TRANSMISSION PLANNING

GENERATION INTERCONNECTION REPORT

2025 TRANSITION CLUSTER STUDY (TCS)

CLUSTER AREA: TRICITIES/UMATILLA #2, PHASE 1 Rev.0

(25TCS CA-TU2 P1-0)

G0745

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1 Executive Summary

In 2025, Bonneville Power Administration (BPA) initiated the Transition Cluster Study (TCS) under the new Large Generator Interconnection Transition Process, Attachment R of BPA's Open Access Transmission Tariff (OATT).[1] BPA received 167 Transition Requests that were eligible to participate in the Transition Cluster Study with a total requested Interconnection Service level of approximately 61,100 MW.

This TCS Phase One Cluster Study (TCS PH1) report examines the feasibility and impact of interconnecting the proposed generation projects to BPA's transmission system. Requests in the Cluster Area were studied at the Points of Interconnection (POIs) according to table below. The generation type, requested MW of Interconnection Service level, project location, and requested Commercial Operation Date are also shown.

Cluster Area Tri-Cities/Umatilla2 (TU2) is comprised of Interconnection Request (IR) G0745 in Adams County, WA. The G0745 request is for a combined solar and battery project seeking a 100 MW total Interconnection Service and 0 MW of grid charging capability. The requested Point of Interconnection (POI) is the BPA Hatton tap to Connell tap to Benton-Scooteney No 1 115 kV transmission line. The requested Commercial Operation Date (COD) is December 31, 2026.

Requirements for interconnection include:
1. Develop a 115 kV, 7 breaker ring bus substation at the POI. Includes expansion of the Scooteney Substation, 7 power circuit breakers, 14 disconnect switches and associated control, relaying, and communications equipment.
2. Tap the Hatton tap to Connell tap to Benton-Scooteney No 1 115 kV transmission line. Includes 2 disconnect switches.
3. BPA-required C&C equipment at customer's Collector site (RAS, Meters, relays, Control House space)
4. BES C&C additions at BPA Scooteney Substation.

All IRs will be required to have the necessary communications and controls equipment installed to be available for generator tripping to maintain flexibility and effectiveness of BPA's Main Grid Remedial Action Schemes (RAS).

The total estimated cost for interconnection of G0745 is $107M including 40% contingency and overhead rates.

BPA's construction of equipment and facilities required to interconnect a generator typically takes between 3 and 10 years to complete depending on the scope and scale of the plan of service. The estimated time to construct a plan of service is refined through the subsequent stages of the interconnection process.
projects.

[1] Capitalized terms that are not defined in the text of this report refer to defined terms in BPA's OATT.

2 Purpose

The Bonneville Power Administration (BPA) processes requests to interconnect Large Generating Facilities to the BPA Transmission System under the Large Generator Interconnection Transition Process, Attachment R of BPA's OATT, and the Standard Large Generator Interconnection Procedures (LGIP), Attachment L of BPA's OATT. BPA conducted the TCS PH1 to evaluate the impacts of all eligible Transition Requests in the Transition Cluster on the reliability of BPA's Transmission System. The TCS PH1 evaluates equipment and facilities required to reliably interconnect requests at the requested MW of Interconnection Service. The TCS PH1 consists of short circuit analysis and power flow analysis. The TCS PH1 report preliminarily identifies: (1) equipment where short circuit capability limits or thermal or voltage ratings have been exceeded, and (2) Interconnection Facilities and Network Upgrades expected to be required to address those issues.

BPA performed the TCS PH1 by segmenting and studying the Interconnection Requests according to geographically and electrically relevant areas on BPA's Transmission System; those segments are identified as Cluster Areas. BPA identified plans of service for a subset of Interconnection Requests within a Cluster Area in some instances, identified as Scalable Plan Blocks. Cost and timeframe estimates for plans of service identified in this report are non-binding good faith estimates. Costs are allocated amongst Interconnection Requests as outlined in Section 4.2.3 of the LGIP.

3 Disclaimers

This document contains the technical study results of an evaluation of the impact of all proposed Interconnection Requests in the Cluster Area on the reliability of BPA's Transmission System. The TCS PH1 evaluates providing Interconnection Service, meaning the service provided by BPA to interconnect a Large Generating Facility to BPA's Transmission System to enable BPA's Transmission System to receive energy and capacity from the Large Generation Facility at the Point of Interconnection. The study results reflect evaluation of providing Energy Resource Interconnection Service to all Interconnection Requests, allowing each Large Generating Facility to connect and be eligible to deliver output on an "as available" basis up to the requested MWs of Interconnection Service. The interconnection process for Large Generating Facilities does not evaluate the requirements or potential impediments to providing transmission of the electrical output of a Large Generating Facility beyond the Point of Interconnection. A customer that wishes to obtain the right to deliver or inject energy from a Large Generating Facility beyond the Point of Interconnection must take a separate action to obtain transmission delivery service under BPA's OATT. The provision of Point-to-Point Transmission Service or Network Integration Transmission Service may require the construction of additional transmission equipment and facilities.

In addition, the technical studies results do not address generator balancing services that may be required to interconnect a Large Generating Facility to BPA's Transmission System.

These studies were conducted using the best available information at the time of the study. Findings and recommendations are based on information and assumptions that could

change. BPA reserves the right to add, delete, or modify any content in this report if new information is provided.

Additional Disclaimers

1) A customer's inclusion of an optional requested POI on a Transition Request does not guarantee that the customer's request was studied for interconnection at that POI. BPA, in its sole discretion, determined the POI for each Large Generating Facility to improve the reliability benefits, cost and/or benefits of the interconnection for the Cluster Area.
2) Energy storage grid charging is defined for this study as importing energy from beyond the POI to the IR storage device. This study evaluates grid charging where elected by each IR, but does not assess all resultant Transmission System requirements beyond the POI. This study presumes that energy storage grid charging connected to BPA's Transmission System will be treated as a generator (not a load) in context of expected transmission curtailments, expected transmission operating limits, or generation tripping RAS.
3) The TCS PH1 does not include the following analyses, which will be provided in the Transition Cluster Study Phase Two Cluster Study or Interconnection Facilities Study:
    a) Provision of Network Resource Interconnection Service (NRIS);
    b) Voltage & Transient Stability studies;
    c) Electromagnetic Transient (EMT) studies; and
    d) Fault Duty studies for detailed equipment sizing.
4) In electing to participate in the TCS, all customers attested that the Generating Facility proposed in a Transition Request would be designed to meet the BPA Transmission Standard *"Technical Requirements for Interconnection to the BPA Transmission Grid"* (STD-N-000001) posted to the BPA Interconnection webpage.
5) Any plan of service identified in this study report that would require access and usage of property associated with the Northwest AC Intertie (NWACI) to construct may require the consent of all owners of NWACI facilities to proceed and be beyond BPA's ability to grant. BPA will continue to study this plan of service but cannot guarantee that the Large Generating Facility may be interconnected under that plan of service.
    i) As noted above, the TCS PH1 does not evaluate requirements or potential impediments to providing transmission delivery service. Any plan of service identified in this study report that would provide electrical connectivity between a Large Generating Facility and a NWACI facility does not provide the customer any right or ability to obtain transmission delivery service on a NWACI facility.

4 Study Assumptions

4.1 General Assumptions

BPA Transmission uses PowerWorld for positive sequence analysis (CTG Tool add-on, ATC Tool add-on, PV/QV Tool add-on, Transient Stability Tool add-on).

For the TCS PH1, "MW injection limit" tests are applied at each POI, to determine IR's MW thresholds at which a steady state system limiter occurs and requires mitigation. Injection limits are also applied in the reverse direction, at POIs that have requested Battery Energy Storage

System (BESS) grid charging. PowerWorld's ATC Tool is used to conduct these injection limit tests.

All analysis presumes Energy Resource Interconnection Service (ERIS) only. BPA Planning presumes IRs are not all dispatched simultaneously. Generally, BPA Planning only presumes IRs are dispatched simultaneously when at most one to two Bulk Electric System (BES) nodes away from the POI under study.

The TCS PH1 assumes all Generating Facilities studied are designed to the standards in STD-N-000001 at the time of publication of this report. Adherence to BPA STD-N-000001 includes many detailed requirements covering but not limited to: minimum BPA communications network transport; BPA control system hardware; participation in BPA RAS; protective relaying; disturbance monitoring; scheduling and metering; voltage control; frequency response; reactive power quality; and more.

4.2 Communications & Control Capability (C&C)

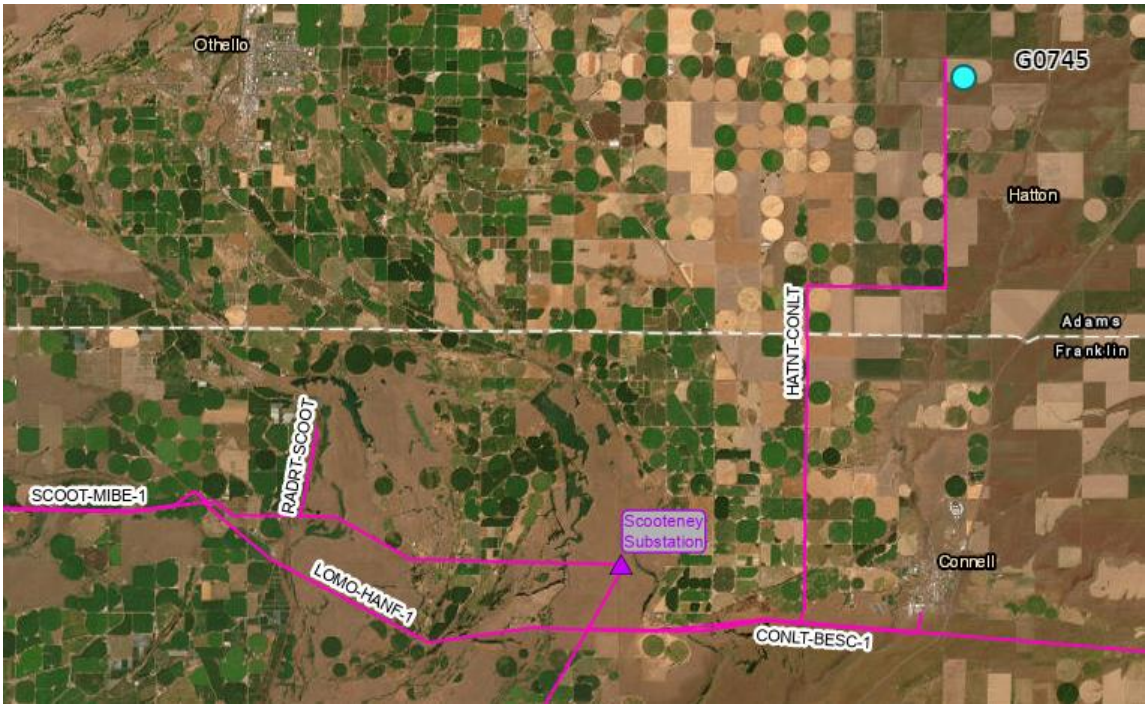
The TCS PH1 assumed:

1. All POI stations are capable of BPA Main Grid Remedial Action Scheme (RAS) participation. There is WECC-Class 1 communications (fully redundant, alternately routed) to each generation facility where the Main Grid RAS Generation Dropping (GD) will occur.
2. All POI stations have:
    a. BPA SCADA Control & Indication
    b. Transfer Trip or Current Differential protective relaying on all gen-ties from BPA station to customer station
    c. Control Phasor Measurement Units (CPMUs)
    d. Revenue Metering and telemetry for each I

5 Study Methodology

5.1 Cluster Area Definition

The following map illustrates the geographic coordinates for the IRs assessed in Cluster Area TU2.



5.2 Studied POI

G0745 was modeled as a 100 MW solar and battery resource with no grid charging capability at approximately the #16/1 tower of the Hatton tap to Connell tap to Benton-Scooteney No 1 115 kV line.

5.3 Starting Base Cases

2030HS and 2026LSP WECC Cases were used for CA-TU2. Planned Projects were modeled as senior to the TCS and impactful to the POI performance. Impactful topology additions for CA TU1 include:

- Longhorn to Hemingway 500 kV Transmission Line - B2H (IPC/PAC)
- Webber Canyon Substation (BPA)
- Richland – Stevens Drive Reinforcement (BPA)
- Sacajawea to Ice Harbor – Franklin #1 Transmission Line (BPA)

5.3.1 Load and Resource Scenario Descriptions

Seasonally light load levels in the local area were modeled to simulate high levels of export from the project to the greater Tri-Cities area.

5.4 Phase 1 POI Injection Tests

Steady state contingency analysis was conducted at the POI injecting total generating or grid-charging amounts. Output at the POI was sunk to the following power flow buses, split equally among each bus:

Bus Number	Bus Name
41007	SNO_KING
40693	MAPLE_VA
40869	RAVER
40821	PAUL
40827	PEARL
40809	OSTRANDER
40687	MALIN
40045	ALLSTON
40601	KEELER

5.5 Phase 1 POI Short Circuit Ratio Strength Tests

Per BPA STD-N-000001, all POIs shall have Short Circuit Ratio (SCR) of 3 or greater for all critical NERC TPL-001 P1 conditions.

The evaluated POI passed BPA's SCR strength test with the prescribed plans of service. This means that no Plan of Service elements are driven solely by the SCR test.

6 Technical Analysis & Study Results

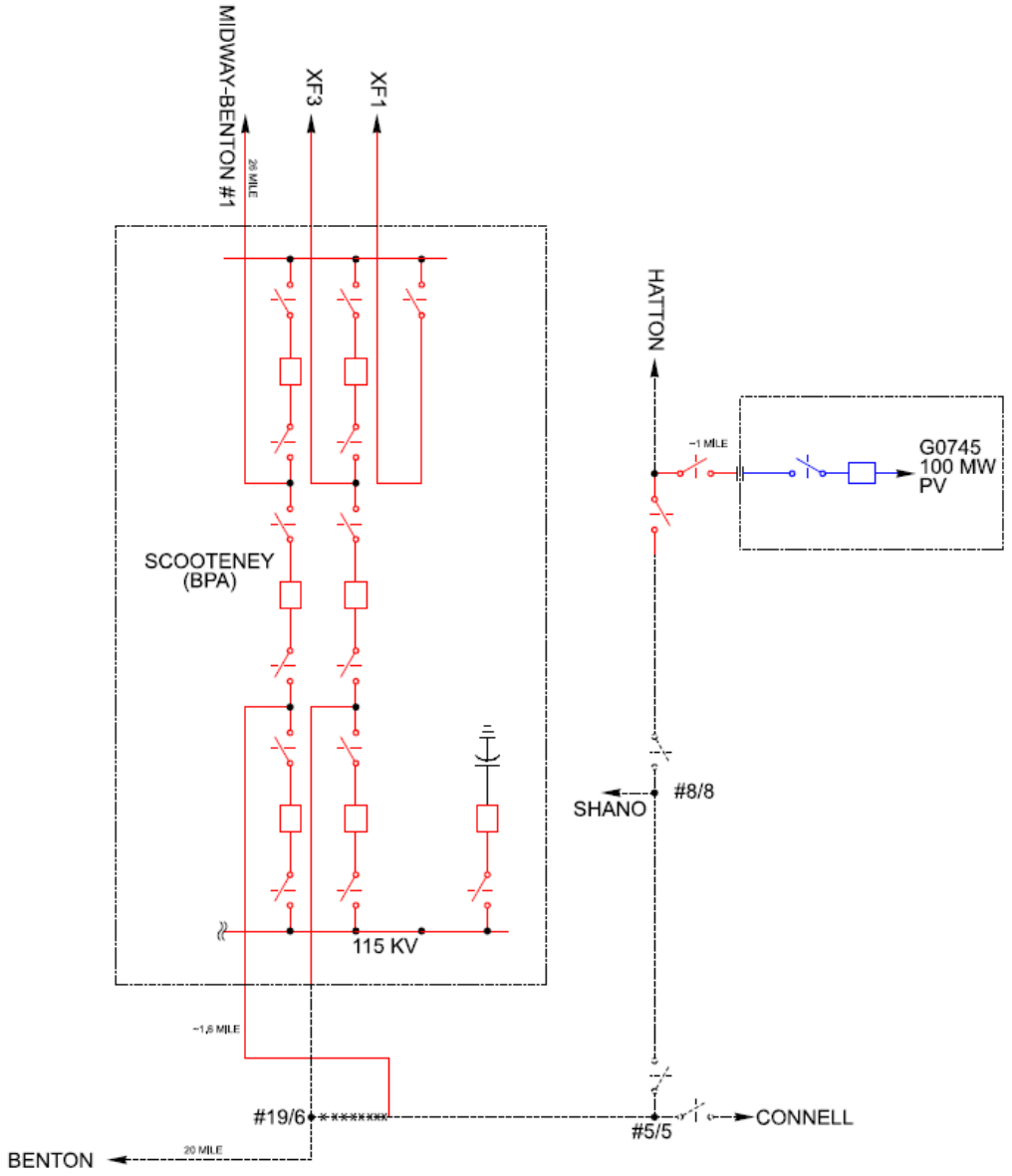
The Hatton tap to Connell tap to Benton-Scooteney No 1 transmission line is served by a relatively long line with several taps, complicating line protection and operational flexibility. To reliably interconnect a large new resource to this line, an expansion of Scooteney substation with dedicated breakers is required.

7 Interconnection Facility Requirements

1. Develop Scooteney 115 kV Substation into a 115 kV, 7-breaker BAAH substation at the POI. Includes 7 power circuit breakers, 14 disconnect switches and associated control and relaying equipment.
2. Tap the Hatton tap to Connell tap to Benton-Scooteney No 1 115 kV transmission line. Includes 2 disconnect switches.
3. Installation of BPA-required C&C equipment at each customer's Collector site (RAS, Meters, relays, Control House space)
4. Significant development of C&C hardware at BPA's POI substation.
5. Participation in BPA RAS algorithms for Tri-Cities and Mid-Columbia area.

The customer will construct a 115 kV line from the BPA POI to their generation facility. The customer will then construct a 115/34.5 kV substation directly adjacent to the POI line to support their 34.5 kV feeders at their collector site.

8 Project One-Line Drawing



9 Costs and Schedules

9.1 Estimated Schedule

The schedule is dependent on,

1) The acquisition of long lead time equipment,
2) BPA's ability to fit the project into its construction work plan, and
3) The customer's ability to obtain any necessary permits for the project and progress through the interconnection process in a timely manner.

A non-binding good faith estimated time to construct is 3-5 years for substation equipment and 7-10 years for transmission line upgrades after design activities begin. The estimated time to construct a plan of service is refined through the subsequent stages of the interconnection process.

BPA will not begin construction of a plan of service required for interconnection until the Interconnection customer has executed a Standard Large Generator Interconnection Agreement (LGIA). BPA's decision to offer an LGIA is dependent on the completion of an environmental compliance decision under the National Environmental Policy Act (NEPA). BPA's environmental compliance decision under NEPA requires the Interconnection customer to have obtained required permitting, certification, and environmental approvals for any facilities that BPA will not own.

9.2 Cost Estimates and Cost Allocations

The following are non-binding good faith estimates of cost based on previous estimates for similar projects. They represent only scopes of work that will be performed by BPA. Costs for any work being performed by the customer are not included. These costs include overhead rates for BPA labor & materials, and for contract labor & materials. The costs also include a 40% contingency. Not included in these estimates are costs for land acquisition, permitting and environmental mitigations. More accurate estimates based on scoping for the project will be available at the completion of the Interconnection Facilities Study.

Detailed Communications and Control (C&C) equipment required for each generation facility and interconnection into the BPA transmission system at the BPA-TS POI substation will be determined in an Interconnection Facilities Study. The TCS PH1 estimates C&C equipment scope and costs based on whether required upgrades fall into the following categories:

1) Collector Station ($5M): for BPA-required C&C equipment at customer's Collector site (RAS, Meters, relays, Control House space)
2) BPA POI Station ($15M): significant BES creation of BPA substation very remote from any existing C&C infrastructure.

Table 9.1: POI 1: Scooteney 115 kV Station Cost Estimate

Estimate Summary			*Scooteney 115 kV*					
Estimate #	Description	Quantity	Contract		BPA		Misc.	Total
			Labor	Material	Labor	Material		
	LOCATION #1	-	-	-	-	-	-	-
ST-070-28-13	115kV New POI: 3x PCB, 3pos Ring	1	$16,460,000	$9,152,000	$3,354,000	$0	$96,000	$29,062,000
ST-070-19-11-2	115kV Add: 1x PCB, 1pos MainAux	4	$8,720,000	$5,608,000	$2,088,000	$0	$48,000	$16,464,000
Collector C&C	Collector Station C&C	1	$0	$0	$0	$0	$5,000,000	$5,000,000
POI C&C L	BPA POI Station C&C	1	$0	$0	$0	$0	$15,000,000	$15,000,000
Contingency %	40%	Subtotal:	$25,180,000	$14,760,000	$5,442,000	$0	$20,144,000	$65,526,000
Overhead %	Labor / Materials & Turnkey	Contingency:	$10,072,000	$5,904,000	$2,176,800	$0	$8,057,600	$26,210,400
	26% / 9%	Overhead:	$9,165,520	$1,859,760	$1,980,888	$0	$2,538,144	$15,544,312
Grand Total:	*(rounded to two significant figures)*		**$44,000,000**	**$23,000,000**	**$9,600,000**	**$0**	**$31,000,000**	**$107,000,000**

Table 9.2: POI 1: Scooteney 115 kV Cost Allocation

Queue #	Requested MW	Station Equipment	Station Equipment Allocation (Per Capita)	Station Equipment Cost	Non-Station Equipment	Non-Station Equipment Allocation (Per MW)	Non-Station Equipment Cost	Non-Network Direct Assigned	Direct Assigned Cost	Cost Assignment
G0745	100	Scooteney 115kV Expansion, and Tap Switches w/ Comm Expansion	100%	$98M	N/A	N/A	N/A	Collector Station C&C and RAS	$9M	$107M