

2016 Transmission Service Request Study and Expansion Process (TSEP)

Cluster Study Results Customer Briefing

June 14, 2017



Topics for Discussion

- Cluster Study TSR Overview/Pattern
- Cluster Study Areas
- Assumptions and Methodology
- Cluster Study Areas – Final Plans of Service
- Next Steps

Reminder – Process Overview

- TSR Study and Expansion Process (TSEP)
 - BPA's process for conducting required studies (system impact and facilities) for incremental requests for service
 - Follows sections 19 and 32 of BPA's tariff
 - Accomplishes BPA's obligation to study, identify and ultimately complete transmission plans of service if customers elect to proceed

Elements of TSEP

Phase 1: Pre-Study

Pre-study:

- Customer TSR submittal and ATC assessment;
- Period between close of last TSR deadline and next TSR deadline for Cluster Study participation (typically June-May)
- \$ - TSR deposit and processing fee

Phase 2: Cluster Study

Cluster Study:

- BPA tenders Study Agreements following TSR deadline;
- BPA commences and completes study (120-day study period);
- Results: preliminary plan of service scope, cost, and schedule;
- \$ - Customer's pro rata share of costs by MW

Phase 3: Preliminary Engineering

Plan of Service Validation and Preliminary Engineering:

- Refinement of cost and scope of Cluster Study results;
- Estimation of Environmental Review scope and costs;
- \$ - Customer's pro rata share of costs by MW

Phase 4: Environmental Review

Environmental Review:

- Required NEPA review of environmental impacts based on identified plan of service
- Includes Record of Decision on preferred route, and whether to build the project;
- \$ - Customer's pro rata share of costs by MW

Phase 5: Project Construction

Project Construction:

- Construction and Energization of identified transmission project;
- \$ - Customer secures its pro rata MW share of construction costs (letter of credit, etc.)

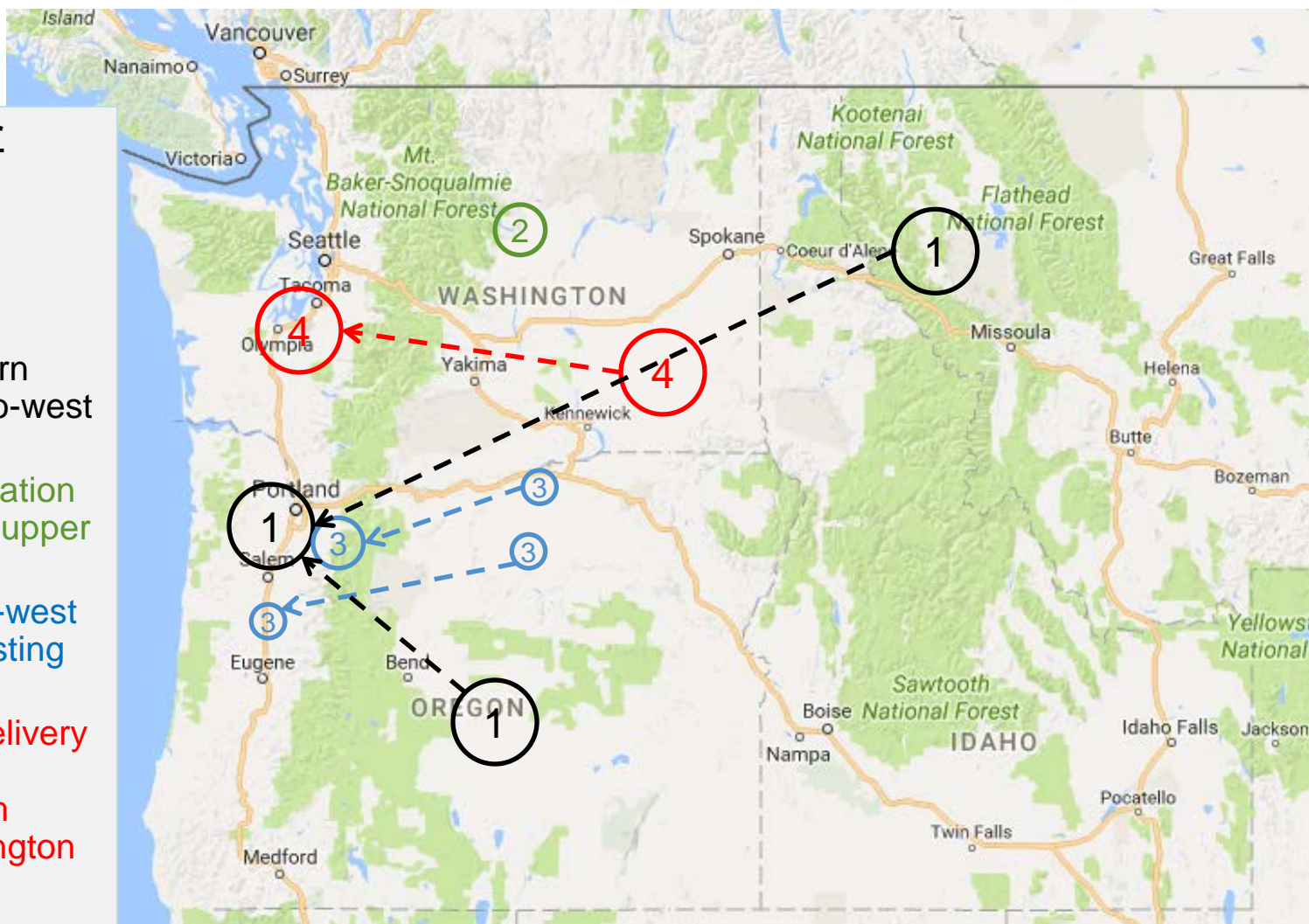
2016 Cluster Study: TSR Overview

| | MW Studied | # TSRs |
|-------------------------------|--------------|-----------|
| Total | 2,042 | 51 |
| Point-to-Point Service | 1,802 | 50 |
| New Service | 1,547 | 46 |
| Redirected Existing Service | 255 | 4 |
| NT Service | 240 | 1 |

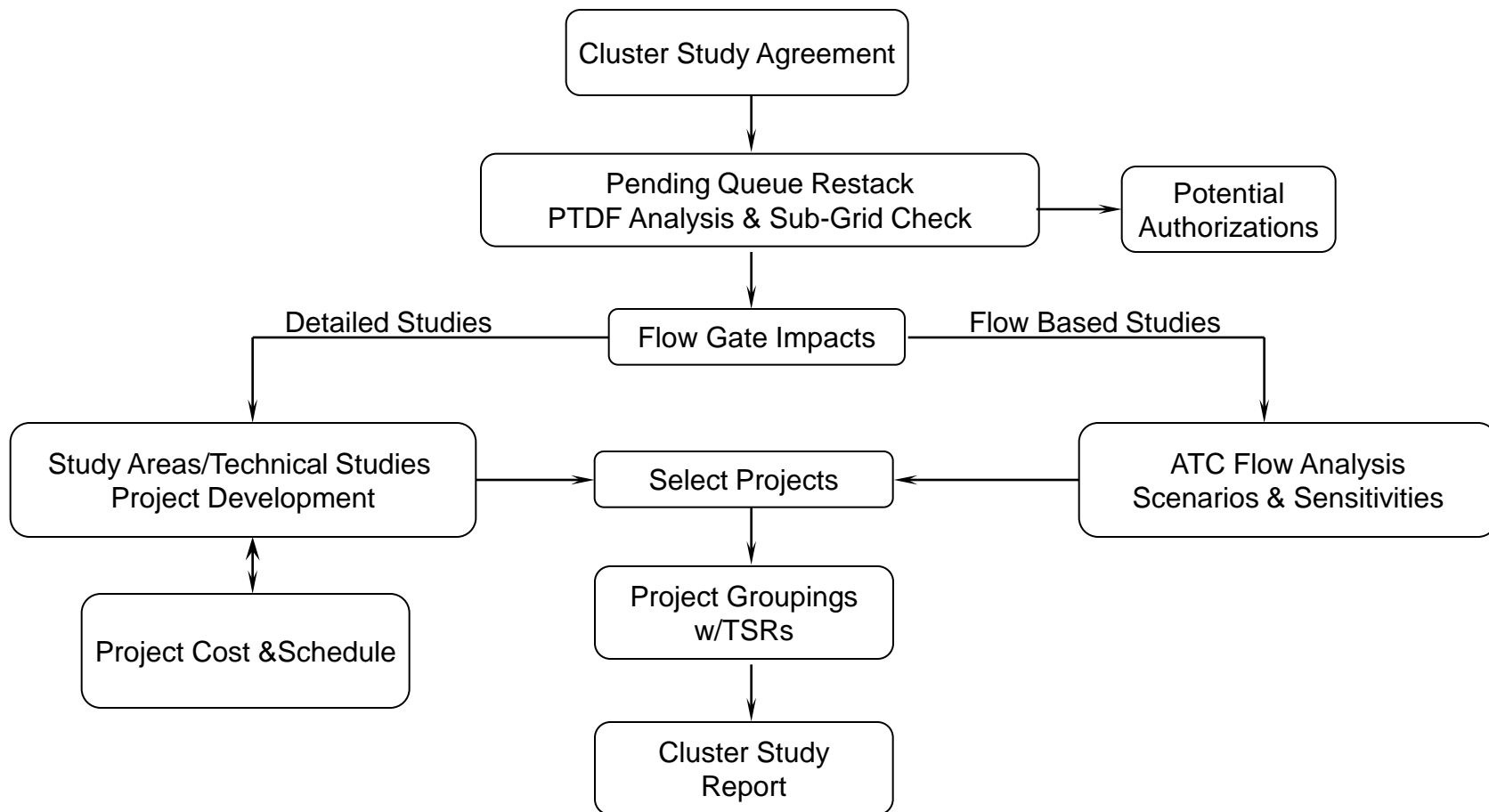
Primary Study Drivers/Generation Trends

Primary Customer Behaviors

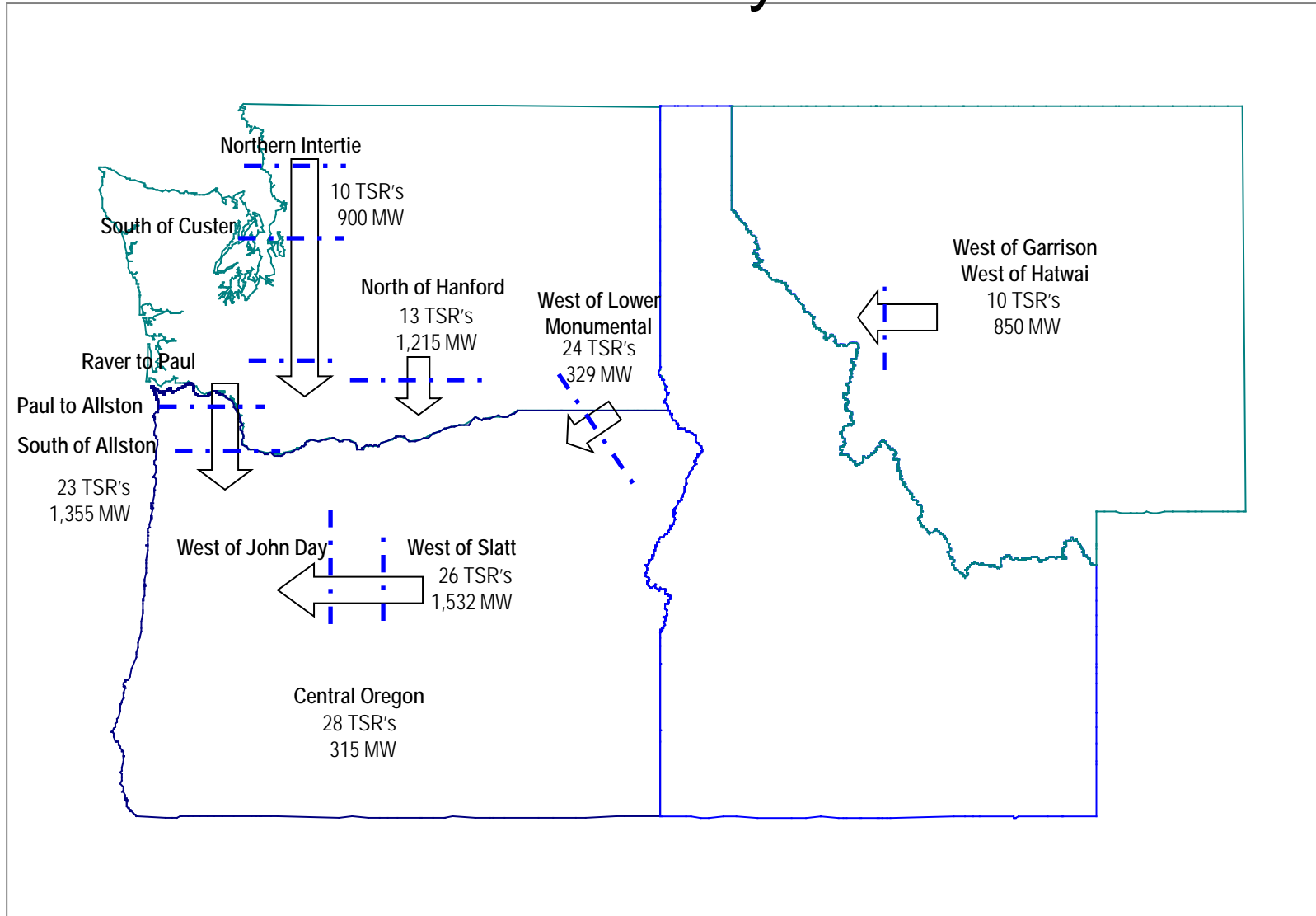
1. Potential new resource development in Montana and Central/Southern Oregon (east-to-west transactions)
2. Potential generation increase in the upper Columbia area
3. Certain east-to-west redirects of existing generation
4. East-to-west delivery of additional generation from eastern Washington



TSEP Cluster Study



Cluster Study Areas



NOTE: Demand from the study areas cannot be added to achieve the cumulative requests in the 2016 TSEP CS.

Assumptions & Methodology

- **Hydro Scenarios**

Includes three scenarios:

- Each zonal stress pattern provides for the nameplate less expected generation outages all of the FCRPS projects in a zone for the appropriate season. The zones include the Upper Columbia, Lower Columbia and Lower Snake.

- **Wind Scenarios**

Includes two scenarios:

- 100 % Wind Generation in the NW was modeled at the lesser of nameplate or demand.
- Wind Generation modeled offline.

- **Canadian Entitlement Return Scenarios**

Includes two scenarios

- FCRPS Hydro Generation dispatched to meet current obligations without CER.
- FCRPS Hydro Generation increased to dispatch CER and deliver to Canada.

| Item | 2016 TSEP |
|-------------------|---|
| Basecase | Summer Case: WECC 2020HS Winter Case: WECC 2020HW |
| Load | Expected 1-in-2 peak |
| Hydro | -Three high generation scenarios: Upper Columbia, Lower Columbia, and Lower Snake -Mid-C remained at assumed contract level |
| Thermal | -All thermal in Northwest set to 100% of contracted/requested demand -All gen participated in basecase balancing |
| Wind | -All wind in Northwest set to 100% of contracted/requested demand and 0%. -All gen participated in basecase balancing |
| Solar | -All solar in Northwest set to 100% of contracted/requested demand -All gen participated in basecase balancing |
| COI/PDCI | 4,800/3,220 Summer |
| Northern Intertie | Contracted demand in N>S direction for summer incremented for requested service from previous NOS; Canadian Entitlement Return for Winter |
| Montana>NW | Set at agreed to levels from ATC Methodology and incremented for requested service |
| Idaho > NW | Set at agreed to levels from ATC Methodology |

Proposed Plans of Service

- **South of Custer (Northern Intertie Westside)**
 - Upgrade Monroe-Novelly 230 kV to 80° C plus
 - Third party impact to Puget Sound Energy (PSE) transmission – Second Portal Way 230/115 kV Transformer required plus additional fixes on PSE system. Final plan of service to be determined based upon discussion with PSE.
- **Raver to Paul Project**
 - South Tacoma-St. Clair 230 kV line sag upgrade
- **Harney Project**
 - Harney SVC
 - Redmond-Brasada 115 kV line sag upgrade
 - Brasada 115 kV shunt capacitor
 - Ponderosa-Brothers Tap 230 kV line (~46 miles) and substation
 - Third party impact to Idaho Power Company (IPC) transmission – Upgrade Hines 138/115 kV Transformer required on IPC's system. Final plan of service to be determined based upon discussion with IPC.
- **La Pine Project**
 - Shunt capacitors
 - La Pine 230/115 kV transformer upgrades
 - La Pine-Fort Rock 115 kV #2 line addition

Proposed Plans of Service

■ Walla Walla Project

- Tucannon River-Hatwai 115 kV line addition (~8 miles)
- At Hatwai Substation a new 115 kV yard with a New bay, PCB, 230/115 kV transformer and a new 230 kV bay and PCB

■ Montana to Washington Project (M2W)

- The M2W project includes upgrading reactive compensation between Garrison, Hatwai and Bell substations
- The M2W project refers to only upgrades on the BPA Network – facilities west of BPA's Garrison Substation plus BPA's share of harmonic filtering at the Colstrip Generating Station

■ Garrison to Ashe Project

- New 500 kV single circuit AC transmission line between Garrison Substation and Ashe Substation, through Bell Substation (~430 Miles)
- Addition of a new 500 kV substation between Taft and Hot Springs substation
- Three 500 kV series capacitors
- Facilities identified here exclude any additional facilities that may be required between Colstrip and Garrison substations, and any other reinforcements east of Garrison needed to deliver generation associated with the requests to BPA's Network

Estimated Costs and Projected Energization Date

| Project Description | Estimated BPA Direct Cost (\$M) | Projected Energization Date* |
|-------------------------------|--|-------------------------------------|
| Montana to Washington Project | \$119 | Fall 2023 |
| Garrison to Ashe Project | \$1,042 | Fall 2029 |
| Harney Project† | \$56 | Fall 2024 |
| La Pine Project | \$65 | Fall 2022 |
| South of Custer Project† | \$1.8 | Fall 2021 |
| Raver to Paul Project | \$0.5 | Fall 2021 |
| Walla Walla Project | \$12 | Fall 2022 |

* Projected energization date based on construction feasibility, and do not account for BPA's NEPA obligations or Integrated Program Review/Capital Investment Review processes

† Third Party projects are not included in these project estimates

Next Steps

- Staff are currently working to perform initial financial analysis on the identified plans of service
 - Anticipate completing this in August
- We are developing customer letters providing additional detail on the immediate next steps for each TSR
 - Includes TSRs that have been studied in prior BPA cluster studies (since 2008)
 - Following the financial analysis, BPA will tender to customers the relevant next phase agreement (Preliminary Engineering, Environmental Study Agreement, e.g.)
- Staff are available to have individual meetings with customers to discuss results and next steps, as necessary
 - Please contact your Transmission Account Executive for more information