

**BEFORE THE
PUBLIC SERVICE COMMISSION
OF MARYLAND**

**IN THE MATTER OF THE APPLICATION OF
CITIZENS UB SOLAR, LLC FOR A
CERTIFICATE OF PUBLIC CONVENIENCE
AND NECESSITY TO CONSTRUCT A 9.9 MW
SOLAR PHOTOVOLTAIC GENERATING
FACILITY IN THE TOWN OF UNION
BRIDGE AND CARROLL COUNTY,
MARYLAND**

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CASE NO: 9483

**DIRECT TESTIMONY AND EXHIBITS
OF
CHRISTOPHER LO
ON BEHALF OF THE STAFF
OF THE
PUBLIC SERVICE COMMISSION OF MARYLAND**

JULY 12, 2019

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1 **INTRODUCTION**

2 **Q. Please state your name and business address.**

3 A. My name is Christopher Lo. My business address is 6 St. Paul Street, Baltimore,
4 Maryland 21202.

5 **Q. What is your occupation?**

6 A. I am employed by the Public Service Commission of Maryland (“Commission”) as a
7 Staff Engineer in the Commission’s Engineering Division.

8 **Q. Please describe your educational background and professional experience.**

9 A. My educational background includes a Bachelor of Science degree in Electrical
10 Engineering from Stony Brook University, Stony Brook, New York. I have
11 approximately ten years of experience as a Patent Examiner with the U.S. Patent and
12 Trademark Office where I was responsible for reviewing patent applications and
13 conducting patent research in engineering fields. I joined the Commission’s Engineering
14 Division in January 2017.

15 **Q. Have you previously testified before the Commission?**

16 A. Yes. A list of the cases in which I have previously testified before the Maryland Public
17 Service Commission is appended as Exhibit CL-1.

18 **Q. What is the purpose of your testimony?**

19 A. The purpose of this testimony is to make a recommendation regarding the effect that the
20 Project proposed by Citizens UB Solar, LLC (“Citizens UB Solar”, “Project”, or
21 “Company”) will have on the reliability and stability of the electric system in the State of
22 Maryland. Reliability and stability are two factors that the Commission is required to
23 consider prior to issuing a Certificate of Public Convenience and Necessity (“CPCN”) pursuant to §§ 7-207 and 7-208 of the Public Utilities Article of the Annotated Code of
24 Maryland.
25

1 **SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

2 **Q. Please summarize your conclusions and recommendations in this proceeding.**

3 A. After reading the testimony of the Company's witnesses, the Company's response to
4 Staff's discovery¹ and performing my analysis, I recommend that the Commission:

5 (1) Grant a CPCN to Citizens UB Solar, LLC for a 8.172 MW solar generating
6 facility in Carroll County, Maryland; and

7 (2) Require the filing of a request for CPCN amendment with the Commission for
8 any generation capacity in excess of 8.172 MW; and

9 (3) Require the signed ISA and CSA executed by Citizens UB Solar with PJM and
10 PE to be filed with the Commission prior to the commencement of construction;
11 and

12 (4) Require Citizens UB Solar, its successors and assigns to (a) provide sixty (60)
13 days written advance notice to the Commission of any non-wholesale electricity
14 sale by Citizens UB Solar to a Maryland retail electric customer, and (b) comply
15 with all regulations regarding such sale including executing any requisite
16 Interconnection Agreement(s), and (c) obtain retail supplier approval(s) from the
17 Commission prior to delivering electricity into the respective systems of
18 Maryland electric companies; and

19 (5) Staff recommends that Citizens UB Solar, its successors and assigns, be required
20 to provide written notice of any change in ownership of all, or any portion of the
21 Project, at least thirty (30) days prior to the closing date of any sale to a third
22 party. The written notice should include, but not be limited to, identifying the
23 third party providing contact information to receive any Commission inquiries,

¹ The responses of Citizens UB Solar to Staff's data requests relevant to my Direct Testimony are included as Exhibit CL-2 of my Direct Testimony.

1 the proposed effective date of any change in ownership, and providing
2 documentation that demonstrates the capability of the prospective owner to
3 operate and maintain the Project to perform in accordance with any CPCN issued
4 in this proceeding; and

5 (6) Staff recommends that the Commission include any additional conditions
6 proposed by the other State agencies having jurisdiction in this proceeding.

7 **TESTIMONY**

8 **Q. Please describe the Maryland process for approval of a generating project.**

9 A. The Code of Maryland Regulations (“COMAR”) 20.79 describes the filing requirements
10 for the interconnection of generation to the grid. The application is reviewed by several
11 State agencies, each of which presents its findings during hearings. After the conclusion
12 of the hearing process, the Public Utility Law Judge will issue a proposed order granting
13 or denying a CPCN. If granted, the CPCN may be conditioned on certain requirements. If
14 no one files an appeal within the appeal period and the Commission does not elect to
15 review the matter, the proposed order automatically becomes a final Commission order.

16 **Q. Who are the applicants in this case?**

17 A. Citizens UB Solar, LLC is the applicant requesting issuance of a CPCN in this
18 proceeding. Citizens UB Solar is a wholly-owned subsidiary of Citizens Energy
19 Corporation which develops, owns, and operates for-profit energy facilities to fund
20 heating oil and natural gas assistance programs for low-income households in the United
21 States. Citizens Energy Corporation currently owns and operates close to 100 MW of
22 distributed solar projects in the United States.

1 **Q. Please describe the Project identified in the application.**

2 A. Citizens UB Solar has proposed an 8.172 MW alternating current (“AC”) solar powered
3 generating facility to be located in an unincorporated area of Carroll County, Maryland.²
4 The facility site is located on Green Valley Road adjacent to the Carroll Substation.³ The
5 Project has one PJM Queue Position AB1-096, in which a 9.9 MW AC solar facility with
6 3.8 MW peak capacity injection into the Potomac Edison Company’s (“PE”) system was
7 evaluated for compliance with reliability criteria for summer peak conditions in 2019.⁴
8 The result of PJM studies found no potential adverse impact of the stability or reliability
9 of the local distribution system.

10 The Project will connect to PE’s 34.5 kV line between the Carroll and Mt. Airy
11 Substations. Facility upgrades will include direct connection network upgrades, non-
12 direct connection network upgrades, and installing additional metering and Point of
13 Interconnection (“POI”) upgrades. Citizens UB Solar indicated an estimated in-service
14 date of June, 2020.⁵

15 **Q. Please describe the process by which generators are connected to the regional**
16 **transmission system.**

17 A. The Regional Transmission Organization responsible for assessing transmission system
18 reliability and stability in Maryland is PJM. A potential interconnection customer, such as
19 the Project, must comply with the PJM Open Access Transmission Tariff (“OATT”), as
20 approved by the Federal Energy Regulatory Commission (“FERC”), and must become a
21 PJM member.

² The Project footprint was reduced in the amended Applicant’s Environmental Review Document (“ERD”), which resulted in a reduction of the AC and direct current (“DC”) capacities of the Project. The current proposed capacity of the Project is 8.172 MW AC / 9.75 MW DC.

³ See the Project location and related easement on Pages 4-6 of ERD.

⁴ Due to the reduction in project size, the Project will have an AC capacity of 8.172 MW with PJM Queue Position AB1-096. PJM is in the process of updating the ISA, CSA and other studies as appropriate to reflect the new capacity.

⁵ See page 40 of ERD.

1 PJM organizes generation interconnection requests into clusters, or queues, for the
2 purpose of identifying required transmission system improvements. Upon the receipt of
3 an interconnection request, PJM conducts sequential studies, provided the potential
4 customer meets certain requirements to retain its queue position. The studies are
5 dependent on other projects within the geographical area. The studies performed by PJM
6 are the Feasibility Study, the System Impact Study, and the Facilities Study. The studies
7 are intended to determine what system enhancements are necessary to accommodate the
8 interconnecting generator and maintain the reliability and stability of the transmission
9 system. PJM and the transmission owner, in this case PE, require the project to assume
10 the financial responsibility for any upgrades to the distribution or transmission system.
11 PE retail electric customers will not have any role, obligation, responsibility or cost in
12 interconnection of the project to the PJM or PE electric systems.

13 **Q. Please describe the Feasibility Study.**

14 A. Computer modeling of the electric system is used by PJM to evaluate the feasibility of
15 new generation with respect to compliance with the Regional Reliability Council,
16 Reliability First, of the North American Electric Reliability Council (“NERC”) reliability
17 and stability criteria. Short circuit calculations are performed to ensure that circuit
18 breaker capacities are not exceeded. This report identifies direct connection requirements
19 and network impacts. Once the Feasibility Study is completed, a Feasibility Report is
20 issued. In order to maintain its queue position, the applicant must then execute an Impact
21 Study Agreement.

22 **Q. Please describe the System Impact Study.**

23 A. The System Impact Study is a continuation of the Feasibility Study with the inclusion of
24 more detailed analysis. Capacity Resources are evaluated for load deliverability and
25 generation deliverability. Load deliverability is a measure of the ability to transfer power
26 to the load in a particular sub-area. Generator deliverability is a measure of the ability to
27 export generation from a sub-area. Stability is evaluated for critical contingencies. Short
28 circuit calculations are performed, taking into consideration all elements of the regional

1 plan, to ensure that circuit breaker capacities are not exceeded. In order to maintain the
2 queue position, the applicant then must execute a Facilities Study Agreement (“FSA”).
3 By executing the Facilities Study Agreement the potential interconnection customer
4 retains the assigned priority in the PJM queues.

5 Upon completion of the System Impact Study, PJM will furnish a Generation
6 Interconnection Facilities Study Agreement to the Developer, along with the estimated
7 cost of the study and the estimated time of completion or an Interconnection Service
8 Agreement (“ISA”) or Upgrade Construction Service Agreement (“CSA”). The
9 Generation Interconnection Facilities Study Agreement will provide the estimated cost
10 responsibility and estimated completion date for the study. It may also define reasonable
11 milestone dates that the proposed project must meet to retain its queue position while
12 PJM is completing the Generation Interconnection Facilities Study.

13 **Q. Are other studies or agreements required as part of the generator interconnection**
14 **process?**

15 A. In general, any generator seeking to interconnect to the PJM transmission system would
16 be required to complete the Feasibility, Impact and Facilities studies and execute the
17 study agreements presented earlier in my testimony. The general interconnection protocol
18 is that upon completion of the Facilities Study a project is tendered an ISA between the
19 Project, PJM, and the transmission owner that is filed with the FERC. The ISA describes
20 the requirements for the physical and operational interconnection of the project to the
21 grid, direct connection requirements, and network upgrades and their cost. The document
22 may also specify requirements related to the operation and maintenance of the system
23 enhancements. The specifications are dependent upon the standards of the local
24 transmission owner. However, most of the system enhancements have already been
25 identified during the course of the PJM studies, since the local transmission owner
26 participates in the PJM studies. It is important for the generation owner and the
27 transmission owner to agree on how the interface should operate. This greatly reduces the
28 risk of failure and, thereby, improves safety and reliability for the local area.

1 A CSA identifies terms and conditions, and coordinates construction activities for
2 completion of identified attachment facilities and network transmission upgrades with the
3 transmission owner, which in this instance is PE. The cost of the attachment facilities
4 and transmission system network upgrades are the responsibility of the Project requesting
5 to interconnect. This agreement completes the interconnection process for a new
6 generator to participate in the PJM market. The Project is interconnecting to a 34.5 kV
7 facility and PJM has classified the POI as on the PJM system. PJM therefore required the
8 execution of an ISA and CSA.⁶

9 **Q. Can you explain what is meant by a Capacity Resource?**

10 A. A Capacity Resource has the right to schedule both capacity and energy deliveries at a
11 point of interconnection into PJM markets, pursuant to a bilateral contract or through
12 participation in the PJM capacity market. A Capacity Resource can provide both capacity
13 and energy to load serving entities to meet their load obligation, pursuant to the PJM
14 Reliability Assurance Agreement that is binding on all PJM members. According to
15 PJM's OATT, an accredited Capacity Resource has Capacity Interconnection Rights
16 ("CIRs")⁷ commensurate with the Capacity Resource's capacity. CIRs entitle the holder
17 to deliver the output of a Capacity Resource at the bus where the Capacity Resource
18 interconnects to transmission facilities. The CIRs of a solar farm are limited due to the
19 intermittency and the variable output of the plant. The output is dependent on weather
20 conditions and the position of the sun, which varies during the course of a day and the
21 time of year. The Project originally was a 9.9 MW AC solar facility with a 3.8 MW peak

⁶ As indicated by the Applicant (See STAFF DR2-3, EXHIBIT CL-2), ISA and CSA have already been executed. However, due to the reduction in project size, PJM is in the process of updating the ISA, CSA and other studies as appropriate to reflect a new capacity of 8.172 MW AC.

⁷ Capacity Interconnection Rights ("CIRs") are the rights to input generation as a Generation Capacity Resource into the transmission system at the Point of Interconnection where the generating facilities connect to the transmission system. CIRs are generator unit-specific and are granted in a quantity commensurate with the Capacity Resource's capacity that is indicated in the megawatts ("MW") of capacity that are identified in a generator's interconnection request and the Interconnection Service Agreement.

1 CIR. Due to the reduction in Project size from 9.9 MW AC to 8.172 MW AC, PJM is in
2 the process of updating this CIR value.

3 **Q. What is the current status and queue position of the Project?**

4 A. Citizens UB Solar has one PJM interconnection queue position AB1-096. Approval of
5 this CPCN application would permit construction to begin in winter, 2019, with
6 completion and operational startup in summer, 2020.⁸ The System Impact Study was
7 completed in March 2016 which confirmed the ability to interconnect the Project to PE's
8 system by tapping onto the 34.5 kV line between Carroll and Mt. Airy Substations.⁹
9 Citizens UB Solar has already executed a signed ISA and CSA with PJM and PE.
10 However, due to the reduction in project size these agreements are in the process of being
11 updated to reflect the new capacity.¹⁰ PJM anticipates only a couple months of review
12 prior to being able to reissue the ISA/CSA.

13 **Q. How will the Project be connected to the PE's system?**

14 A. The Project is located in PE's service territory and will connect to the existing PE 34.5
15 kV line between Carroll and Mt. Airy Substations. Since the Project will be connected to
16 the grid through an overhead line tap, no easements will be required in order to meet the
17 conditions specified per the PJM Generation Interconnection Combined Feasibility and
18 System Impact Study. There will be three separate power inverters where the direct
19 current from the arrays will be converted to AC as transmitted by the electric grid. Power
20 inverters will be grouped together and fed into approximately three transformers, each
21 located on a concrete pad on an integrated skid with the inverters.

22 Citizens UB Solar is responsible for all design and construction related to activities on
23 their side of the POI. The Company is required to provide protective relaying, metering
24 design and installation in compliance with PE's applicable standards, as well as revenue

⁸ See page 40 of Applicant's ERD.

⁹ See page 2 of PJM System Impact Study Report (AB1-096).

¹⁰ It is expected that the Project as currently configured to reflect the Site will have a capacity of 8.172 MW AC with PJM Queue Position AB1-096.

1 metering and real-time telemetering data to PJM. Also, the Company will be responsible
2 for all costs of the interconnection upgrades noted in the PJM interconnection studies. PE
3 customers will not bear responsibility for cost or work associated with the upgrades.

4 **Q. What are the interconnection and transmission network upgrade facilities and costs**
5 **identified in the System Impact Study?**

6 A. The PJM studies identify a list of transmission facilities and equipment upgrades that are
7 required to accommodate 8.172 MW of generation into the PE's system. The scope of
8 work includes the following:

9 Metering and POI Upgrades:

10 Install 34.5 kV metering equipment and build a single span of overhead conductor
11 from the distribution line to the POI. The cost estimate is \$91,250.¹¹

12 Network Upgrades:

13 Install two 34.5 kV line switches and remote end relay, protection and metering
14 setting adjustments. The cost estimate is \$113,750.¹²

15 Citizens UB Solar will comply with all interconnection requirements and complete the
16 requisite facility upgrades as determined by the studies in order to ensure the Project will
17 not have an adverse impact on the stability and reliability of the electric system. All the
18 expenses outlined in the ISA will be the responsibility of Citizens UB Solar and not that
19 of PE and its customers.

20 **Q. Why is the stability analysis important for new projects seeking to interconnect in**
21 **PJM?**

22 A. Stability is a measure of the transmission system's ability to recover from changes to its
23 normal operation. Large or sudden changes in load or generation output can have

¹¹ See page 3 of PJM's System Impact Study (AB1-096).

¹² See page 3 of PJM's System Impact Study (AB1-096).

1 significant impacts on transmission system operations resulting in voltage collapse or
2 cascading outages. Stability Analysis takes into consideration the response of the
3 generator to requests for changes in real (MWs) and reactive power (MVARs) output.¹³

4 **Q. Have the effects of the Project on the reliability and stability of the electric system in**
5 **Maryland been determined?**

6 A. Yes. PJM System Impact Study reports that the Project will not have an adverse impact
7 on reliability and stability of the electric system in Maryland. Prior to operation, the
8 Project will be required to comply with PE's and PJM's interconnection requirements and
9 complete the requisite facility upgrades and milestones specified in the ISA and CSA.
10 The Project's compliance with these agreements would assure no adverse impact to the
11 reliability and stability of the electric transmission system. The additional generation
12 capability of the Project would be of benefit to Maryland and the PJM system.

13 **Q. Why are you recommending CPCN conditions regarding reliability and**
14 **transmission system stability?**

15 A. Compliance with the ISA and CSA is critical for maintaining the reliability and stability
16 of the electric system. Therefore, these have been referenced in the proposed CPCN
17 conditions for approval of the Project. Compliance with the ISA and CSA provides a
18 level of assurance to the Commission, and to the public, that the required facilities
19 identified in the PJM studies will be completed and in place prior to operation of the
20 Project. Compliance with these agreements will also ensure that all required
21 interconnection facilities shall be designed, procured, installed and constructed in
22 accordance with Good Utility Practice.¹⁴

¹³ Reactive power (MVARs) is energy lost in an alternating current circuit when the voltage and current are not in phase. This energy loss can be recovered by supplying reactive power to the circuit. Reactive power is lost to loads such as motors, transformers, and long transmission lines. Reactive power losses reduce the ability of a transmission system to deliver power. Extreme losses in reactive power can lead to voltage collapse or blackouts.

¹⁴ Good Utility Practice consists of any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light

1 **Q. Is the Project consistent with Maryland policy on renewable energy?**

2 A. Maryland's Renewable Portfolio Standard ("RPS") requires electric suppliers to utilize
3 renewable resources to serve an increasing percentage of total demand or pay an
4 alternative compliance fee. Under legislation enacted by Maryland in 2019, utilities and
5 other electricity suppliers in Maryland must rely on Tier 1 renewable energy (which
6 includes solar energy) for at least 50% of total demand by the year 2030, with at least
7 14.5% of the supply from solar energy.¹⁵ The Citizens UB Solar Project would provide
8 additional solar generating capacity that suppliers could rely on to satisfy Maryland's
9 renewable energy requirements.

10 **CONCLUSIONS**

11 **Q. What is your recommendation in this matter?**

12 A. Staff recommends that the Commission issue a CPCN for the Project to Citizens UB
13 Solar in accordance with the following conditions:

14 (1) Grant a CPCN to Citizens UB Solar, LLC for an 8.172 MW solar generating
15 facility in Carroll County, Maryland; and

16 (2) Require the filing of a request for CPCN amendment with the Commission for
17 any generation capacity in excess of 8.172 MW; and

of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to optimum practice, method, or act to the exclusion of all others, but rather to be acceptable practices, methods, or acts generally accepted in the region; including those practices required by Federal Power Act Section 215(a)(4).

¹⁵ Senate Bill 516, which was enacted as Laws of Maryland, chapter 757. The renewable energy requirement is codified at PUA 7-203(b).

1 (3) Require the signed ISA and CSA executed by Citizens UB Solar with PJM and
2 PE to be filed with the Commission prior to the commencement of construction;
3 and

4 (4) Require Citizens UB Solar, its successors and assigns to (a) provide sixty (60)
5 days written advance notice to the Commission of any non-wholesale electricity
6 sale by Citizens UB Solar to a Maryland retail electric customer, and (b) comply
7 with all regulations regarding such sale including executing any requisite
8 Interconnection Agreement(s), and (c) obtain retail supplier approval(s) from the
9 Commission prior to delivering electricity into the respective systems of
10 Maryland electric companies; and

11 (5) Staff recommends that Citizens UB Solar, its successors and assigns, be required
12 to provide written notice of any change in ownership of all, or any portion of the
13 Project, at least thirty (30) days prior to the closing date of any sale to a third
14 party. The written notice should include, but not be limited to, identifying the
15 third party providing contact information to receive any Commission inquiries,
16 the proposed effective date of any change in ownership, and providing
17 documentation that demonstrates the capability of the prospective owner to
18 operate and maintain the Project to perform in accordance with any CPCN issued
19 in this proceeding; and

20 (6) Staff recommends that the Commission include any additional conditions
21 proposed by the other State agencies having jurisdiction in this proceeding.

22 **Q. Does this conclude your testimony?**

23 **A.** Yes.

EXHIBITS

EXHIBIT CL-1

List of cases in which Christopher Lo previously testified before the Maryland Public Service Commission:

Case No. 9431	In the Matter of the Applications of US Wind, Inc. and Skipjack Offshore Energy, LLC for a Proposed Offshore Wind Project(s) Pursuant to the Maryland Offshore Wind Energy Act of 2013.
Case No. 9353	In the Matter of the Review of Annual Performance Reports on Electric Service Reliability Filed Pursuant to COMAR 20.50.12.11.
Case No. 9353	In the Matter of the Review of System-Wide Reliability Standards for 2020-2023.
Case No. 9463	In the Matter of the Application of MD Solar 2, LLC for a Certificate of Public Convenience and Necessity to Construct a 27.5 MW Solar Photovoltaic Generation Facility.
Case No. 9470	In the Matter of the Application of The Potomac Edison Company for a Certificate of Public Convenience and Necessity to Modify the Ringgold-Catoctin Transmission Line.
Case No. 9490	In the Matter of the Application of the Potomac Edison Company for Adjustments to Its Retail Rates for The Distribution of Electric Energy.

EXHIBIT CL-2

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-1. According to PJM, the Impact Study Report was completed on March 2016, and the PJM website indicates that the status of AB1-096 is suspended. Will Citizen UB Solar require restarting the PJM queuing process? Will PJM require updating the Impact Study Report?

Response: Citizens UB Solar will not need to restart the PJM queuing process, but will need to remove the project from suspension. Once removed from suspension, the project simply picks up when it left off when put into suspension. After discussions with PJM, the only thing they might need to do is check to make sure costs of equipment and labor haven't changed since the work was originally priced.

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-2. Please provide the current schedule for the following:
- Engineering and permitting: **Response:** Aug-Sep 2019
 - Construction: **Response:** Nov 2019-Apr 2020
 - In-service date: **Response:** Apr 2020

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-3. Will Citizens US Solar execute an interconnection agreement (“IA”) with Potomac Edison (“PE”) as the generation interconnection is being made through distribution level facilities? If so, please provide the time schedule for completing the IA with PE.

Response: No. The project is interconnecting to a 34.5 kV facility and PJM has required the execution of an ISA and CSA. These documents have already been executed.

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-4. On pages 5-6 of PJM's Impact Study Report, has PJM determined any potential impact that the project may contribute in regard to steady-state voltage, short circuit and stability and reactive power?

Response: No impacts determined.

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-5. On page 4 of PJM's Impact Study Report, please explain the requirement of a back-up service agreement and in what situation the Company will require to execute the agreement?

Response: A back-up service agreement is required for the site to purchase power as required by the facility. When the system is not producing electricity, it needs to procure power in order to operate the transformers and inverters in a "standby" mode.

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-6. Please detail the outreach efforts that Citizens UB Solar has made to the residents living in the immediate vicinity of the project site. Please provide a description of all community outreach efforts to date and all adjustments that the Company will make to the project to address resident concerns.

Response: Citizens UB Solar has performed many outreach efforts over the past year to abutters of the facility. Some of these outreach efforts are listed below. The first three bullet points included one-on-one discussions with abutters.

- Open house at Town of Union Bridge: 5/17/2018
- Public Hearing: 7/19/2018, 10/18/2018
- Public meetings with Town boards: 4/12/2018, 6/21/2018
- Meeting with Carroll County: 9/19/2018
- Multiple meetings and phone calls with Lehigh Cement

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-7. Please identify the regulatory agencies having jurisdiction over the proposed interconnection and describe how the proposed interconnection would be subject to regulatory oversight. Please describe the areas of regulatory oversight of all applicable agencies.

Response: PJM and FERC have jurisdiction. FERC provides regulatory oversight over PJM and this interconnection.

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-8. Does PE have the ability to control the circuit breakers and isolate the solar project in order to address operational events adversely impacting the electric system?

Response: Yes, the proposed project will be required to include a SCADA system and real-time high-speed communications from the project site to the PJM / Potomac control center which will allow the utility real-time monitoring and the ability to trip the PV site off line if there are adverse system conditions.

**Maryland Public Service Commission
Case No. 9483**

Commission Staff Data Request No. 1 to Citizens UB Solar, LLC

Request Date: December 14, 2018

Response Date: February 15, 2019

- 1-9. Please explain how protection equipment will be used to isolate the project during certain contingencies on the grid.

Response: The proposed project will include multiple levels of protection to isolate the PV generation from the utility grid for detected abnormal conditions. The individual PV inverters will include over/under voltage and frequency settings for protection from system voltage and frequency changes, in accordance with the accepted industry standard UL-1741. The site as a whole will be protected by a customer installed circuit breaker with protective relay. This relay will include typical overcurrent protection to protect the utility grid from PV system short circuit faults, along with over/under voltage and frequency protection in accordance with the industry standard IEEE 1547-2018 and other related standards. Settings will also be in accordance with the utility and ISO requirements for under-frequency load shedding (UFLS) and low-voltage ride-through (LVRT).

CASE NO. 9483
CITIZENS UB SOLAR LLC
RESPONSE TO STAFF DATA REQUEST NO. 2
RESPONSE DATE: June 21, 2019

Item No.: STAFFDR2-1 Due to the reduction in project size, will PJM update the ISA and CSA and re-evaluate the project to reflect the new AC capacity of 8.172 MWAC? If so, when will the updated agreements be complete? Also, when will PJM resume AB1-096 queuing process and update the project (e.g. transmission facilities/ network upgrades, costs of equipment or labor) to reflect the new 8.172 MW capacity?

RESPONSE:

Yes, PJM will be restudying the project and adjust the ISA and CSA as appropriate. We are currently in the process of removing AB1-096 from suspension in order to provide these updates to PJM. We have had preliminary discussions regarding the change and PJM anticipates only a couple months of review prior to being able to reissue the ISA/CSA.

CASE NO. 9483
CITIZENS UB SOLAR LLC
RESPONSE TO STAFF DATA REQUEST NO. 2
RESPONSE DATE: June 21, 2019

Item No.: STAFFDR2-2 On Page 3 of PJM's system impact study, PJM states that Citizen UB Solar (IC) requires the purchase and installation of a fully rated 34.5 kV circuit breaker on the high side of the AB1-078 facility step-up transformer. However, AB1-078 has been withdrawn according to PJM's website. Please describe how and where the fully rated 34.5 kV circuit breaker will be installed.

RESPONSE:

The reference to AB1-078 is a typo in the SIS. Citizens UB Solar will purchase and install a 34.5 kV breaker on the high side of our transformer.

CASE NO. 9483
CITIZENS UB SOLAR LLC
RESPONSE TO STAFF DATA REQUEST NO. 2
RESPONSE DATE: June 21, 2019

Item No.: STAFFDR2-3 Following up to your response to Staff DR1-3, please explain why an ISA is required although the project is connected to PE's 34.5 kV system at a distribution level. Staff's understanding is that an interconnection agreement ("IA") is needed as the generation interconnection is being made through distribution level facilities.

RESPONSE:

PJM has classified the point of interconnection as on the PJM system, therefore, the Applicant has executed an ISA signed by PJM and PE, as opposed to just an IA with PE.

CASE NO. 9483
CITIZENS UB SOLAR LLC
RESPONSE TO STAFF DATA REQUEST NO. 2
RESPONSE DATE: June 21, 2019

Item No.: STAFFDR2-4 Will the project need to obtain approval by the Federal Energy Regulatory Commission (“FERC”) of a Wholesale Market Participant Agreement (“WMPA”) that authorizes wholesale transactions by the project in connection with the electricity delivered into PJM markets? If so, when will the WMPA be executed?

RESPONSE:

A WMPA will not be required as the project holds an ISA from PJM and is interconnecting on PJM’s 34.5 kV system.