

Community Solar Project Interconnection
Community Solar Project Tier 2 Review

Completed for

(“Applicant”)
OCS017

Proposed Interconnection
On PacifiCorp’s Existing
Circuit 5R227 out of Campbell substation

May 19, 2020

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1.0 DESCRIPTION OF THE GENERATING FACILITY

(“Applicant”) proposed interconnecting 1.287 MW of new generation to PacifiCorp’s (“Public Utility”) circuit 5R227 out of Campbell substation located in Jackson County, Oregon. The project (“Project”) will consist of eleven (11) Delta M125HV inverters at 117 kW for a total requested output of 1.287 MW. The requested commercial operation date is December 31, 2020.

The Public Utility has assigned the Project “OCS017.”

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 Applicant’s proposed Community Solar Project will be interconnected to the Public Utility’s distribution circuit 5R227 out of Campbell substation. The Point of Interconnection will be located near existing pole map string 01337001.01, facility point 354041 at coordinates 42°18'4"N, 122°47'6.6"W in Jackson County, Oregon. Figure 1 below is a one-line diagram that illustrates the interconnection of the proposed generating facility to the Public Utility’s system.

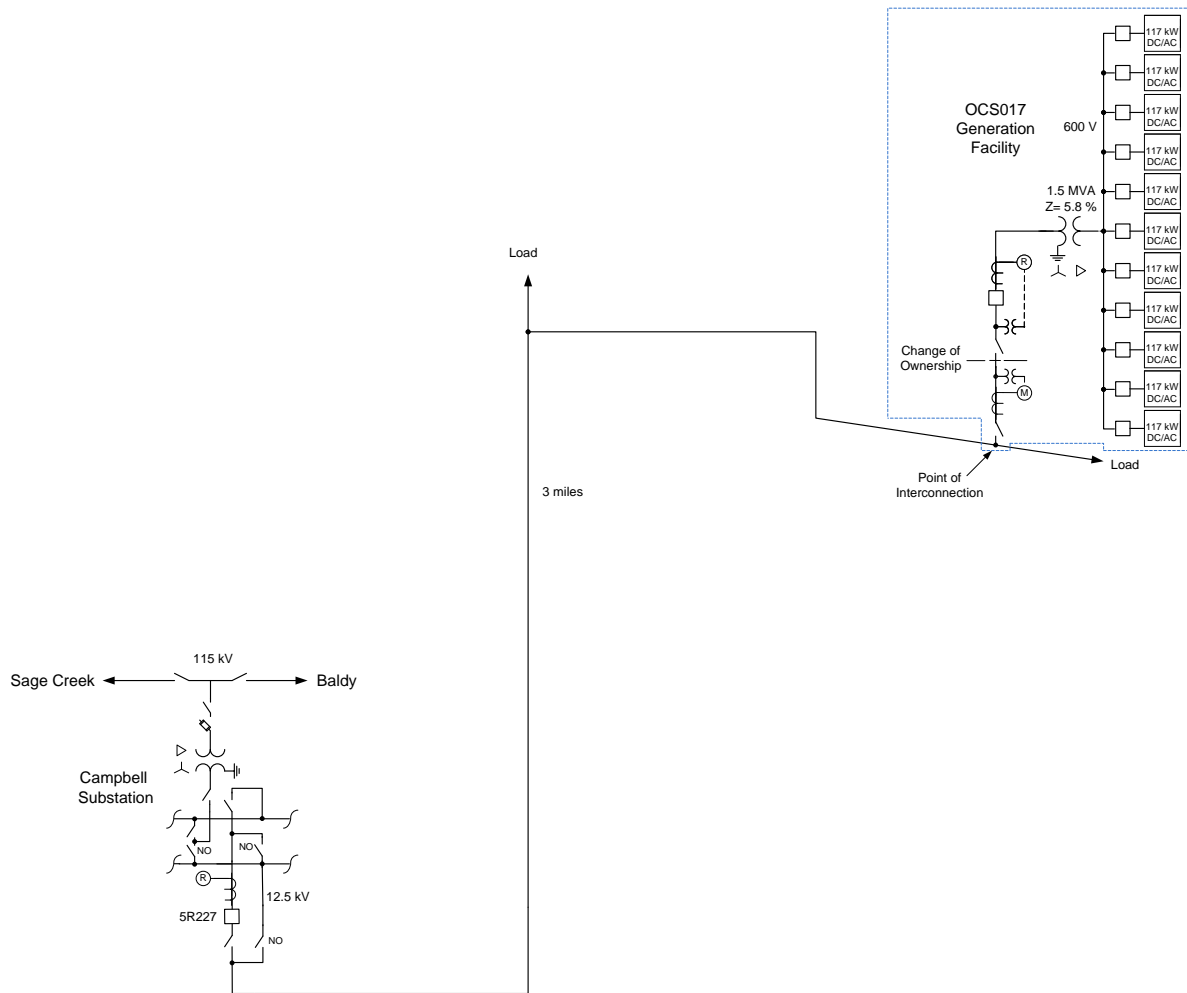


Figure 1: System One Line Diagram

3.1 Review 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 review 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 unity (100%). This review assumes that the customer will provide constant power factor control at unity power factor.
- The existing PacifiCorp pole at map string 01337001.01, facility point 354041 is assumed to be the starting location for the Public Utility's line extension to the point of change of ownership.
- This review is based on information available at the time of the review. 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 5R227 peak load was measured at 6.108 MW on August 5, 2019. The existing customers on this circuit have a generation capacity of 0.218 MW. The aggregate nameplate capacity of the existing customer's and this Applicant's generation is 1.505 MW. Thus, the aggregated nameplate capacity on the circuit is 1.505 MW generation divided by 6.108 MW peak load, which equals 24.6%.

Additionally, the line section near the Applicant's Point of Interconnection, there is a fraction of the annual peak load at the 5R227 circuit breaker. Reverse flow is expected at that location during daytime hours.

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: N/A

There is no indication that the Applicant will interconnect on the load side of spot network protectors.

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 on the 12.5 kV line at the Point of Interconnection the generating facility will contribute 65% 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

90% of the short circuit interrupting capabilities of distribution protective devices is not expected.

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

Circuits 5R218 and 5R227 are normally served by Campbell substation transformer T-3402. The aggregated nameplate capacity of the existing customer and this Applicant is 1.589 MW. This value is under 10 MW.

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

A grounded-wye – delta connection is specified on the winding of the Applicant's transformer.

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: N/A

The applicant has requested a three-phase interconnection.

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

The applicant has requested a three-phase interconnection.

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

System upgrades may be necessary to accommodate operating the system at a reduced voltage level. The distribution circuit to the Point of Interconnection contains over 1.6 line miles of #4 ACSR conductor, which is high impedance conductor that is expected to produce a significant voltage rise when reverse fed. To accommodate the voltage rise associated with the reverse flow of this Applicant's interconnection, the substation bus voltage will require a permanent decrease from traditional operating levels, which could negatively impact existing customers and require system upgrades to mitigate.

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

The Campbell substation transformer capacity and the capacity of the transmission system supplying Campbell are adequate to serve OCS017.

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: Pass

The applicant does not have a synchronous machine.

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 Public Utility anticipates system upgrades and interconnection facilities that 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 review 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 review 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

**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).

