

PRE-FILED DIRECT TESTIMONY OF
DONNA ROBICHAUD
ON BEHALF OF MACADAMIA SOLAR LLC
NCUC DOCKET NO. EMP-119, SUB 0

INTRODUCTION

1
2 **Q. PLEASE STATE YOUR NAME, TITLE, AND BUSINESS**
3 **ADDRESS.**

4 A. My name is Donna Robichaud. I am senior vice president of development
5 strategy for Geenex Solar LLC (“Geenex Solar”) based in Charlotte, North Carolina. The
6 company’s address is 1930 Abbott Street, Suite 402, Charlotte, NC 28203.

7 **Q. PLEASE DESCRIBE YOUR EDUCATION AND PROFESSIONAL**
8 **EXPERIENCE.**

9 A. I have a B.S. in Math, Physics, and Mechanical Engineering and a Masters’
10 degree in Business Administration. From May 1990 to September 2012, I worked for Duke
11 Energy and its predecessors in various capacities. Between 1990 and 1997, I was the lead
12 mechanical project engineer for various capital projects in power plants, including a new
13 combustion turbine plant. From 1997 to 2010, I developed, managed, and provided
14 strategic direction for district energy, cogeneration, renewable energy, and carbon offset
15 projects in the non-regulated division of the company, currently identified as Duke Energy
16 Sustainable Solutions. In my last two and a half years at Duke Energy, I led Duke Energy
17 Carolinas LLC’s development and ownership of renewable energy projects, administration
18 of other third-party renewable power purchase agreements, and management of the
19 interconnection queue.

20 After leaving Duke I established my own consulting firm, QF Solutions LLC, later
21 renamed QF Holding Corp. (“QF Holding”). QF Holding has been under contract to

1 provide consulting services to Geenex Solar since 2013.

2 **Q. PLEASE DESCRIBE YOUR RELATIONSHIP WITH THE**
3 **APPLICANT IN THIS DOCKET AND YOUR EMPLOYMENT**
4 **RESPONSIBILITIES.**

5 A. Geenex Solar is the owner and developer of Macadamia Solar LLC
6 (“Macadamia Solar” or “Applicant”) for the Macadamia Solar Facility (hereinafter, the
7 “Facility” or “Macadamia Solar Facility”). Since 2013, I have been advising Geenex Solar
8 in a consulting role on their growth strategy, including where to build solar plants, size of
9 solar plants and what markets/states to enter. This work began with Geenex Solar’s first
10 distribution-interconnected Qualifying Facilities (“QFs”) projects in the Dominion service
11 territory, and later included larger merchant transmission interconnected projects
12 throughout PJM and in other investor-owned utility service territories. My primary duties
13 for Geenex Solar include administering the PJM interconnection process for Geenex Solar
14 projects and conducting contingency analyses. Other duties include providing public
15 policy support, PJM policy advocacy, energy market analysis, and related regulatory work.

16 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THIS**
17 **COMMISSION?**

18 A. I have previously offered testimony by affidavit before the North Carolina
19 Utilities Commission on behalf of Fresh Air Energy – X, LLC and Fresh Air Energy – II,
20 LLC in NCUC Docket No. E-22, Sub 150. I provided prefiled Supplemental Testimony
21 on behalf Sumac Solar LLC and Sweetleaf Solar LLC (two other projects under
22 development by Geenex Solar) in support of their applications for merchant plant CPCNs
23 in docket no. EMP-110 Sub 0 and EMP-110 Sub 0, respectively.

1 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

2 A. The purpose of my testimony is to support the Application for a Certificate
3 of Public Convenience and Necessity for a Merchant Plant (“Application”) filed by
4 Macadamia Solar in this docket, and to provide the Commission technical information
5 concerning the Macadamia Solar Facility, including its electrical configuration and issues
6 related to interconnection and Network Upgrades.

7 **Q. WERE YOU INVOLVED IN THE PREPARATION OF**
8 **MACADAMIA SOLAR’S CPCN APPLICATION?**

9 A. Yes. I collaborated in preparing the Application on behalf of Macadamia
10 Solar, both by providing information from my personal knowledge and also by gathering
11 information from other members of the Geenex Solar team. I am familiar with the contents
12 of the application, which are hereby incorporated by reference.

13 **FACILITY DESCRIPTION AND INTERCONNECTION**

14 **Q. WHAT IS THE FACILITY’S ANTICIPATED ELECTRICITY**
15 **PRODUCTION CAPABILITY?**

16 A. As detailed in Exhibit 2 of the Application, the nameplate generating
17 capacity of the Facility is 484 MWac.

18 **Q. PLEASE DESCRIBE THE BASIC COMPONENTS OF THE**
19 **FACILITY.**

20 A. The components of the Facility are described in Exhibit 2 of the CPCN
21 Application.

22 **Q. DOES THE APPLICANT HAVE PLANS TO INCORPORATE ENERGY**
23 **STORAGE AT THE FACILITY?**

1 A. At this time the Applicant has no plans to include energy storage at the
2 Facility.

3 **Q. HOW WILL THE FACILITY BE INTERCONNECTED TO THE**
4 **GRID?**

5 A. The Facility will interconnect with the transmission grid owned by Virginia
6 Electric and Power Company, d/b/a Dominion Energy North Carolina (“Dominion” or
7 “DENC”) at new breaker at a reconfigured Trowbridge Substation. The Facility will
8 interconnect via an approximately 6.53-mile 230 kV transmission line that connects the
9 Trowbridge Substation and two new 270 MVA step-up transformers in the Facility’s
10 Substation. Macadamia Solar expects to enter into an Interconnection Service Agreement
11 (“ISA”) with Dominion, and PJM Interconnection LLC by Q1 2022. This ISA will provide
12 the terms and conditions under which the Macadamia Solar Facility will interconnect.

13 Macadamia Solar has three positions in the PJM queue, with a total maximum
14 facility output of 484 MWac (the capacity of the generating facility for which a CPCN is
15 sought in this proceeding). Queue No. AD1-074 represents a total maximum facility output
16 of 300 MWac, AD1-075 represents 75 MWac, and AD1-076 represents 109 MWac of
17 maximum facility output. All three queue positions are behind the same point of
18 interconnection and are being studied by PJM as a single combined Facility. Submitting
19 simultaneous interconnection applications at the same POI is permissible under PJM
20 procedures, though it requires the interconnection customer to pay additional application
21 and study fees. Geenex Solar has filed applications in this way in order to provide
22 additional flexibility to adjust the size of the Facility if necessary to avoid triggering
23 significant Network Upgrades. Geenex Solar intends to evaluate re-tooled studies that are

1 typically issued near the time an ISA is tendered to determine if a downsizing is
2 appropriate.

3 PJM uses a cluster study process which allocates cost responsibility for Network
4 Upgrades among the projects that trigger and contribute the Network Upgrade. As projects
5 withdraw from the queue, or as other conditions change, that cost allocation changes and
6 some Network Upgrades may no longer be necessary. PJM determines the changes to cost
7 allocation for Network Upgrades through retooled studies which results are indicated in a
8 revised SIS Report. Consequently, the results of an SIS Report for a particular project may
9 not be indicative of the Network Upgrades or Network Upgrade costs that are ultimately
10 assigned to the project. After the event an ISA is executed, if further changes occur that
11 cause a Network Upgrade not to be required for a particular project, PJM will amend the
12 ISA to reflect removal of such cost allocations. However, an ISA will not be amended to
13 **increase** the cost allocation for a project after it has been executed.

14 **Q. IS THERE ANY INTERCONNECTION STUDY AVAILABLE FOR**
15 **THE PROPOSED FACILITY? IF SO, PROVIDE ANY INTERCONNECTED**
16 **STUDY RECEIVED FOR THE PROPOSED FACILITY. IF THE APPLICANT**
17 **HAS NOT RECEIVED A STUDY, PROVIDE A DATE BY WHEN THE STUDY IS**
18 **EXPECTED TO BE COMPLETED.**

19 A. Macadamia Solar has received the following studies:

- 20 ● Generation Interconnection Feasibility Study Report for PJM Generation Interconnection
21 Request Queue Position AD1-074/AD1-075/AD1-076 (Feb. 2018) (“Feasibility Report”)
22 (Attachment A)
23 ● Generation Interconnection System Impact Study Report for PJM Generation

1 Interconnection Request Queue Position AD1-074/AD1-075/AD1-076 (Dec. 2019)

2 (“December 2019 SIS Report”) (Attachment B)

- 3 • Generation Interconnection Affected System Study Report for PJM Interconnection
4 Cluster AD1 by Duke Energy Progress (April 5, 2021) (“April 2021 Affected System
5 Report”) (Attachment C)

6 Macadamia Solar is expected to receive the following studies in the fall of 2021:

- 7 • Revised Generation Interconnection System Impact Study Report for PJM Generation
8 Interconnection Request Queue Position AD1-074/AD1-075/AD1-076
- 9 • Generation Interconnection Facility Study Report for PJM Generation Interconnection
10 Request Queue Position AD1-074/AD1-075/AD1-076. Coincident with receiving this
11 report, PJM is expected to tender the ISA to Macadamia Solar.
- 12 • Revised Generation Interconnection Affected System Study Report for PJM
13 Interconnection Cluster AD1 by Duke Energy Progress

14 **Q. ARE THERE ANY NETWORK UPGRADE TO DENC’S, AEP’S OR**
15 **ANY AFFECTED SYSTEM’S TRANSMISSION SYSTEM REQUIRED TO**
16 **ACCOMMODATE THE OPERATION OF THE APPLICANT’S PROPOSED**
17 **FACILITY? IF SO, PROVIDE THE AMOUNT OF NETWORK UPGRADES ON**
18 **DENC’S, AEP’S OR ANY AFFECTED SYSTEM’S TRANSMISSION SYSTEM, IF**
19 **ANY, REQUIRED TO ACCOMMODATE THE OPERATION OF THE**
20 **APPLICANT’S PROPOSED FACILITY.**

21 A. Yes. The December 2019 SIS Report in Attachment B identified a number
22 of upgrades to DENC’s, Appalachian Power Company, d/b/a American Electric Power
23 (“AEP”) and DEP’s transmission system that may be required to facilitate the

1 interconnection of the Facility. Some of these upgrades are absolutely required for
 2 Macadamia to interconnect to DENC’s system (“Interconnection Upgrades”). Other
 3 upgrades are potentially required in order to remedy “contingent overloads,” *i.e.*, overload
 4 conditions that would only exist under certain contingency conditions, such as a line outage
 5 or tower outage on another part of the transmission system causing network upgrades to
 6 members of PJM (“Network Upgrades”) or DEP (“Affected System Network Upgrade”).
 7 While the Facility could physically connect without completing the upgrades required for
 8 contingent overloads, it would not be able to inject power into DENC’s grid unless
 9 confirmed by PJM in the ISA or with a Deliverability Study. So the Interconnection
 10 Upgrades and any other upgrades that might prevent delivery would likely need to be
 11 completed prior to the Facility going in-service. A high-level summary of the upgrades in
 12 PJM’s and DEP’s system as identified in the December 2019 SIS Report and April 2021
 13 Affected System Study Report, is as follows:

14 Table 1: Summary of Upgrades

Description	Total Cost	Allocated Cost
Interconnection Upgrades		
DENC Attachment & Non-Direct Network Upgrades	\$5,800,000	\$5,800,000
Network Upgrades (PJM)		
DENC Network Upgrade	\$206,886,000	\$124,321,114
AEP Network Upgrades	\$9,000,000	\$9,000,000
Affected System Network Upgrades (DEP)		
Everetts-Greenville 230 kV	\$10,000,000	\$0
Rocky Mt. – Hathaway 230 kV line	\$25,000,000	\$25,000,000
Subtotal Network Upgrades	\$250,886,000	\$158,321,114
Total Costs	\$256,6	\$164,1

	86,000	21,114
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1 None of the above costs are final. As discussed above, PJM and DEP are expected
2 to provide revised studies incorporating changes in the transmission system(s) and/or their
3 cost estimates this fall. DEP also indicated that they would remove the \$25 M cost
4 allocation for the Rocky Mt. – Hathaway 230 kV upgrade since their portion of the tie-line
5 is not overloaded (contrary to the assumptions in their Affected System Study). Removing
6 this allocation and incorporating other changes due to withdrawn projects, reliability
7 system upgrades, system updates, and updated cost estimates, the allocations listed above
8 are expected to be significantly reduced. Whatever the cost of the Interconnection and
9 Network Upgrades that are assigned to Macadamia Solar by PJM, they will not be
10 reimbursed by ratepayers. The cost for the Affected System Network Upgrades on DEP’s
11 system, on the other hand, may be reimbursed by ratepayer.

12 PJM conducts interconnection studies in a serial order within each cluster. Several
13 projects might trigger or contribute to the need for the same contingent upgrade and receive
14 a cost allocation for such upgrade. Before an ISA is issued, PJM updates their SIS Report
15 for each project, if necessary, to include any changes that impact system flows and updated
16 cost estimates. These changes may have a significant impact on the upgrades required to
17 interconnect the project. The actual upgrades required for contingent overloads are not
18 determined, and the costs of those upgrades are not allocated, until PJM issues an ISA. In
19 addition, the costs for any contingent upgrade allocated to a particular customer may be
20 reimbursed by subsequently queued projects that also contribute to the contingent overload,
21 if those projects execute their ISAs within five years of the initial project funding the
22 contingent upgrade.

1 The December 2020 SIS Report also discusses reliability upgrades known as
2 Baseline, and Supplemental Upgrades. These may be needed before the Facility can go
3 online. The need for these transmission reliability upgrades has already been identified in
4 PJM’s planning process per their manuals¹ for the reliable performance, operation, and
5 expansion of the Bulk Electric System, and is not triggered by the Facility. Cost allocation
6 for these upgrades is assigned to various load zones as described under Schedule 6 of the
7 PJM Operating Agreement and Schedule 12 of the PJM Open Access Transmission Tariff
8 (“OATT”). While Macadamia Solar will not be allocated costs for these Baseline and
9 Supplemental Upgrades because they are already required for the system, Macadamia Solar
10 may need these upgrades to be completed prior to delivering power to the grid.

11 **Q. IS THE APPLICANT AWARE OF ANY SYSTEM OTHER THAN**
12 **THE STUDIED SYSTEM THAT IS OR WILL BE AFFECTED BY THE**
13 **INTERCONNECTION? IF YES, EXPLAIN THE IMPACT AND BASIS.**

14 A. Yes. The 2019 SIS Report for Macadamia Solar (at page 35), which was
15 prepared by PJM, identifies potential constraints on the following Dominion-Duke Energy
16 Progress (“DEP”) tie lines:

- 17 • Everetts - Greenville 230 kV line
- 18 • Rocky Mt. – Hathaway 230 kV line

19 DEP adopted the overload flows from the December 2019 SIS Report and
20 completed the April 2021 Affected System Study Report. DEP’s solution for the Everetts-
21 Greenville 230 kV line is reconductoring 1.87 miles of their portion of the Everetts-

¹ PJM Manual 14-B, PJM Region Transmission Planning Process, Revision 49, Effective June 23, 2021

1 Greenville 230 kV tie-line. DEP only allocates Affected System Network Upgrades to one
2 project. A previously queued project, AD1-023 (Sumac Solar), is currently allocated \$10
3 million for this Affected System Network Upgrade. Project AD1-056/57 (Sweetleaf Solar)
4 and Macadamia Solar benefit from the upgrade but do not have a cost allocation. If a
5 previously queued project withdraws, the cost of the upgrade could be allocated to one of
6 the subsequently queued projects.

7 DEP's solution for the Rocky Mt. – Hathaway 230 kV line overload is
8 reconductoring 4.73 miles of double circuit 230 kV line plus terminal equipment. The cost
9 is estimated to be \$25 million and is allocated to Macadamia Solar in the April 2021
10 Affected System Study Report. However, that report omitted assumptions about the
11 capacity of the DEP segment of the tie-line.² Applicant asked DEP to review the analysis
12 in the April 2021 Affected System Study Report in light of this omission and use the correct
13 line rating for their portion of the line. On June 28, 2021, DEP confirmed by e-mail that
14 the April 2021 Affected System Study Report was in error, and that Macadamia Solar does
15 not cause an overload on that line and will not be responsible for any upgrade to it.

16 DEP based their April 2021 Affected System Study discussed above on the
17 December 2019 SIS Report that was issued by PJM. PJM is expected to revise their
18 December 2019 SIS Report in the fall of 2021 due to withdrawn projects, retirements,
19 changes in the system and load forecasts. Subsequently, DEP is also expected to revise
20 their April 2021 Affected System Report both to reflect PJM's updated analysis and to
21 correct the error discussed above (which would result in the removal of the \$25 M upgrade

² The Dominion-owned portion of the Hathaway to Rocky Mount 230 kV line is rated for 374 mega volt ampere ("MVA") rating. The Affected System Study Report omitted the capacity of the DEP line rated at 542 MVA.

1 for Macadamia Solar). However, there remains a possibility that a revised Affected System
2 Study for the ADI cluster could show that the Everetts-Greenville 230 kV upgrade
3 allocation moved to Macadamia Solar.

4 If after restudies, Macadamia Solar is assigned any Affected System Network
5 Upgrades and a milestone for Macadamia Solar to execute an Affected System Operating
6 Agreement (“ASOA”) is included in its ISA, Macadamia Solar will fund the Affected
7 System Network Upgrade. It is unclear at this point whether reimbursement would be
8 available for any such costs.

9 On October 1, 2020, DEP modified their Business Practices to eliminate a
10 reimbursement provision in their template Affected System Operating Agreement (“ASOA
11 Template”), meaning that the costs of Affected System Upgrades would no longer be
12 reimbursed or charged to customers. On May 12, 2021, Edgecombe Solar Energy LLC
13 filed with the Federal Energy Regulatory Commission (“FERC”) (Docket No. EL21-73-
14 000) challenging this policy and asserting that the cost of Affected System Upgrades should
15 be reimbursed to interconnection customers.

16 On May 20, 2021, DEP filed the Affected System Operating Agreement between
17 American Beech Solar LLC and DEP (“American Beech ASOA”) with FERC (Docket No.
18 ER21-1995). Subsequently on July 8, 2021, FERC sent DEP a letter informing them that
19 their filing was deficient and requested additional information explaining how the
20 reimbursement provision in the American Beech ASOA complies with DEP’s Joint Open
21 Access Transmission Tariff (“DEP Joint OATT”). DEP responded to FERC that 1) the
22 Large Generator Interconnection Agreement (“LGIA”) in DEP Joint OATT is not
23 applicable for entities that are not an Interconnection Customer of DEP, 2) FERC has ruled

1 that an Affected System Operator is not bound by the terms of the Large Generator
2 Interconnection Procedures (“LGIP”) and LGIA, and 3) there is present for mutually
3 acceptable affected system agreements.

4 These proceeding could result in the reversal of DEP’s current policy of eliminating
5 the reimbursements. Once the final costs are known and if such costs are assigned to
6 Macadamia Solar, Macadamia Solar would negotiate an ASOA agreement including
7 whether or not reimbursement provisions are included.

8 **Q. WOULD THE CONSTRUCTION OF THESE UPGRADES TO**
9 **DEP’S SYSTEM BENEFIT DEP’S RATEPAYERS?**

10 A. Yes. The upgrades listed in the April 2021 Affected System Study are tie-
11 lines between PJM and DEP. In the event there is a low probability, high impact event like
12 a gas pipeline outage, more robust tie-lines between PJM and DEP will allow for more
13 import generation from PJM to DEP ratepayers. This demonstrates a resiliency benefit for
14 DEP ratepayers. A gas pipeline outage could cause operational issues for approximately
15 3000 MW of existing natural gas generation in DEP’s territory if a sufficient amount of
16 backup fuel oil is not stored at the generating sites. During an extreme emergency, DEP
17 ratepayers could receive energy from generators in PJM through tie-lines if they are
18 sufficiently sized. PJM is the largest market in the country with approximately 180,000
19 MW of capacity available and approximately 45,000 MW of reserve margin. This
20 compares to approximately 13,500 MW of generation in DEP’s territory. Increasing
21 capacity of tie-lines is an important tool for enhancing resiliency for extreme events. Other
22 benefits ratepayers could realize is a reduction in reserve margin by tapping into
23 neighboring systems. Load diversity with large geographic areas increases the probability

1 that peaks are not simultaneous which results in individual utility members holding less
2 generation in reserve. While historical resource adequacy planning typically did not
3 include neighboring system, it may be an effective tool to consider in the future.³
4 Furthermore, as discussed below, the likely reimbursed cost of any Affected System
5 Network Upgrade would be very low on a per-MWh basis.

6 **Q. COULD THERE BE ANY “NOT YET IDENTIFIED” NETWORK**
7 **UPGRADES REQUIRED FOR MACADAMIA SOLAR TO CONNECT TO THE**
8 **GRID?**

9 A. Based on the information currently available, that appears very unlikely.
10 However, while PJM performs very robust studies, there is no guarantee that future
11 revisions to their studies will not uncover other necessary upgrades. Similarly, DEP may
12 also conduct future studies on their system which could uncover other upgrades and ask
13 PJM to incorporate their results in their final reports for Macadamia Solar.

14 **Q. IF THERE ARE ANY REQUIRED SYSTEM UPGRADES, DOES**
15 **THE APPLICANT HAVE LEVELIZED COST OF TRANSMISSION (LCOT)**
16 **INFORMATION FOR THE SYSTEM UPGRADE? IF SO, PROVIDE THE LCOT**
17 **INFORMATION FOR ANY REQUIRED TRANSMISSION SYSTEM UPGRADES**
18 **OR MODIFICATIONS.**

19 Yes. The Applicant has calculated the LCOT for both PJM Network Upgrades and
20 DEP Affected System Network Upgrades associated with the Macadamia Solar Facility

³ Redefining Resource Adequacy for Modern Power Systems, 2021, by Energy Systems
Integration Group, p. 22
<https://www.esig.energy/wp-content/uploads/2021/08/ESIG-Redefining-Resource-Adequacy-2021.pdf>

1 based on the December 2019 SIS Report, on the April 2021 Affected System Report, and
 2 on several likely alternative scenarios.

3 Macadamia Solar triggers PJM Network Upgrades in both Dominion and AEP's
 4 transmission system and Affected System Network Upgrades in DEP's transmission
 5 system. The cost of PJM Network Upgrades will not be reimbursed by ratepayers. The
 6 cost of DEP Affected System Network may be reimbursed depending on the outcome of
 7 pending FERC proceedings. To cover the range of possible outcomes, several scenarios
 8 were developed as the basis for LCOT calculations. PJM Scenario 2 with an LCOT of
 9 \$2.56/MWh and DEP Scenario 1 with an LCOT of \$0.26 are considered the most likely by
 10 Applicant. The total LCOT for both sets of Network Upgrades would be \$2.92/MWh.
 11 Under the worst-case scenario, the LCOT for costs that might be reimbursable by
 12 ratepayers would be \$1.33/MWh.

13 **Table 2 – Levelized Cost of Transmission (LCOT) Summary for Upgrades**

Macadamia Solar	PJM Scenario 1	PJM Scenario 2	DEP Scenario 1	DEP Scenario 2	DEP Scenario 3
Nameplate (MWac)	484	484	698	484	484
Capacity Factor (%)	29.48%	29.48%	29.48%	29.48%	29.48%
Degradation (%/yr)	0.50%	0.50%	0.50%	0.50%	0.50%
Facility Life (yrs)	35	35	35	35	35
Transmission Asset life (yrs)	60	60	60	60	60
Annual generation	1,249,905	1,249,905	1,802,549	1,249,905	1,249,905

(MWh)					
Total generation	40,224,785	40,224,785	58,010,123	40,224,785	40,224,785
Network Upgrades (\$)	\$133,321,114 (non-reimbursable)	\$67,216,586 (non-reimbursable)	\$10,000,000 (potentially reimbursable)	\$25,000,000 (potentially reimbursable)	\$35,000,000 (potentially reimbursable)
\$/MWh	\$3.31	\$1.67	\$0.17	\$0.62	\$0.87
\$/kW	\$275	\$139	\$14	\$52	\$72
Discount Rate	4.4%	4.4%	4.4%	4.4%	4.4%
LCOT (\$/MWh)	\$5.08	\$2.56	\$0.26	\$0.95	\$1.33

The following is a description of the various scenarios:

- PJM Scenario 1:** This is based on the allocated PJM Network Upgrade costs listed in the December 2019 SIS Report. In this scenario, the LCOT of (non-reimbursable) Upgrades would be \$5.08/MWh. As discussed below, Macadamia Solar does not believe this is a likely scenario.
- PJM Scenario 2:** This is based on the allocated PJM Network Upgrade costs listed in the December 2019 SIS Report, minus an allocation for the n5609 upgrade. n5609 is a \$123.4 M Network Upgrade to rebuild 41 miles of the Midlothian – North Anna 500 kV Line #576. Macadamia Solar was allocated \$66.1 M for this upgrade in the December 2019 SIS Report. After the report was issued, however, a prior-queued natural gas project (AB2-068) withdrew from the queue and the Yorktown 1 & 2 coal units retired. Applicant believes that once PJM’s models are updated to reflect the reduced loading as a result of these developments, Macadamia Solar will no longer contribute to an overload and the allocation will be removed in a revised SIS report issued by PJM this fall. In this scenario, the LCOT of (non-reimbursable) Upgrades would be \$2.56/MWh. Lower queued interconnection customers in PJM may reduce the allocation for Macadamia Solar if they

1 contribute to the overload, though this was not factored into the calculation.

- 2 • **DEP Scenario 1:** This scenario represents a \$10 M Affected System Network Upgrade
3 (Everetts-Greenville 230 kV), being spread among the “first to cause” project, Sumac Solar
4 (AD1-022/23) and two subsequent projects in the AD1 cluster, Sweetleaf Solar (AD1-
5 056/57) and Macadamia Solar (AD1-074/75/76). This upgrade was identified in the April
6 2021 Affected System Study Report issued by DEP. Neither Macadamia Solar nor
7 Sweetleaf Solar were assigned responsibility for this upgrade by DEP but they both benefit
8 from it. The LCOT of potentially reimbursable Upgrade costs in this scenario would be
9 \$0.26/MWh.
- 10 • **DEP Scenario 2:** DEP’s April 2022 Affected System Study Report, identified a \$25 M
11 upgrade for Rocky Mt. – Hathaway 230 kV line and assigned the cost to Macadamia Solar.
12 The LCOT of potentially reimbursable Upgrade costs in this scenario would be
13 \$0.95/MWh. However, Applicant subsequently asked DEP to review the line ratings for
14 their portion of the tie-line, and upon review DEP agreed that their portion was not
15 overloaded and indicated they would remove the allocation. Applicant expects DEP to
16 issue a revised Affected System Study Report, reflecting no allocation of costs for this
17 upgrade to Macadamia Solar, after PJM releases a revised SIS report in Fall 2021.
- 18 • **DEP Scenario 3:** This scenario represents a worst-case scenario under which (a) the \$10
19 M upgrade for Everetts – Greenville 230 kV line currently allocated to Sumac Solar slips
20 to Macadamia Solar; (b) DEP changes their position and allocates the \$25 M Rocky Mt. –
21 Hathaway 230 kV upgrade to Macadamia Solar; and (c) Macadamia Solar is the only
22 project that benefits from this upgrade. The LCOT of potentially reimbursable Upgrade
23 costs in this scenario would be \$1.33/MWh.

1 The Applicant's LCOT analysis is detailed in **Confidential Attachment D**.

2 **Q. IS THERE AN 8760 MWh ANNUAL PROFILE AVAILABLE FOR**
3 **THE MW OUTPUT OF THE FACILITY?**

4 A. The Applicant's 8760 MWh annual profile is detailed in **Confidential**
5 **Attachment E**.

6 **NEED FOR THE FACILITY**

7 **Q. PLEASE EXPLAIN THE NEED FOR THE FACILITY.**

8 A. A description of the need for the facility in North Carolina and the broader
9 region is set forth in **Exhibit 3** of the Application, which is hereby incorporated by
10 reference.

11 **Q. DESCRIBE THE OFFTAKE PLANS FOR THE FACILITY.**

12 A. Geenex Solar has substantial experience with solar power development and
13 offtake in the PJM market and the expectations for power purchase from the PJM market
14 in the southeast United States are strong. Geenex Solar has previously secured and is
15 actively negotiating for over 6.3 GW of offtake within the PJM market, and is using this
16 experience to secure offtake for Macadamia Solar.

17 The Macadamia Solar Facility will interconnect with the Dominion Energy
18 transmission grid, affording it access to the PJM Interconnection ("PJM"), a Regional
19 Transmission Organization ("RTO") in which Dominion participates. As discussed in
20 Exhibit 3 of the Application, the Facility is poised to take advantage of several offtake
21 opportunities in the PJM market, and the long-term offtake prospects for renewable energy,
22 renewable energy credits, and ancillary services generated by the Facility are very
23 favorable.

1 Geenex Solar has executed an option agreement with EDF Renewables
2 Development, Inc. (“EDF”) to own, operate, and secure the power purchase agreements
3 for the off-take of the 484 MWac facility. The option is expected to be exercised in the 4th
4 quarter of 2021 or 1st quarter of 2022. Additional information about EDF is included in
5 the testimony of Kara Price concurrently submitted with the Application. In the event EDF
6 Renewables does not execute its option, Geenex Solar will negotiate with another
7 renewable energy developer/investor.

8 **Q. IS THE APPLICANT PROPOSING TO SELL ENERGY AND**
9 **CAPACITY FROM THE FACILITY TO A DISTRIBUTION FACILITY**
10 **REGULATED BY THE COMMISSION?**

11 A. Not at this time.

12 **Q. IS THE APPLICANT PROPOSING TO SELL ENERGY AND**
13 **CAPACITY FROM THE PROPOSED FACILITY TO A PURCHASER WHO IS**
14 **SUBJECT TO A STATUTORY OR REGULATORY MANDATE WITH RESPECT**
15 **TO ITS ENERGY SOURCING?**

16 A. Not at this time.

17 **Q. DOES THE APPLICANT HAVE A POWER PURCHASE**
18 **AGREEMENT (PPA), REC SALE CONTRACT OR CONTRACTS FOR**
19 **COMPENSATION FOR ENVIRONMENTAL ATTRIBUTES FOR THE OUTPUT**
20 **OF THE PROPOSED FACILITY?**

21 A. Not at this time.

22 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

23 A. Yes.