Community Solar Project Interconnection

Tier 2 Community Solar Project Report

Completed for

(“Applicant”)
OCS020

Proposed Interconnection
On PacifiCorp’s Existing
Circuit 5L1 out of Beatty substation near 42°26'26.9"N, 121°16'23.8"W

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PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

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1.0 DESCRIPTION OF THE GENERATING FACILITY

("Applicant") proposed interconnecting 0.594 MW of new generation to PacifiCorp's ("Public Utility") circuit 5L1 out of Beatty substation near 42°26'26.9"N, 121°16'23.8"W located in Klamath County, Oregon. The project ("Project") will consist of four (4) Delta M125HV 119 kw inverters and one (1) Delta M125HV 118 kw inverter for a total requested output of 0.594 MW. The requested commercial operation date is December 31, 2020.

The Public Utility has assigned the Project "OCS020."

2.0 APPROVAL CRITERIA FOR TIER 2 INTERCONNECTION REVIEW

Pursuant to Section H of the Public Utility's CSP Interconnection Procedures, a Public Utility must use the Tier 2 interconnection review procedures for an application to interconnect a small generator facility that meets the following requirements:

(a) The Community Solar Project must have a nameplate capacity of two (2) megawatts or less;
(b) The Community Solar Project must be interconnected to either a radial distribution circuit or a spot network distribution circuit limited to serving one customer;
(c) The Community Solar Project must use interconnection equipment that is either lab-tested equipment or field –tested equipment. For equipment to gain status as field-tested equipment, the applicant must provide all the documentation from the prior Tier 4 study, review, and approval, including any interconnection studies and the certificate of completion.

3.0 PROPOSED POINT OF INTERCONNECTION

The proposed Community Solar Project is to be interconnected to the Public Utility's distribution circuit 5L1 out of Beatty substation via a new 12.5 kV primary meter. The Point of Interconnection is expected to be at mapstring 01436012.0, facility point 159061 near 42°26'26.9"N, 121°16'23.8"W. Figure 1 below is a one-line diagram that illustrates the interconnection of the proposed generating facility to the Public Utility's system.

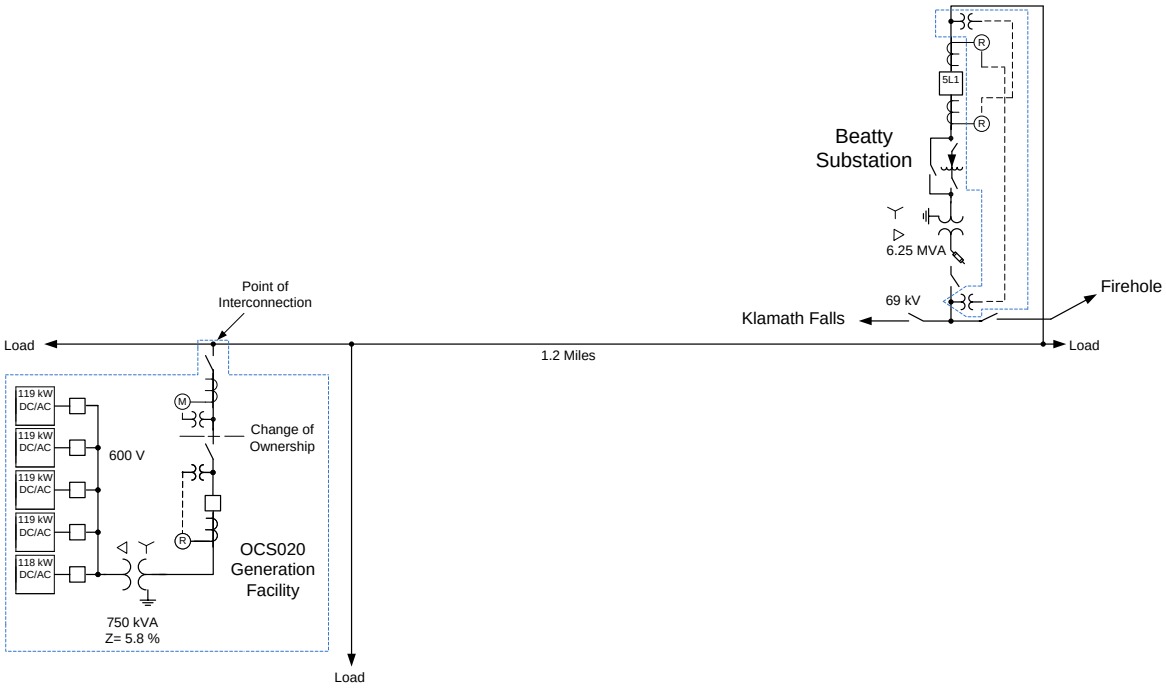

Figure 1: System One Line Diagram

3.1 Study Assumptions

- All active higher-priority requests for transmission service and/or generator interconnection service (including requests in the traditional interconnection queue and other requests in the Community Solar queue) in the local area of the requested POI 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.
- The Applicant's request for interconnection service in and of itself does not convey transmission service.
- This study assumes the Project will be integrated into Public Utility's system at the agreed upon and/or proposed Point of Interconnection.
- The Applicant will construct and own any facilities required between the point of interconnection and the Project.
- Generator tripping may be required for certain outages.
- All facilities will meet or exceed the minimum WECC, NERC, and Public Utility performance and design standards.
- The generator is expected to operate during daylight hours. The primary meter (point of interconnection) power factor range studied was .95 leading/lagging prior to the proposed generation facility being installed.
- The studied distribution point of interconnection is facility point 01436012.0-159061.

- 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)

4.0 TIER 2 COMMUNITY SOLAR PROJECT RESULTS

4.1 Screen 1

For interconnection of a Community Solar Project to a radial distribution circuit, the aggregated nameplate capacity on the circuit must not exceed 15 percent of the line section annual peak load as most recently measured at the substation or calculated for the line section.

Result: Fail
The aggregated nameplate generation capacity on Beatty 5L1 including OCS020 of 633 kW is 25% of the 5L1 2541 kW peak load.

4.2 Screen 2

For interconnection of a Community Solar Project to the load side of spot network protectors, the aggregated nameplate capacity on the load side of the spot network protectors must not exceed the lesser of five percent of a spot network's maximum load or 50 kilowatts.

Result: Pass N/A

4.3 Screen 3

The aggregated nameplate capacity must not contribute more than 10 percent to the distribution circuit's maximum fault current at the point on the primary voltage distribution line nearest the point of interconnection.

Result: Fail
For a single line to ground fault at the point of interconnection on the 12 kV circuit the generation facility will contribute 36 % of the fault current.

4.4 Screen 4

The aggregated nameplate capacity on the distribution circuit must not cause any distribution protective devices and equipment (including substation breakers, fuse cutouts, and line reclosers) or other public utility equipment on the transmission or distribution system to be exposed to fault currents exceeding 90 percent of the short circuit interrupting capability. The Community Solar Project's Point of Interconnection must not be located on a circuit that already exceeds 90 percent of the short circuit interrupting capability.

Result: Pass
The minimum short circuit interrupting capability of Pacific Power legacy equipment is 8 kA. With the aggregate generation the maximum short circuit current will be 22 % of the short circuit interrupting capability of existing equipment.

4.5 Screen 5

The aggregated nameplate capacity on the distribution side of a substation transformer feeding the circuit where the small generator facility proposes to interconnect must not exceed 10 megawatts in an area where there are known or posted transient stability limitations to generating units located in the general electrical vicinity (for example, three or four distribution busses from the point of interconnection).

Result: Pass

4.6 Screen 6

If the Community Solar Project interconnection is to a primary line on the distribution system, then the interconnection must meet the following criteria:

(A) If the Community Solar Project is three-phase or single-phase and will be connected to a three-phase, three-wire primary line, then the Community Solar Project must be connected phase-to-phase.

(B) If the Community Solar Project is three-phase or single-phase and will be connected to a three-phase, four-wire primary line, then the Community Solar Project must be connected line-to-neutral and effectively grounded.

Result: Pass

The 12 kV circuit that OCS020 will be interconnected to is a four wire circuit. The grounded wye – delta step up transformer planned to be installed by the Community Solar project will provide a ground reference to the 12 kV circuit.

4.7 Screen 7

For interconnection of a Community Solar Project to a single-phase shared service line on the distribution system, the aggregated nameplate capacity on the shared secondary line must not exceed 20 kilowatts.

Result: NA

4.8 Screen 8

For interconnection of a single-phase Community Solar Project to the center tap neutral of a 240-volt service line, the addition of the Community Solar Project must not create a current imbalance between the two sides of the 240-volt service line of more than 20 percent of the nameplate rating of the service transformer.

Result: N/A

4.9 Screen 9

Except as provided in Screen 12, the interconnection of the Community Solar Project must not require system upgrades or interconnection facilities different from or in addition to the applicant's proposed interconnection equipment.

Result: Fail

The area around Beatty is agricultural and the load has two main seasons, irrigation (summer) and non-irrigation (winter). The Beatty 5L1 estimated minimum daytime loads are 774 kW during irrigation season and 261 kW during non-irrigation season. Full generation is anticipated on or before the spring equinox and irrigation season typically starts after the spring equinox. A 332 kW reverse power flow is modeled at Beatty breaker 5L1 during full generation and non-irrigation season minimum daytime load. The reverse power flow condition requires transfer trip between the POI and Beatty substation

4.10 Screen 10

The aggregated nameplate capacity, in combination with exiting transmission loads, must not cause the transmission system circuit directly connected to the distribution circuit where the Community Solar Project interconnection is proposed to exceed its design capacity.

Result: Pass
Beatty substation transformer capacity and transmission supply capacity are adequate.

4.11 Screen 11

If the public utility's distribution circuit uses high speed reclosing with less than two seconds of interruption, then the Community Solar Project must not be a synchronous machine. If the small generator facility is a synchronous machine, then the applicant must submit a Tier 4 application.

Result: N/A

4.12 Screen 12

If the Community Solar Project fails to meet one or more of the criteria in Screens 1 - 11, but the Public Utility determines that the Community Solar Project could be interconnected safely if minor modifications to the transmission or distribution system were made (for example, changing meters, fuses, or relay settings), then the Public Utility must offer the applicant a good-faith, non-binding estimate of the costs of such proposed minor modifications. Modifications are not considered minor under this subsection if the total cost of the modifications exceeds $10,000. If the Applicant authorizes the Public Utility to proceed with the minor modifications and agrees to pay the entire cost of the modifications, then the Public Utility must approve the application under Tier 2.

Result: Fail
The estimated costs for the required system upgrades and interconnection facilities will exceed $10,000.

5.0 TIER 2 – NEXT STEPS

Because the Applicant's interconnection request has failed Screens 1, 3, 9 and 12 and the Public Utility has determined that the Applicant's interconnection request cannot be safely interconnected without additional study and facilities construction. Applicant will be required to submit a new application under the Tier 4 Community Solar Procedures.

6.0 PARTICIPATION BY AFFECTED SYSTEMS

No Affected Systems were identified in relation to this Interconnection Request.

7.0 APPENDICES

Appendix 1: Higher Priority Requests
Appendix 2: Informational Network Resource Interconnection Service Assessment

APPENDIX 1:
HIGHER PRIORITY REQUESTS

All active higher priority transmission service and/or generator interconnection and Community Solar Project 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
OCS015	1.98
OCS017	1.287

OCS019	0.882

APPENDIX 2:
INFORMATIONAL NETWORK RESOURCE INTERCONNECTION SERVICE ASSESSMENT

The study results described above reflect an energy resource interconnection service ("ERIS") evaluation, modified in the CSP program rules to examine only generation and load conditions local to the requested CSP project's interconnection point (sometimes referred to as the "zoomed in view"). The "zoomed in view" functions to: (1) study the project's proposed interconnection without considering certain existing or higher-queued requests outside of the local area; and (2) to inform whether the CSP facility must cap its project to mitigate, although not eliminate, the risk of potential deliverability-related network upgrades to accommodate the proposed CSP generator.

By contrast, the following informational section provides a network resource interconnection service ("NRIS") evaluation performed with traditional assumptions, i.e., not modified to examine only local generation and load conditions, but rather one that assumes that all existing interconnections, higher-queued requests for interconnection service (in both the traditional and CSP queue), and generators with executed contracts beyond the local area are in-service. Depending on the severity of the conditions created when absorbing additional generation (capped or not capped) in that broader, "zoomed out" area, the local area-focused generator size cap developed in the "zoomed in" examination may not be sufficient to mitigate the need for deliverability-related network upgrades. Regardless of this report's informational NRIS results, the deliverability-related network upgrades ultimately necessary to accommodate the proposed CSP generator will depend on conditions present when the future transmission service study is performed, as well as whether network upgrade alternatives are available at that time.

There are currently a significant number of higher-queued requests seeking interconnection in the southern Oregon area where the CSP generator proposes to interconnect. These interconnection studies must be completed before the transmission provider can determine what upgrades and associated cost estimates may be required for the aggregate of generation in the local area to be delivered to the aggregate of load on the transmission provider's transmission system (the NRIS study scope).