Generation Interconnection
Facilities Study Report

PJM Generation Interconnection Request
Queue Position AE2-334 "Clayton-Williamstown 69 kV"

April 2022

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Transmission Owner Facilities Study Summary

1.0 Description of Project

Gloucester Solar I, LLC, the Interconnection Customer (IC), has proposed a 44 MW (28.7 MW capacity) solar generating facility to be located in Gloucester County, New Jersey at Latitude: 39.6418630, Longitude: -75.0637120. PJM studied AE2-334 as an injection to Atlantic City Electric Company's (ACE) system as a tap on the existing 69kV Clayton to Williamstown circuit (TSOM 0716 Monroe to Clayton). Peak summer conditions were evaluated for 2022. The planned in-service date, as requested by the IC is June 30, 2022. The feasibility of the requested in-service date is dependent upon the execution of a WMPA/IA and ACE's construction schedule for the associated direct-connect and network upgrades.

The proposed 44 MWs of generation will require one (1) new transmission level Point of Interconnection (POI). Based on the original feasibility study the POI will be at a new 69kV three-breaker ring bus substation to be constructed adjacent to the Clayton-Monroe 69kV circuit.

2.0 Amendments to the System Impact Study or System Impact Study Results

The scope of the project, as stated in the Impact Study dated February 2020, has been modified pursuant to a retool analysis, which modified 'Schedule A – Details of Design and Cost Estimates/Quality for the Facilities Study' in July 2021. Moreover, this report further delineates the scopes of work and provides more detailed estimates than those included in the Impact Study.

3.0 Interconnection Customer's Milestone Schedule

Site Work Complete:	36-48 months prior to new estimated ISD for commercial operation
Commercial Operation:	December 31, 2026

4.0 Interconnection Customer's Scope of Work

The IC assumes full responsibility for the design, permitting and construction of all facilities associated with the AE2-334 generating station on their side of the POI. ACE requires that an IC's circuit breaker be located within 500 feet of the ACE substation property to facilitate the relay protection scheme between ACE and the IC at POI. The IC shall conform to Transmission Owner's engineering and construction standards and coordinate all work directly with the Transmission Owner to ensure minimal interruption to the electric system. The IC also assumes responsibility for the permitting and construction of the service road(s) to the generating site, if any is required. The access road design must be approved by the Transmission Owner to ensure it provides adequate access to the substation to support construction and maintenance activities.

Protective relaying and metering design and installation must comply with Transmission Owner's applicable standards. The IC is also required to provide revenue metering and real-time telemetering data to PJM in conformance with the requirements contained in PJM Manuals M-01 and M-14 and the PJM Tariff. It is critical that the IC also provides 120 VAC uninterruptible power to the primary meter installed by Transmission Owner.

Transmission Owner will require the capability to remotely disconnect the generator from the grid by communication from its System Operations facility; the IC shall have a circuit breaker capable of locking out when the command is sent. The IC is responsible for calling Transmission Owner System Operations before

manually reconnecting with the grid. The phone number to System Operations should be clearly displayed next to the circuit breaker and out of public view.

Transmission Owner Facilities Study Results

5.0 Transmission Owner Scope of Work

This section describes upgrades to existing facilities required to accommodate the interconnection of AE2-334; these will be performed by the Transmission Owner. It also delineates the attachment facilities necessary to support the interconnection to the IC's generating site from the designated POI. The facilities identified to be installed, replaced, and/or upgraded by Transmission Owner to accommodate the connection of AE2-334 includes the cut-in of the existing 69kV Circuit 0716 Clayton to Williamstown transmission line and a new 3-position ring bus substation; these scopes are further detailed in sections 5.1 and 5.2, for transmission and substation scopes, respectively. During detailed design and analysis, other components may be identified for installation or replacement due to this interconnection.

All work to accommodate the installation of the interconnection facilities is dependent upon the IC obtaining all necessary permits, real property rights and acquisitions, including, but not limited to rights of way, easements, and fee simple, in a form approved by Transmission Owner. Any setbacks in obtaining the necessary real property rights, acquisitions and permits required for this interconnection may delay the execution of construction activities.

The scope of work for the installation of IC's interconnection and generation facilities are not included in this study nor are the responsibility of the Transmission Owner.

5.1 Transmission Line Facilities

5.1.1 Attachment Facilities

The POI will be within 500 ft of the new substation bus position; as such, the TO will install a transmission line span from the new substation breaker position to the POI. Any future revisions to the location of the POI, especially the placement may trigger the need for a scope and cost re-evaluation of the transmission line attachment facilities.

5.1.2 Non-Direct Connect

Circuit 0716 must be cut-into the newly proposed substation as part of the non-direct connection activities. The scope assumes six (6) new steel dead-end structures will be installed to route from the existing centerline of Circuit 0716 to the new takeoff structures within the proposed substation. Glass insulator strings will be used for all insulators, and all structures will be supported on concrete drilled pier foundations. 0.638" 96-count OPGW will be installed as the static wire for all new conductor sections.

Material/Equipment – Direct Connect Transmission Line	*Quantity*
▪ Transmission Conductor 69kV 795 kcmil ASCR Drake	~3,000 ft
▪ 0.638 96SM OPGW	~1,000 ft
▪ 69kV Single-Circuit Dead-end steel monopoles	6
▪ Insulators, connectors, fittings, grounding and miscellaneous	1 lot
▪ 8'x40' expected drilled pier foundations for DE structures	6

Major Labor Activities

- Install proposed dead-end foundation, structures, and insulators.
- Install new conductors to tie-in the existing 0716 into the new two (2) bus positions.
- Install conductor from new bus position at the new switchyard to the IC's POI station.
- Site restoration of the disturbed areas within the right-of-way

5.2 Substation Facilities

5.2.1 Direct Connect

A new 69kV substation will be required for this interconnection with a minimum of three (3) positions on the ring bus. Two (2) of the ring bus positions will be transmission line terminals for ACE Line 0716 and the third will be for the interconnection of the AE2-334 Facility.

Short circuit, arc flash, lighting, direct stroke shielding, and ground grid studies will be required.

New protection relaying will be added for each of the three (3) new terminals. The line protection relaying will be required for two (2) terminals and will consist of SEL-411L (PRI) and SEL-311C (BU) that are both connected to direct fiber over the re-built transmission lines.

To interconnect the proposed facility, two (2) of the ring bus positions will be the transmission line terminals for ACE Line 0716 cutting into the new substation; the third will be for the interconnection of the AE2-334 Facility. The scope assumes that the new substation will in proximity to the existing circuit centerline.

Bus protection for the interconnection position will be provided by two (2) SEL-487B (PRI and BU). These relays will be installed within the new substation control cubicle but will require two (2) CT inputs from the IC breaker via copper cables. In addition, two (2) trip outputs will be sent to the IC via copper cables to isolate IC-owned equipment.

The PRI and BU line relays will utilize outputs that directly trip line-associated breakers, initiate associated-breaker failure schemes, and initiate associated-line breaker reclosing schemes under fault conditions. In cases where transfer trip is received via fiber channel mirrored bits (from lines other than IC line), the PRI line relays will utilize an output that directly picks up a high-speed self-resettable auxiliary relay which directly trips and blocks close line-associated breakers. If transfer trip is received from IC (via copper cables), a high-speed self-resettable auxiliary relay will be asserted which will also directly trip and block close line-associated breakers.

Breaker control, failure and reclosing will be accomplished using three (3) SEL-451 relays (one for each breaker). Failure schemes will be initiated by breaker-associated bus and line protection. The breaker failure lockout relay associated with the scheme will send direct transfer trip through associated PRI line relay using fiber channel mirrored bits (for lines other than the IC line), and permissive transfer trip through associated BU line relay using fiber channel mirrored bits (for lines other than the IC line). In case of breaker failure schemes that feed IC line, direct copper cables will send redundant transfer trip signals from associated SEL-451 relay. Additionally, SEL-451 relay outputs will be wired (via copper cables) to remotely control IC breaker for operational switching.

A communication panel within new control cubicle and IRIG antenna mounted to the outside of the new control cubicle will also be required. The new communication panel will contain an Orion LX RTU, Arbiter GPS clock, SEL-2411 alarm I/O relay, and three (3) Siemens Ruggedcom RSG2100 switches. A new MPLS panel will also be required for communication panel to reach the ACE communication network.

Two (2) new OPGW-ADSS splice enclosures in yard, two (2) new fiber panels in control cubicle, and ADSS fiber from splice enclosures to fiber panels will be required.

5.2.1.1 Major Substation Equipment

Material/Equipment – Direct Connect Substation	*Quantity*
▪ 69kV Circuit Breaker, 2000A, 40kA, 3 cycle	3
▪ 69kV Line Disconnect Switch, 2000A	3
▪ 69kV CB Disconnect Switch, 2000A	6
▪ 69kV CCVT	9
▪ 69kV CT/VT Combo Unit (with extended range CTs)	3
▪ 69kV CT/VT Stand, High, Steel	3
▪ 69kV Surge Arresters	9
▪ 69kV Disconnect Switch Stand, High, Steel	9
▪ 69kV CCVT Stand, Three Phase, High, Steel	3
▪ 69kV Dead-end/Take-off Structure	3
▪ 69kV/240-120V SSVT, 100kVA	2
▪ 69kV Breaker Foundation (slab)	3
▪ 69kV Line Disconnect Switch Stand Foundation (group of piers)	3
▪ 69kV 3-Phase CCVT Stand Foundation (group of piers)	3
▪ 69kV Dead-end/Take-off Structure Foundation (group of piers)	3
▪ 69kV Bus Support Structure, 3-phase, Steel	22
▪ 69kV Station Post Insulators	102
▪ 4” SPS AL Bus (Sch 80) with 954 ACSR Damper	850 FT
▪ 954 ACSR Bare Conductor	750 FT
▪ 477 AAC Bare Conductor	250 FT
▪ Fencing	500 FT
▪ Control Enclosure, includes AC/DC Panelboards, 125VDC Battery & Charger (47’x16’)	1
▪ Pre-cast Cable Trench (24” x 24”)	420 FT

Material/Equipment – Direct Connect Substation	*Quantity*
▪ 4” Sch 40 PVC Conduit	3,000 FT
▪ Ground Conductor, 4/0 Bare Copper (Soft Drawn)	7,000 FT
▪ Bus Differential Relay Panel with two (2) SEL-487B (24” wide)	1
▪ Line Relay Panel with SEL-411L & SEL-311C (24” wide)	2
▪ Circuit Breaker Control Panel with two (2) SEL-451/LOR (24” wide)	1
▪ Circuit Breaker Control Panel with one (1) SEL-451/LOR (24” wide)	1
▪ Revenue Metering Cabinet	1
▪ RTU/Communications Panel with SEL2411, Orion LX, & Ethernet switches (24”)	1
▪ Physical Security Panel (24”)	1
▪ Fiber Panel	2
▪ MPLS Panel	1
▪ Comm DC Plant Panel	1
▪ Control Cable 4C#10AWG	4,500 FT
▪ Control Cable 7C#10AWG	500 FT
▪ Control Cable 12C#10AWG	500 FT
▪ Control Cable 4C#12AWG	2,500 FT
▪ Control Cable 12C#12AWG	2,500 FT
▪ OPGW-ADSS Fiber Splice Enclosure	2
▪ ADSS Fiber Trunk Cable, 500ft	2
▪ Serial/Fiber Optic Transceiver (SEL-2830)	4
▪ Multimode (62.5um) Fiber-Optic Cable	350 ft
▪ Single-Mode (1300nm) Fiber-Optic Patch Cable	500 ft

5.2.1.2 Assumptions

- Land purchase for the substation is not included within the Transmission Owner’s scope nor estimate; it is assumed that the IC will acquire and obtain the permits necessary to site the substation.
- Site clearing and grading performed by IC.
- Grounding, environmental, and soil studies will be necessary, but are not included in this scope.
- Communication fiber optic available to new substation.
- No distribution connections/nor upgrades are associated with the new substation.
- Three-line switches are required (Impact Study had indicated two).
- Two-line relay panels are required (Impact study had indicated three).
- One bus relay panel is required (Impact study had indicated three)

5.2.2 Non-Direct Connection

The project will require re-wiring and adjustment of existing relay schemes at Clayton, Williamstown, and Monroe to accommodate the proposed 69 kV substation.

5.2.2.1 Clayton Substation Terminal Upgrades

The existing line relays at Clayton substation are electromechanical and cannot be re-purposed to support the upgrades required for AE2-334. The existing line protection will be replaced with an SEL-411L (PRI)

and SEL-311C (BU). Th existing breaker failure, reclosing, and breaker control relaying will be replaced with a new breaker control relay (SEL-451). The existing line communications is accomplished via power line carrier and will be replaced with direct fiber over rebuilt transmission lines. The Monroe line wave trap and tuner needs to be removed.

The PRI and BU line relays will utilize outputs that directly trip line circuit breaker, initiate line breaker failure scheme, and initiate line breaker reclosing scheme under fault conditions. In cases where transfer trip is received (via fiber channel mirrored bits), the PRI line relays will utilize an output that directly picks up a high-speed self-resettable auxiliary relay which directly trips and blocks close line breaker.

Breaker control, failure and reclosing will be accomplished using a SEL-451 relay. Failure scheme will be initiated by breaker-associated bus and line protection. The breaker failure lockout relay associated with the scheme will send direct transfer trip through associated PRI line relay using fiber channel mirrored bits, and permissive transfer trip through associated BU line relay using fiber channel mirrored bits.

Lockout relays will be utilized to directly trip related breakers under fault conditions and send transfer trips to the remote end via Mirror Bits. Breaker control and failure will be accomplished using SEL-451 relays. New 3-single phase CCVTs are required to support the upgraded relaying.

A new communication panel within control enclosure and IRIG antenna mounted to outside of control enclosure will also be required. The new communication panel will contain an Orion LX RTU, Arbiter GPS clock, SEL-2411 alarm I/O relay, and three (3) Siemens Ruggedcom RSG2100 switches. A new MPLS panel will also be required for communication panel to reach the ACE communication network.

A new OPGW-ADSS splice enclosure in yard, a fiber panel in control cubicle, and ADSS fiber from splice enclosure to fiber panel will be required.

Short circuit, arc flash, lighting, direct stroke shielding, and ground grid studies will not be required.

Terminal Upgrades at Clayton Material/Equipment	*Quantity*
▪ Line Relay Panel with SEL-411L & SEL-311C (24" wide)	1
▪ Circuit Breaker Control Panel with one (1) SEL-451/LOR (24" wide)	1
▪ RTU/Communications Panel with SEL2411, Orion LX, & Ethernet switches (24")	1
▪ MPLS Panel	1
▪ Fiber Panel	1
▪ 69kV CCVT	3
▪ 69kV CCVT Stand, Three Phase, High, Steel	1
▪ 69kV 3-Phase CCVT Stand Foundation (group of piers)	3
▪ 477 AAC Bare Conductor	50 ft
▪ Control Cable 4C#10AWG	1,000 ft
▪ Control Cable 4C#12AWG	1,000 ft
▪ Control Cable 12C#12AWG	1,000 ft
▪ OPGW-ADSS Fiber Splice Enclosure	1

Terminal Upgrades at Clayton Material/Equipment	*Quantity*
▪ ADSS Fiber Trunk Cable, 250ft	1
▪ Serial/Fiber Optic Transceiver (SEL-2830)	2
▪ Multimode (62.5um) Fiber-Optic Cable	250 ft
▪ Single-Mode (1300nm) Fiber-Optic Patch Cable	300 ft

5.2.2.2 Williamstown Substation Terminal Upgrades

The existing line relays at Williamstown substation are electromechanical and cannot be re-purposed to support the upgrades required by AE2-334. The existing line protection will be replaced with a SEL-411L (PRI) and SEL-311C (BU). Th existing breaker failure, reclosing, and breaker control relaying will be replaced with a new breaker control relay (SEL-451). The existing line communications is accomplished via power line carrier and will be replaced with direct fiber over rebuilt transmission lines. The Monroe-Clayton line wave trap and tuner will need to be removed.

The PRI and BU line relays will utilize outputs that directly trip line circuit breaker, initiate line breaker failure scheme, and initiate line breaker reclosing scheme under fault conditions. In cases where transfer trip is received (via fiber channel mirrored bits), the PRI line relays will utilize an output that directly picks up a high-speed self-resettable auxiliary relay which directly trips and blocks close line breaker.

Breaker control, failure and reclosing will be accomplished using a SEL-451 relay. Failure scheme will be initiated by breaker-associated bus and line protection. The breaker failure lockout relay associated with the scheme will send direct transfer trip through associated PRI line relay using fiber channel mirrored bits, and permissive transfer trip through associated BU line relay using fiber channel mirrored bits.

Lockout relays will be utilized to directly trip related breakers under fault conditions and send transfer trips to the remote end via Mirror Bits. Breaker control and failure will be accomplished using SEL-451 relays. New 3-single phase CCVTs are required to support the upgraded relaying.

A new OPGW-ADSS splice enclosure in yard, a fiber panel in control cubicle, and ADSS fiber from splice enclosure to fiber panel will be required.

Short circuit, arc flash, lighting, direct stroke shielding, and ground grid studies will not be required.

Terminal Upgrades at Williamstown Material/Equipment	*Quantity*
▪ Line Relay Panel with SEL-411L & SEL-311C (24” wide)	1
▪ Circuit Breaker Control Panel with one (1) SEL-451/LOR (24” wide)	1
69kV CCVT	3
▪ 69kV CCVT Stand, Three Phase, High, Steel	1
▪ 69kV 3-Phase CCVT Stand Foundation (group of piers)	3
▪ 477 AAC Bare Conductor	50 ft
▪ Control Cable 4C#10AWG	1,000 ft
▪ Control Cable 4C#12AWG	1,000 ft
▪ Control Cable 12C#12AWG	1,000 ft

Terminal Upgrades at Williamstown Material/Equipment	*Quantity*
▪ OPGW-ADSS Fiber Splice Enclosure	1
▪ ADSS Fiber Trunk Cable, 250ft	1
▪ Fiber Panel	1
▪ Serial/Fiber Optic Transceiver (SEL-2830)	2
▪ Multimode (62.5um) Fiber-Optic Cable	150 ft
▪ Single-Mode (1300nm) Fiber-Optic Patch Cable	300 ft

5.2.2.3 Monroe Substation Terminal Upgrades

The existing line relays at Monroe substation consists of electromechanical type and cannot be re-purposed to support the upgrades required by AE2-334. The existing line protection will be replaced with a SEL-411L (PRI) and SEL-311C (BU). The existing breaker failure, reclosing, and breaker control relaying will be replaced with a new breaker control relay (SEL-451). The existing line communications is accomplished via power line carrier and will be replaced with direct fiber; this scope assumes fiber is available from Clayton substation. The Clayton line wave trap and tuner will be required to be removed.

The PRI and BU line relays will utilize outputs that directly trip line circuit breaker, initiate line breaker failure scheme, and initiate line breaker reclosing scheme under fault conditions. In cases where transfer trip is received (via fiber channel mirrored bits), the PRI line relays will utilize an output that directly picks up a high-speed self-resettable auxiliary relay which directly trips and blocks close line breaker.

Breaker control, failure and reclosing will be accomplished using a SEL-451 relay. Failure scheme will be initiated by breaker-associated bus and line protection. The breaker failure lockout relay associated with the scheme will send direct transfer trip through associated PRI line relay using fiber channel mirrored bits, and permissive transfer trip through associated BU line relay using fiber channel mirrored bits.

Lockout relays will be utilized to directly trip related breakers under fault conditions and send transfer trips to the remote end via Mirror Bits. Breaker control and failure will be accomplished using SEL-451 relays.

New 3-single phase CCVTs are required to support the upgraded relaying.

A new OPGW-ADSS splice enclosure in yard, a fiber panel in control cubicle, and ADSS fiber from splice enclosure to fiber panel will be required.

Short circuit, arc flash, lighting, direct stroke shielding, and ground grid studies will not be required.

Terminal Upgrades at Monroe Material/Equipment	*Quantity*
▪ Line Relay Panel with SEL-411L & SEL-311C (24” wide)	1
▪ Circuit Breaker Control Panel with one (1) SEL-451/LOR (24” wide)	1
Control Cable 4C#10AWG	1,000 FT
▪ Control Cable 4C#12AWG	1,000 FT
▪ Control Cable 12C#12AWG	1,000 FT
▪ 69kV CCVT	3

Terminal Upgrades at Monroe Material/Equipment	*Quantity*
▪ 69kV CCVT Stand, Three Phase, High, Steel	1
▪ 69kV 3-Phase CCVT Stand Foundation (group of piers)	3
▪ 477 AAC Bare Conductor	50 FT
▪ OPGW-ADSS Fiber Splice Enclosure	1
▪ ADSS Fiber Trunk Cable, 250ft	1

6.0 Network Facilities

The results generated via the PJM retool analysis for PJM Queue project AE2-334 conducted in July 2021, identified no network upgrades longer required to accommodate the interconnection of the project. However, the TO must conduct relay modifications at the remote ends of the proposed substation to support its functionality, as described in the preceding sections.

7.0 Metering & Telemetry

A three phase 69 kV revenue metering point will need to be established within the Interconnection Customer Facilities at the Point of Interconnection, which shall be located within 500 ft of Transmission Owner's proposed substation. The Interconnection Customer will purchase and install all metering instrument transformers as well as construct a metering structure per the Transmission Owner's specifications. The secondary wiring connections at the instrument transformers will be completed by the Interconnection Customer's contractors and inspected by the Transmission Owner. The secondary wiring connection at the metering enclosure will be completed by the Transmission Owner's meter technicians. The metering control cable and meter cabinets will be supplied by the Transmission Owner and installed by the Interconnection Customer's contractors. The Interconnection Customer will provide 120 VAC power to the meter cabinets from an uninterruptible power source. Transmission Owner's meter technicians will program and install two solid state multi-function meters (primary and backup) for each new metering position.

Each meter will be equipped with load profile, telemetry, and DNP outputs. The Interconnection Customer will be provided with one-meter DNP output for each meter. The Transmission Owner will supply a wireless modem for remote meter interrogation. If a wireless modem is unable to reliably communicate, the IC will be required to make provisions for a POTS (Plain Old Telephone Service) line or equivalent technology approved by the TO within approximately three (3') feet of the metering position to facilitate remote interrogation and data collection. It is the Interconnection Customer's responsibility to send the data that PJM and the Transmission Owner require directly to PJM. It is the IC's responsibility to send the data that PJM and Transmission Owner requires directly to PJM. The IC will grant permission for PJM to send Transmission Owner the following telemetry that the IC sends to PJM: real time MW, MVAR, volts, amperes, generator status, and interval MWH and MVARH.

The Transmission Owner's revenue meters will be the official meters and must be the source for reporting generation output to PJM. The Interconnection Customer is responsible for installing telemetry equipment necessary to obtain the revenue meter data and submitting the data to PJM.

8.0 Environmental, Real Estate and Permitting

All work to accommodate the interconnection of AE2-334 is dependent upon the IC obtaining all necessary permits. Moreover, the IC shall be responsible for acquiring all necessary real property rights and acquisitions, including rights of way, easements, and fee simple, in a form approved by Transmission Owner. This is applicable for all facilities including the cut-in of the 0716 Clayton to Williamstown 69kV circuit and the proposed 3-breaker ring substation. Any setbacks in obtaining the necessary real property rights, acquisitions and permits required for this interconnection may delay the construction schedule.

Environmental permits may need to be secured. Additional tree trimming/clearing may be needed. This estimate assumes that all the applicable permitting will be obtained by the IC for the generating facility and the service road(s).

9.0 Proposed Schedule for Completion of Work

The Transmission Owner project schedule is based on a 36–48-month timeline from receipt of a fully executed interconnection agreement; this timeline is subject to storm damage and restoration efforts that may impact the resources and/or the geographic area of this project, time of year limitations, permitting issues, outage scheduling, system emergencies, and contractor and equipment availability.

It is important to note that this project will be incorporated into the existing project workload at Transmission Owner at the time of contract execution. If the workload of existing projects is extensive, resource constraints may cause this project to be delayed beyond the planned in-service date.

10.0 Total Cost of Transmission Owner Facilities

The overall cost of interconnection AE2-334 into PJM/ACE service territory is estimated based on a ROM (rough order of magnitude) of ±50% (Phase 0); the estimate for all TO's facilities is $12,997,075. Exact figures and cost breakdowns are presented in the table below.

	Estimated Costs ($)		
AE2-334 Interconnection Facilities	***Direct***	***Indirect***	***Total Cost ($)***
Direct Connection Facilities			
New 69kV Substation	8,069,013	641,059	8,710,072
Subtotal - Direct Connect	*$8,069,013*	*$641,059*	*$8,710,072*
Non-Direct Connection Facilities			
0716 Line Cut-In	1,464,151	132,281	1,596,432
Clayton Sub Terminal Upgrades	915,520	81,693	997,213
Monroe Sub Terminal Upgrades	769,243	77,436	846,679
Williamstown Terminal Upgrades	769,243	77,436	846,679
Subtotal - Non-Direct Connect	*$3,918,157*	*$368,846*	*$4,287,003*
Total Cost	$11,987,170	$1,009,905	**$12,997,075**

Generation projects meeting IRS "Safe Harbor" provisions do not incur "CIAC"(Contribution in Aid to Construction), a tax collected by the utility for the state or federal government. Transmission Owner does not expect to collect CIAC for this project. If for any reason "CIAC" would be required for this project, it would be the responsibility of the party owning the generator to pay this cost.

Transmission Owner reserves the right to charge the Interconnection Customer operation and maintenance expenses to maintain the Interconnection Customer attachment facilities, including metering facilities, owned by Transmission Owner.

Attachment #1
AE2-334 Clayton-Williamstown 69kV
Interconnection One-Line

Attachment #2
AE2-334 Clayton-Williamstown
69 kV Substation One-Line

Attachment #3
AE2-334 Clayton-Williamstown 69kV
Modified General Arrangement