Community Solar Project Interconnection

Community Solar Project Facilities Study Report

Completed for

(“Applicant”)
OCS025

Proposed Point of Interconnection
Circuit 5L12 out of Westside substation at 12.0 kV
(At approximately 42°12'27.58"N, 121°48'52.48"W)

September 24, 2020

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1.0 DESCRIPTION OF THE PROJECT

("Applicant") proposed interconnecting 2.8 MW of new generation to PacifiCorp's ("Public Utility") circuit 5L12 out of Westside substation near 42°12'27.58"N, 121°48'52.48"W located in Klamath County, Oregon. The project ("Project") will consist of twenty four (24) Delta M125HV inverters factory limited to approximately 116 kW for a total requested nameplate output of 2.8 MW. The requested commercial operation date is December 31, 2020.

The Public Utility has assigned the Project "OCS025."

2.0 APPROVAL CRITERIA FOR TIER 4 INTERCONNECTION REVIEW

Pursuant to Public Utility Commission of Oregon Order 19-392 approved Community Solar Project procedures, a Public Utility must use the Tier 4 review procedures for an application to interconnect a Community Solar Project that meets the following requirements:

(a) The Community Solar Project does not qualify for or failed to meet Tier 2 interconnection review requirements; and
(b) The Community Solar Project must have a nameplate capacity of three (3) megawatts or less.

3.0 SCOPE OF THE STUDY

Pursuant to Public Utility Commission of Oregon Order 19-392 approved Community Solar Project procedures the Facilities Study Report shall consist of:

(a) A detailed scope identifying the interconnection facilities and system upgrades required to safely interconnect the Community Solar Project including the electrical switching configuration of the equipment, including the transformer, switchgear, meters, and other station equipment as applicable;
(b) A good-faith, non-binding estimate of the costs for the facilities and upgrades, including equipment, engineering, procurement, and construction costs, and;
(c) A detailed estimate of the time required to procure, construct, and install the required interconnection facilities and system upgrades.

4.0 PROPOSED POINT OF INTERCONNECTION

The Applicant's proposed Community Solar Project is to be interconnected to the Public Utility's distribution circuit 5L12 out of Westside substation via a new primary meter. The Point of Interconnection ("POI") will be located near 42°12'27.58"N, 121°48'52.48"W in Klamath County, Oregon. Figures 1 and 2 below are one line diagrams that that illustrate the interconnection of the proposed generating facility to the Public Utility's system.

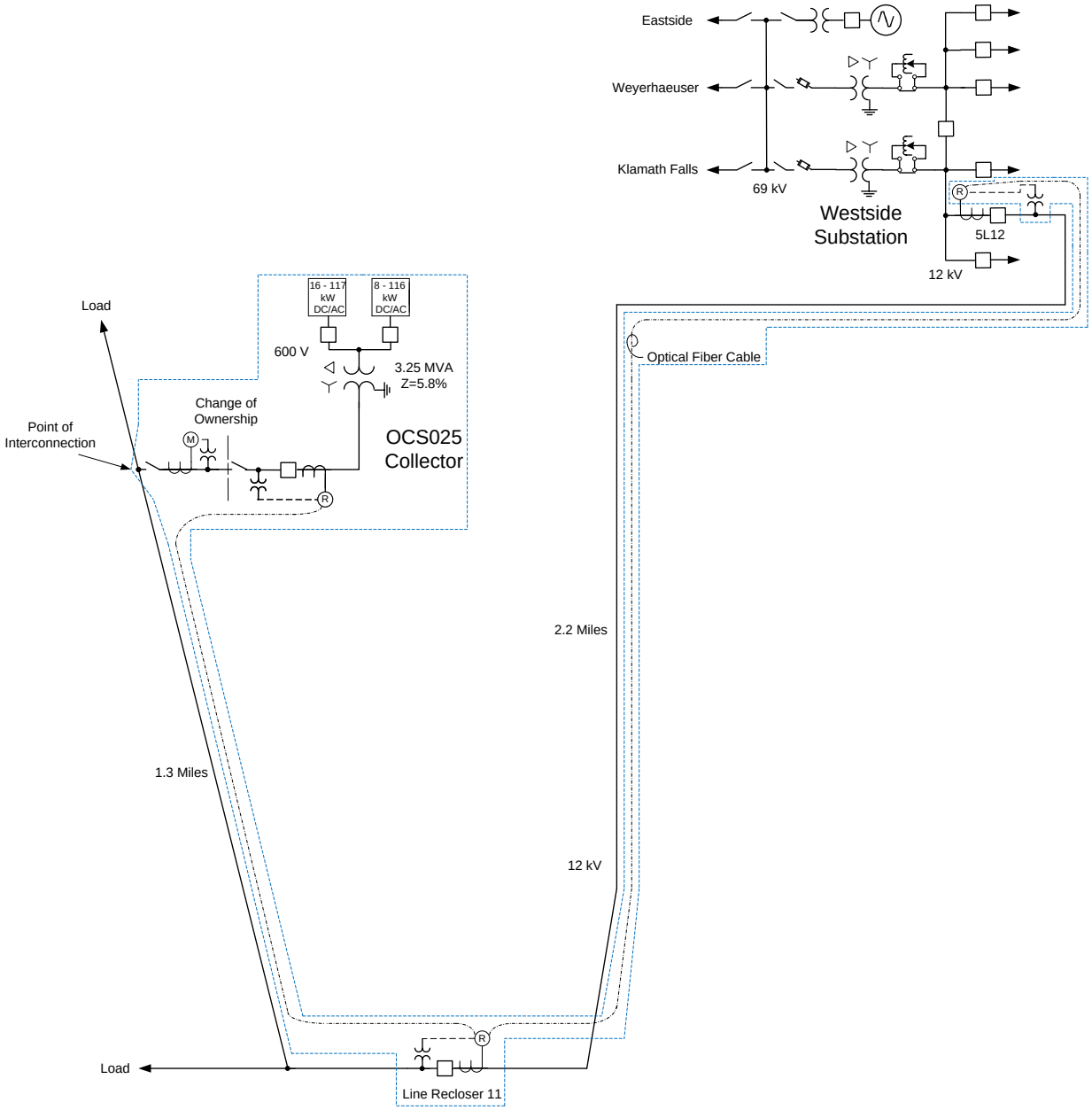

Figure 1: System One Line Diagram

5.0 STUDY ASSUMPTIONS

- All active higher priority transmission service and/or generator interconnection and Community Solar Project requests will be considered in this study and are listed in Appendix 1. If any of these requests are withdrawn, the Public Utility reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.
- For study purposes there are two separate queues:
  - Transmission Service Queue: to the extent practical, all System Upgrades that are required to accommodate active transmission service requests will be modeled in this study.

  - Generation Interconnection Queue and Community Solar Queue: all relevant higher queue interconnection requests will be modeled in this study.
- The Applicant's request for interconnection service in and of itself does not convey any other form or service.
- This study assumes the Project will be integrated into Public Utility's system at the agreed upon and/or proposed POI.
- The Applicant will construct and own the facilities required between the POI and the Project unless specifically identified by the Public Utility.
- Line reconductor or fiber underbuild required on existing poles will be assumed to follow the most direct path on the Public Utility's system. If during detailed design the path must be modified it may result in additional cost and timing delays for the Applicant's Project.
- Generator tripping may be required for certain outages.
- All facilities will meet or exceed the minimum Western Electricity Coordinating Council ("WECC"), North American Electric Reliability Corporation ("NERC"), and Public Utility performance and design standards.
- This report is based on information available at the time of the study. It is the Applicant's responsibility to check the Public Utility's web site regularly for transmission system updates (https://www.oasis.oati.com/ppw)

6.0 REQUIREMENTS

6.1 COMMUNITY SOLAR PROJECT MODIFICATIONS

The following outlines the design, procurement, construction, installation, and ownership of equipment at the Applicant's Community Solar Project.

6.1.1 APPLICANT TO BE RESPONSIBLE FOR

- Design the Community Solar Project with reactive power capabilities necessary to operate within the full power factor range of 0.95 leading to 0.95 lagging as measured at the high side of the Applicant's GSU transformer. This power factor range shall be dynamic and can be met using a combination of the inherent dynamic reactive power capability of the generator or inverter, dynamic reactive power devices and static reactive power devices to make up for losses.
- Design the Community Solar Project such that it can provide positive reactive support (i.e., supply reactive power to the system) immediately following the removal of a fault or other transient low voltage perturbations or install dynamic voltage support equipment. These additional dynamic reactive devices shall have correct protection settings such that the devices will remain on line and active during and immediately following a fault event.
- Equip the Community Solar Project with automatic voltage-control equipment and operate with the voltage regulation control mode enabled unless explicitly authorized to operate another control mode by the Public Utility.
- Operate the Community Solar Project so as to maintain the voltage at the POI, or other designated point as deemed appropriated by Public Utility, at a voltage schedule to be provided by the Public Utility following testing.

- Operate the Community Solar Project with a voltage droop.
- Design, procure, install, and own a Public Utility approved 12.5 kV recloser containing a Schweitzer Engineering Laboratories ("SEL") 651R relay/controller to monitor the voltage and frequency of the Generating Facility, to detect faults and to monitor current flow.
- Procure and install instrument transformers on the Public Utility side of the recloser.
- Input the settings provided by the Public Utility into the recloser relay.
- Provide the Public Utility Level 2 password control of the recloser relay.
- Terminate the fiber provided by the Public Unity in the recloser relay.
- Provide the Public Utility the necessary easement to allow the Public Utility to construct its line extension between its existing facilities and the Point of Change of Ownership.
- Provide Public Utility unfettered and maintained access to its interconnection facilities.
- Construct the Interconnection Customer's last pole and span of conductor tying to the Public Utility's interconnection facilities to the Public Utility's standard and leave sufficient conductor for the Public Utility to terminate it on the first Public Utility structure.
- Arrange for and provide permanent retail service for power that will flow from the Public Utility's system when the Project is not generating. This arrangement must be in place prior to approval for backfeed.
- Provide any construction or backup retail service necessary for the Project.
- Provide the Public Utility a Professional Engineer ("PE") stamped maintenance plan for all Interconnection Customer facilities.

6.1.2 PUBLIC UTILITY TO BE RESPONSIBLE FOR

- Develop and provide the settings for Interconnection Customer's recloser relay.
- Observe and provide acceptance of the relay settings in the Interconnection Customer recloser relay.
- Observe and provide acceptance of the Interconnection Customer's design of the final span of conductor and pole.
- Terminate the Interconnection Customer's final span of conductor onto the Public Utility owned interconnection facilities.
- Provide the Interconnection Customer sufficient fiber optic cable for Interconnection Customer to terminate to its recloser relay. Observe the installation and confirm connectivity and functionality of the transfer trip communications path.
- Install the necessary communications equipment to tie the fiber optic cable to Interconnection Customer's recloser including a patch panel and jumpers.

6.2 POINT OF INTERCONNECTION

The following outlines the design, procurement, construction, installation, and ownership of equipment at the POI.

6.2.1 PUBLIC UTILITY TO BE RESPONSIBLE FOR

- Reconfigure the Public Utility's nearest existing pole to the POI to allow for the necessary line extension and install appropriately sized fuses.
- Design, procure, install, own and maintain at the Interconnection Customer's expense the required extension of the 12 kV facilities from Public Utility's existing facilities to the Point of Change of Ownership including a minimum of two poles, conductor, cutouts, fuses, jumpers and a gang operated switch.
- Terminate the Interconnection Customer's final span of conductor onto the Public Utility owned interconnection facilities.
- Design, procure and install 12 kV pole mounted revenue metering equipment for the Project including a revenue quality meter and instrument transformers.
- Provide and install a cellular connection for retail sales and generation accounting via the MV-90 translation system.

6.3 OTHER

The following outlines the design, procurement, construction, installation, and ownership of equipment past the POI.

6.3.1 PUBLIC UTILITY TO BE RESPONSIBLE FOR

- Distribution Circuit
  - Install approximately 3.5 miles of 48-fiber, single-mode, fiber optic cable along the distribution line between Westside substation, line recloser 11 and the Interconnection Customer's POI recloser.
  - Replace recloser 11 with a recloser capable of handling dead line checking and a transfer trip scheme.
  - Install the necessary communications equipment to tie the new fiber optic cable to line recloser 11 including a patch panel in an enclosure and jumpers.
  - Install a dead line check control circuit at recloser 11.

- Westside Substation
  - Procure and install a set of voltage instrument transformers on the line side of circuit breaker 5L12.
  - Replace the relay for circuit 5L12 with a relay that will prevent tripping for faults on other substation circuits.
  - Develop and implement a transfer trip scheme to trip the Interconnection Customer's generating facility offline for faults on the distribution line past Westside substation and line recloser 11.
  - Install a dead line check control circuit.
  - Terminate the new fiber optic cable into the substation control building.
  - Install the necessary communications equipment to tie in the new fiber optic cable including a patch panel in an enclosure and jumpers.

7.0 COST ESTIMATE

The following estimate represents only scopes of work that will be performed by the Public Utility. Costs for any work being performed by the Applicant are not included.

OCS025 Collector Station *Line extension, relay setting development.*	$157,000
Line Recloser *Replace recloser, install communications.*	$108,000
Communications Fiber *Install ~ 3.5miles of fiber.*	$146,000
Westside Substation *Replace relay, install VT and communication*	$93,000
Total	**$504,000**

*Any distribution line modifications identified in this report will require a field visit analysis in order to obtain a more thorough understanding of the specific requirements. The estimate provided above for this work could change substantially based on the results of this analysis. Until this field analysis is performed the Public Utility must develop the project schedule using conservative assumptions. The Applicant may request that the Public Utility perform this field analysis, at the Applicant's expense, prior to the execution of an Interconnection Agreement in order to obtain more cost and schedule certainty.

Note: Costs for any excavation, duct installation and easements shall be borne by the Applicant and are not included in this estimate. This estimate approximates the costs incurred by the Public Utility to interconnect this Community Solar Project to the Public Utility's electrical distribution or transmission system based upon the level of study completed to-date. The Applicant will be responsible for all actual costs, regardless of the estimated costs communicated to or approved by the Applicant.

8.0 SCHEDULE

Execute Interconnection Agreement	October 15, 2020
Provision of Financial Security	October 15, 2020
*Interconnection Customer Initial Design Package Provided	October 30, 2020
**Transmission Provider Engineering & Procurement Commences	November 30, 2020
Interconnection Customer Property/Permits/ROW Procured	December 18, 2020
*Interconnection Customer Final Design Package Provided	March 26, 2021

Transmission Provider Engineering Design Complete	May 28, 2021
Construction Begins	July 19, 2021
Interconnection Customer Maintenance and Commissioning Plans Provided	July 26, 2021
Interconnection Customer and Transmission Provider Construction Complete	September 3, 2021
Transmission Provider Commissioning Activities Complete	September 24, 2021
Transmission Provider Commissioning Document Review Complete	October 1, 2021
Interconnection Customer's Facilities Receive Backfeed Power	October 4, 2021
Initial Synchronization/Generation Testing	October 6, 2021
Commercial Operation	October 12, 2021

*Interconnection Customer initial design package shall include final generating facility location, inverter/turbine selection, basic protection package, tie line route and collector system locations and data as applicable. Interconnection Customer final design package shall include PE stamped issued for construction ("IFC") drawings for generating facility, collector substation, tie line as well as an updated PSS/e model and updated WECC approved model, electromagnetic transient ("EMT") model and a detailed short circuit model of its generation system using the ASPEN OneLine short circuit simulation program as applicable. The WECC model parameters must be adjusted to reflect the plant's actual anticipated performance. The plant controller must be included in the model. If there is to be coordination between facilities or a master VAR controller, this must be included in the detailed WECC dynamic model, as well as in the PSS/e user-written model.

Please note, the time required to perform the scope of work identified in this report does not support the Applicant's requested commercial operation date of December 31, 2020.

9.0 PARTICIPATION BY AFFECTED SYSTEMS

Public Utility has identified the following Affected Systems: None

Copies of this report will be shared with each Affected System.

10.0 APPENDICES

Appendix 1: Higher Priority Requests
Appendix 2: Property Requirements

10.1 APPENDIX A: HIGHER PRIORITY REQUESTS

All active higher priority transmission service and/or generator interconnection requests will be considered in this study and are identified below. If any of these requests are withdrawn, the Public Utility reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.

Transmission/Generation Interconnection/Community Solar Queue Requests considered:

Queue #	Size (MW)
660	10
721	55
741	40
849	100
905	50
971	2.7
1029	400
1031	80
1032	80
1033	80
1034	60
1055	4.2
1062	240
1087	50
1104	3
1120	3
1126	8
1133	80
1134	120
1135	80
1147	2.999
1158	1.8
1160	70
1192	238.5
OCS003	0.8
OCS004	0.8
OCS019	0.882
OCS020	0.594
OCS023	0.6

10.2 APPENDIX B: PROPERTY REQUIREMENTS

Requirements for rights of way easements
Rights of way easements will be acquired by the Applicant in the Public Utility's name for the construction, reconstruction, operation, maintenance, repair, replacement and removal of Public Utility's Interconnection Facilities that will be owned and operated by PacifiCorp. Applicant will acquire all necessary permits for the project and will obtain rights of way easements for the project on Public Utility's easement form.

Real Property Requirements for Point of Interconnection Substation
Real property for a POI substation will be acquired by an Applicant to accommodate the Applicant's project. The real property must be acceptable to Public Utility. Applicant will acquire fee ownership for interconnection substation unless Public Utility determines that other than fee ownership is acceptable; however, the form and instrument of such rights will be at Public Utility's sole discretion. Any land rights that Applicant is planning to retain as part of a fee property conveyance will be identified in advance to Public Utility and are subject to the Public Utility's approval.

The Applicant must obtain all permits required by all relevant jurisdictions for the planned use including but not limited to conditional use permits, Certificates of Public Convenience and Necessity, California Environmental Quality Act, as well as all construction permits for the project.

Applicant will not be reimbursed through network upgrades for more than the market value of the property.

As a minimum, real property must be environmentally, physically, and operationally acceptable to Public Utility. The real property shall be a permitted or able to be permitted use in all zoning districts. The Applicant shall provide Public Utility with a title report and shall transfer property without any material defects of title or other encumbrances that are not acceptable to Public Utility. Property lines shall be surveyed and show all encumbrances, encroachments, and roads.

Examples of potentially unacceptable environmental, physical, or operational conditions could include but are not limited to:

- Environmental: known contamination of site; evidence of environmental contamination by any dangerous, hazardous or toxic materials as defined by any governmental agency; violation of building, health, safety, environmental, fire, land use, zoning or other such regulation; violation of ordinances or statutes of any governmental entities having jurisdiction over the property; underground or above ground storage tanks in area; known remediation sites on property; ongoing mitigation activities or monitoring activities; asbestos; lead-based paint, etc. A phase I environmental study is required for land being acquired in fee by the Public Utility unless waived by Public Utility.

- Physical: inadequate site drainage; proximity to flood zone; erosion issues; wetland overlays; threatened and endangered species; archeological or culturally sensitive areas; inadequate sub-surface elements, etc. Public Utility may require Applicant to procure various studies and surveys as determined necessary by Public Utility.

- Operational: inadequate access for Public Utility's equipment and vehicles; existing structures on land that require removal prior to building of substation; ongoing maintenance for landscaping or extensive landscape requirements; ongoing homeowner's or other requirements or restrictions (e.g., Covenants, Codes and Restrictions, deed restrictions, etc.) on property which are not acceptable to the Public Utility.