rating (MVA/V)	3.0/600
Medium Voltage Transformers Per PCU	1
Medium Voltage Transformer Supplier	ABB
Medium Voltage Transformer Type	3-Phase, 60 Hz, 3-Windings
Medium Voltage Transformer Rating (MVA)	3.3
Number of Inverters	26
Inverter Capacity Installed (MVA)	82.7 @ 35° C
Number of Medium Voltage Transformers	26
Medium Voltage Transformer Capacity Installed (MVA)	85.8
Number of Panel Per PCU Block (Average)	12,340
DC Input Per PUC Block (MW_{DC})	4.355
PV Panel Support Mechanism	Fixed Tilt System-Tilt Angle = 20°
PV Panel Support Mechanism Material	Structural Steel Shapes
Step-up Power Transformer Supplier	• Hyundai Power Transformers USA, Inc.[1] • Starkstrom Geratebau GMBH[2]
Step-up Power Transformer Type	3-Phase, 60 Hz
Step-up Power Transformer Ratings	• 115 kV[3] • 138 kV[4] • 230 kV[5]

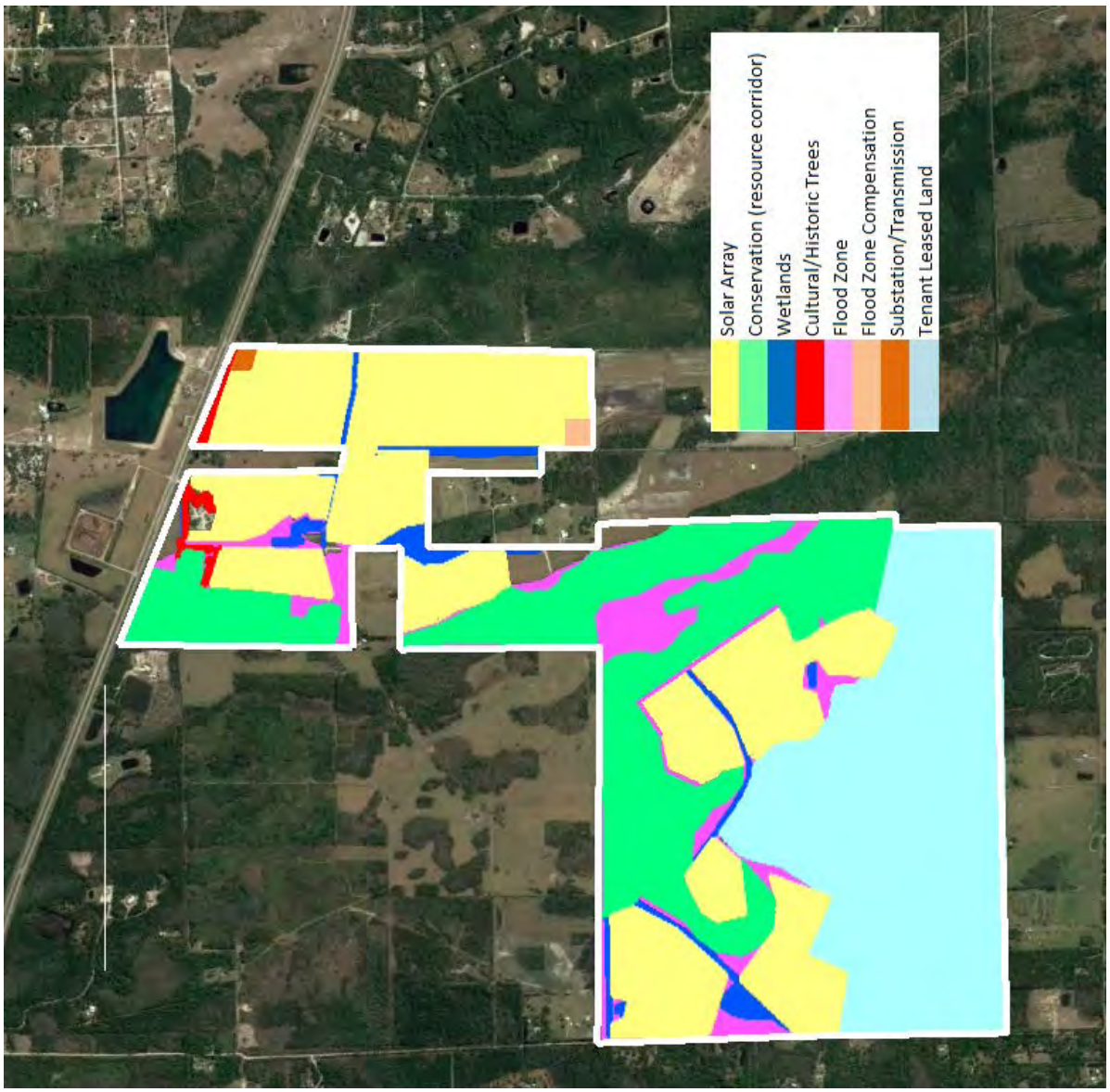
[1] Sunshine Gateway, Miami-Dade and Pioneer Trail
[2] Interstate
[3] Sunshine Gateway
[4] Miami-Dade
[5] Interstate and Pioneer Trail



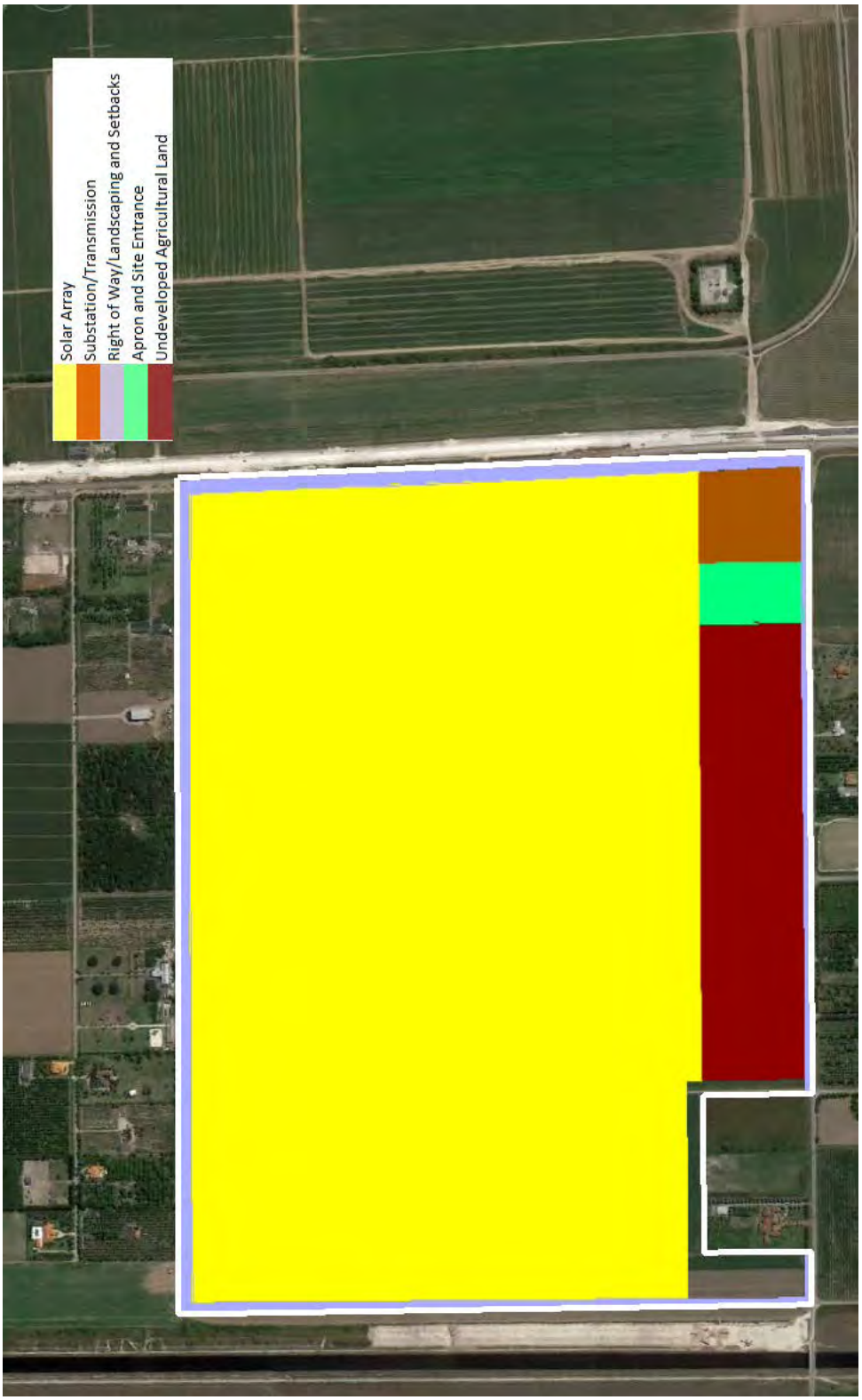
Sunshine Gateway Solar Energy Center



Interstate Solar Energy Center



Pioneer Trail Solar Energy Center



Miami-Dade Solar Energy Center

Construction Schedule for 2019 Solar Energy Centers

		Miami-Dade		Interstate		Pioneer Trail		Sunshine Gateway	
Item	**Major Activities**	**Start**	**Finish**	**Start**	**Finish**	**Start**	**Finish**	**Start**	**Finish**
1	PV panel contract	9/29/2017	1/15/2018	9/29/2017	1/15/2018	9/29/2017	1/15/2018	9/29/2017	1/15/2018
2	Power Conversion Unit contract	10/30/2017	3/31/2018	10/30/2017	3/31/2018	10/30/2017	3/31/2018	10/30/2017	3/31/2018
3	LNTP for EPC contracts		3/26/2018		3/26/2018		3/26/2018		3/26/2018
4	Contractor mobilization	7/1/2018	7/15/2018	7/1/2018	7/15/2018	6/15/2018	7/1/2018	6/15/2018	7/1/2018
5	Panel deliveries	9/7/2018	12/28/2018	9/7/2018	12/28/2018	8/10/2018	10/2/2018	8/10/2018	10/2/2018
6	Power Conversion Unit deliveries	10/5/2018	12/4/2018	10/5/2018	12/4/2018	10/5/2018	12/4/2018	10/5/2018	12/4/2018
7	Energization, Testing & Startup	2/8/2019	2/22/2019	2/8/2019	2/22/2019	2/8/2019	2/22/2019	2/8/2019	2/22/2019
8	Commence Commercial Operations	3/1/2019							

Docket No. 20180001-EI
Construction Schedule for 2019 Solar Energy Centers
Exhibit WFB-6, Page 1 of 1

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

FLORIDA POWER & LIGHT COMPANY

TESTIMONY OF JUAN E. ENJAMIO

DOCKET NO. 20180001-EI

MARCH 2, 2018

Q. Please state your name and business address.

A. My name is Juan E. Enjamio. My business address is Florida Power & Light Company, 700 Universe Boulevard, Juno Beach, Florida 33408.

Q. By whom are you employed and what is your position?

A. I am employed by Florida Power & Light Company ("FPL" or the "Company") as Manager of Analytics in the Finance Department.

Q. Please describe your educational background and professional experience.

A. I graduated from the University of Florida in 1979 with a Bachelor of Science degree in Electrical Engineering. I joined FPL in 1980 as a Distribution Engineer. Since my initial assignment in FPL, I have held positions as a Transmission System Planner, Power System Control Center Engineer, Bulk Power Markets Engineer, Supervisor of Transmission Planning, and Supervisor of Supply and Demand Analysis. In 2004, I became Supervisor of Integrated Analysis – Resource Planning. In 2014, I became Manager of Analytics – Finance Department.

Q. Please describe your duties and responsibilities in your current position.

A. In my current position as Manager of Analytics, I am responsible for the management and coordination of economic analyses of alternatives to meet FPL's resource needs and maintain system reliability.

Q. Are you sponsoring an exhibit in this case?

A. Yes. I am sponsoring the following exhibits which are attached to my direct testimony:

- JE-1 Load Forecast
- JE-2 FPL Fuel Price Forecast
- JE-3 FPL Resource Plans
- JE-4 CPVRR – Costs and (Benefits)
- JE-5 Avoided Fossil Fuel
- JE-6 Avoided Air Emissions

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to present the results of the economic analysis, which shows that 298 megawatts alternating current ("MW_{AC}") of universal solar photovoltaic ("PV") generation scheduled to be placed in service in early 2019 is cost-effective. My testimony covers several areas. First, I identify the four sites on which the solar PV facilities will be constructed. Second, I discuss the major assumptions and the methodology used to perform the economic analysis. Third, I present the results of the economic analysis demonstrating that the addition of 298 MW_{AC} of solar PV generation is cost-effective. Lastly, I discuss non-economic benefits derived from the construction and operation of these facilities.

Q. Please summarize your testimony.

A. FPL is proposing the construction and operation of 298 MW_{AC} of solar PV generation, consisting of one construction project made up of four universal solar energy centers which are expected to be in-service by March 1, 2019 (the "2019 Project"). FPL performed an economic analysis and determined that the 2019 Project will result in a reduction in the cumulative present value of revenue requirements ("CPVRR") to FPL customers, for a total savings of approximately $40 million. In addition, these centers are projected to result in a significant reduction in air emissions, primarily carbon dioxide ("CO_2") resulting from a reduction in the projected use of fossil fuels, which will in turn lower FPL's system reliance on generation fueled by natural gas. The 2019 Project is cost-effective, as required to qualify for a Solar Base Rate Adjustment ("SoBRA") under FPL's 2016 Rate Case Settlement approved by the Commission in Order No. PSC-16-0560-AS-EI.

Q. Please describe the 2019 Project.

A. The 2019 Project comprises four centers with a total nameplate capacity of 298 MW_{AC}, which will be constructed and placed in service by March 1, 2019. Each of these centers can generate about 173,000 MWh in a year. This is enough energy to serve the annual energy needs of about 14,500 homes. FPL witness Brannen describes each center in greater detail and demonstrates that the cost for the proposed solar generation is reasonable, and falls well below the $1,750 per kilowatt alternating current ("kW_{AC}") threshold established in the 2016 Rate Case Settlement.

Q. What are the major system assumptions used in this study?

A. The major assumptions used in this study are the following:

- **Load Forecast –** The analysis uses FPL's most recent long-term load forecast, approved as FPL's official load forecast in February 2018. This load forecast, including system peaks and net energy for load, will be used in FPL's 2018 Ten Year Site Plan ("TYSP") and is shown in Exhibit JE-1;
- **Fuel Price Forecast –** The analysis uses FPL's most recent long-term fuel forecast, based on FPL's standard long-term fuel forecasting methodology, approved as FPL's official fuel price forecast in February 2018. This fuel price forecast will be used in FPL's 2018 TYSP and is shown in Exhibit JE-2;
- **CO_2 Emission Price Forecast -** The CO_2 cost projections used in this filing are based on ICF's proprietary CO_2 compliance costs forecast dated January 31, 2018. ICF is a consulting firm with extensive experience in forecasting the cost of air emissions and is recognized as one of the industry leaders in this field. This forecast, which assumes that CO_2 compliance costs will start in the year 2028, will be used in preparing FPL's 2018 TYSP.

Q. Please describe the resource plans that formed the basis for FPL's cost-effectiveness analysis.

A. For purposes of this filing, FPL developed two resource plans. The first resource plan, called the "No Solar Plan," does not include any new solar facilities beyond those already in-service as of March 1, 2018. In this plan, future resource needs are met by combined cycle units and short-term power purchases and by the planned extension of the operating lives of the Turkey Point 3&4 nuclear units by 20 years (from 2032 to 2052 for Unit 3 and from 2033 to 2053 for Unit 4).

The second resource plan, called the "2019 Solar Plan," adds the 2019 Project described above. Since each center is assumed to provide FPL approximately 55% of the nameplate capacity as firm capacity to meet the Company's reliability obligations, the size of several short-term purchase power agreements needed between 2019 and 2030 were reduced, a greenfield combined cycle unit that would have been placed in service in 2028 was delayed to 2029, and the size of the combined cycle unit projected for 2031 was also reduced to account for the solar firm capacity at the time of summer peak. These two resource plans are shown in Exhibit JE-3.

Q. How did FPL determine the firm capacity that solar facilities will provide?

A. Firm capacity value is based on the expected output of a solar facility at the time of summer peak load, which typically occurs annually in August from 4 p.m. to 5 p.m., and winter peak load, which typically occurs in January from 7 a.m. to 8 a.m. FPL applies this same methodology to all its solar PV facilities, existing or new.

The 2019 centers are projected to have a first-year net capacity factor of 26.5% and a summer firm capacity value of 55% of their nameplate rating. Therefore, each of the four centers with a nameplate capacity of 74.5 MW_{AC} is assumed to have a firm capacity value of 41 MW_{AC} for a total firm capacity of 164 MW_{AC} at time of summer peak. These solar installations are assumed to have zero firm capacity value at time of winter peak due to FPL's winter peak occurring in the early morning, when there is little or no solar generation output.

Q. Please provide an overview of the analytical process that FPL used to determine the cost-effectiveness of the 2019 Project.

A. FPL used the hourly production costing model UPLAN to forecast the system economics and compare resource plans that include or exclude the 2019 Project. This model has been used by FPL in prior proceedings at the Commission. Each UPLAN modeling run is used to determine generation system costs, consisting primarily of fuel costs, variable O&M costs, and emissions costs for a given resource plan. The output of each of the UPLAN model runs is then imported into FPL's Fixed Cost Spreadsheet ("FCSS") Model, which adds fixed costs such as capital costs, capital replacements costs, and fixed O&M costs. The FCSS Model is used to determine the CPVRR for each resource plan.

Q. Please provide the result of the economic analysis.

A. To determine the CPVRR impact of the proposed solar generation, FPL subtracted the CPVRR of the No Solar Plan from the CPVRR of the 2019 Solar Plan. As shown in Exhibit JE-4, the CPVRR benefit to FPL customers from the 2019 Project is approximately $40 million.

Q. Will the 2019 Project reduce FPL's use of fossil fuel?

A. Yes. As shown on Exhibit JE-5, the energy from the 2019 Project will displace fossil fuel generation. The Project is expected to reduce the annual average use of natural gas by 4,463 million cubic feet, the use of oil by 6,224 barrels, and the use of coal by 1,838 tons. By adding the Project to its generation fleet, FPL reduces its reliance on natural gas, coal and oil.

Q. What effect will these solar energy centers have with respect to greenhouse gases and other air emissions?

A. As shown in Exhibit JE-6, reducing the use of fossil fuel results in an average annual reduction of 271,000 tons of global warming gases, specifically CO_2. This reduction in CO_2 is equivalent to removing approximately 52,000 cars from the road. Sulfur dioxide and nitrogen oxide emissions are reduced by an annual average of 14 tons and 45 tons, respectively.

Q. What is your conclusion regarding the 2019 Project?

A. As demonstrated by the economic analysis described in my testimony, the addition of the 2019 Project will result in CPVRR savings of approximately $40 million. Therefore, the 2019 Project meets the SoBRA cost-effectiveness requirement established in the 2016 FPL Rate Case Settlement. Additionally, the Project will reduce the use of fossil fuel, reduce air emissions, and reduce FPL's reliance on natural gas.

Q. Does this conclude your testimony?

A. Yes.

Load Forecast
February 2018

Year	Summer Peak MW	Winter Peak MW	Net Energy for Load MWh
2018	24,010	19,604	118,228,698
2019	24,456	19,989	119,673,658
2020	24,713	20,182	120,398,001
2021	24,904	20,430	120,442,238
2022	25,189	20,489	120,829,293
2023	25,546	20,774	121,218,544
2024	25,939	21,067	122,161,164
2025	26,259	21,283	122,680,239
2026	26,672	21,579	123,654,457
2027	27,076	21,867	124,556,092
2028	27,478	22,161	125,729,319
2029	28,020	22,462	127,002,669
2030	28,569	22,766	128,507,013
2031	29,101	23,059	129,932,044
2032	29,616	23,322	131,397,092
2033	30,123	23,585	132,421,755
2034	30,619	23,847	133,611,889
2035	31,111	24,108	134,797,943
2036	31,610	24,369	136,080,462
2037	32,099	24,630	137,072,175
2038	32,605	24,891	138,271,826
2039	33,118	25,151	139,480,073
2040	33,624	25,412	141,213,405
2041	33,957	25,672	142,467,221
2042	34,291	25,933	143,717,556
2043	34,626	26,194	144,963,146
2044	34,962	26,455	146,203,921
2045	35,298	26,716	147,438,078
2046	35,636	26,978	148,668,879
2047	35,974	27,240	149,897,847
2048	36,312	27,502	151,083,699
2049	36,652	27,764	152,309,283
2050	36,992	28,027	153,535,145

FPL Fuel Price Forecast
February 2018

Year	FGT Firm Gas ($/MMBTU)	Gulfstream Firm Gas ($/MMBTU)	Sabal Trail Firm Gas ($/MMBTU)	Residual Oil ($/MMBTU)	Distillate Oil ($/MMBTU)	Scherer 4 Coal Price ($/MMBTU)
2018	3.03	3.00	3.03	11.15	15.63	2.35
2019	2.90	2.87	2.90	10.61	15.15	2.37
2020	2.89	2.87	2.90	10.74	15.01	2.73
2021	3.15	3.12	3.14	10.72	15.88	2.83
2022	3.21	3.18	3.20	10.72	15.85	2.93
2023	3.74	3.71	3.73	11.23	16.60	3.02
2024	3.82	3.79	3.80	11.54	16.60	3.11
2025	4.08	4.05	4.05	11.92	16.61	3.20
2026	4.41	4.37	4.38	12.26	16.72	3.27
2027	4.62	4.59	4.59	12.52	16.84	3.34
2028	4.84	4.81	4.80	12.75	17.09	3.43
2029	5.06	5.02	5.01	13.00	17.38	3.50
2030	5.24	5.20	5.19	13.22	17.69	3.57
2031	5.42	5.37	5.36	13.43	18.01	3.65
2032	5.51	5.47	5.45	13.63	18.33	3.74
2033	5.65	5.60	5.59	13.85	18.66	3.84
2034	5.78	5.73	5.71	14.06	19.00	3.94
2035	5.91	5.86	5.84	14.28	19.37	4.05
2036	6.04	5.99	5.97	14.53	19.70	4.16
2037	6.18	6.13	6.11	14.78	20.04	4.27
2038	6.30	6.25	6.23	15.03	20.38	4.40
2039	6.43	6.38	6.35	15.29	20.74	4.50
2040	6.55	6.50	6.48	15.56	21.09	4.59
2041	6.65	6.60	6.57	15.59	21.20	4.68
2042	6.74	6.69	6.66	15.62	21.32	4.78
2043	6.84	6.78	6.75	15.65	21.43	4.89
2044	6.93	6.88	6.85	15.68	21.54	5.00
2045	7.03	6.98	6.94	15.71	21.65	5.12
2046	7.13	7.07	7.04	15.74	21.77	5.25
2047	7.23	7.17	7.14	15.77	21.88	5.37
2048	7.33	7.28	7.24	15.80	22.00	5.50
2049	7.43	7.38	7.34	15.83	22.12	5.63
2050	7.54	7.48	7.44	15.86	22.23	5.77

Resource Plans

At Time of Summer Peak

Unit(s)/Capacity added

Year	No Solar Resource Plan	2019 Solar Resource Plan
2018	2017/2018 596 MW SoBRA	2017/2018 596 MW SoBRA
2019	Okeechobee Energy Center; 1-year 476 MW Purchased Power Agreement ("PPA")	2019 298 MW SoBRA; Okeechobee Energy Center; 1-year 311 MW PPA
2020	1- year 470 MW PPA	1-year 305 MW PPA
2021	1- year 717 MW PPA	1-year 553 MW PPA
2022	Dania Beach Energy Center	Dania Beach Energy Center
2023	1-year 215 MW PPA	1-year 52 MW PPA
2024	1 Greenfield 3x1 CC Unit	1 Greenfield 3x1 CC Unit
2025		
2026		
2027	1-year 122 MW PPA	
2028	1 Greenfield 3x1 CC Unit	1-year 404 MW PPA
2029		1 Greenfield 3x1 CC Unit
2030	1-year 17 MW PPA	
2031	Equalizing 603 MW CC Unit	Equalizing 444 MW CC Unit

CPVRR - Costs and (Benefits)

Solar Revenue Requirements		Non-Solar (Avoided) Generation Costs						Avoided System Costs			
Generation Capital (Millions)	Fixed O&M (Millions)	Generation Capital (Millions)	Fixed O&M (Millions)	Transmission Interconnection (Millions)	Capital Replacement (Millions)	Incremental Gas Transport (Millions)	Short-Term Purchases (Millions)	System Net Fuel (Millions)	Startup + VOM (Millions)	Emission (Millions)	Total CPVRR (Millions)
$422	$21	($113)	($7)	($7)	($23)	($39)	($6)	($260)	($7)	($19)	($40)

* Negative ( ) indicates savings to FPL customers

Avoided Fossil Fuel

Year	Avoided Natural Gas MMCF	Avoided Oil Barrels	Avoided Coal Short Tons
2018	0	0	0
2019	4,052	78,919	13,887
2020	4,558	47,767	10,194
2021	4,422	31,216	7,760
2022	4,737	7,041	6,125
2023	4,661	15,326	9,760
2024	4,633	4,437	(777)
2025	4,568	8,104	3,599
2026	4,728	14,127	1,320
2027	4,595	14,460	3,775
2028	5,989	(48,517)	(6,179)
2029	4,751	9,041	2,739
2030	3,903	21,015	513
2031	4,560	158	(5,767)
2032	4,507	(480)	(5,483)
2033	4,388	(788)	(3,896)
2034	4,236	(553)	3,646
2035	4,379	(454)	3,733
2036	4,374	(272)	2,328
2037	4,245	0	2,032
2038	4,372	41	(51)
2039	4,145	(42)	3,386
2040	4,394	0	2,159
2041	4,410	0	(1,459)
2042	4,254	177	2,220
2043	4,393	(202)	(1,232)
2044	4,493	(208)	765
2045	4,375	0	1,705
2046	4,001	167	(384)
2047	4,364	(215)	726
2048	4,571	(482)	91
2049	4,379	(282)	719
2050	4,383	(318)	845
Average* =	**4,463**	**6,224**	**1,838**

* Average does not include 2018

Avoided Air Emissions

Year	Avoided CO_2 Short Tons	Avoided SO_2 Short Tons	Avoided NO_x Short Tons
2018	0	0	0
2019	297,423	158	104
2020	307,777	88	90
2021	287,722	63	99
2022	291,940	24	94
2023	297,742	35	85
2024	272,195	14	57
2025	277,961	21	62
2026	286,123	31	66
2027	282,736	30	68
2028	314,867	(110)	(122)
2029	287,481	21	(78)
2030	239,471	41	28
2031	256,726	(1)	31
2032	253,830	(2)	23
2033	249,532	(3)	31
2034	254,244	2	49
2035	262,821	2	48
2036	260,039	4	44
2037	252,175	(2)	21
2038	255,844	3	44
2039	248,690	3	47
2040	261,077	0	42
2041	255,520	1	40
2042	253,096	0	48
2043	254,903	1	40
2044	264,303	3	47
2045	259,158	1	48
2046	233,577	2	50
2047	256,640	0	39
2048	267,544	2	70
2049	299,031	1	62
2050	334,224	1	65
Average* =	**271,138**	**14**	**45**

* Average does not include 2018