BPA Network Open Season 2013 Cluster Study

September 19th, 2013

Topics for Discussion

- Cluster Study TSRs/TSN
- Cluster Study Process
- Cluster Study Assumptions
- Cluster Study Methodology
- Treatment of the SILS TSN in the Cluster Study

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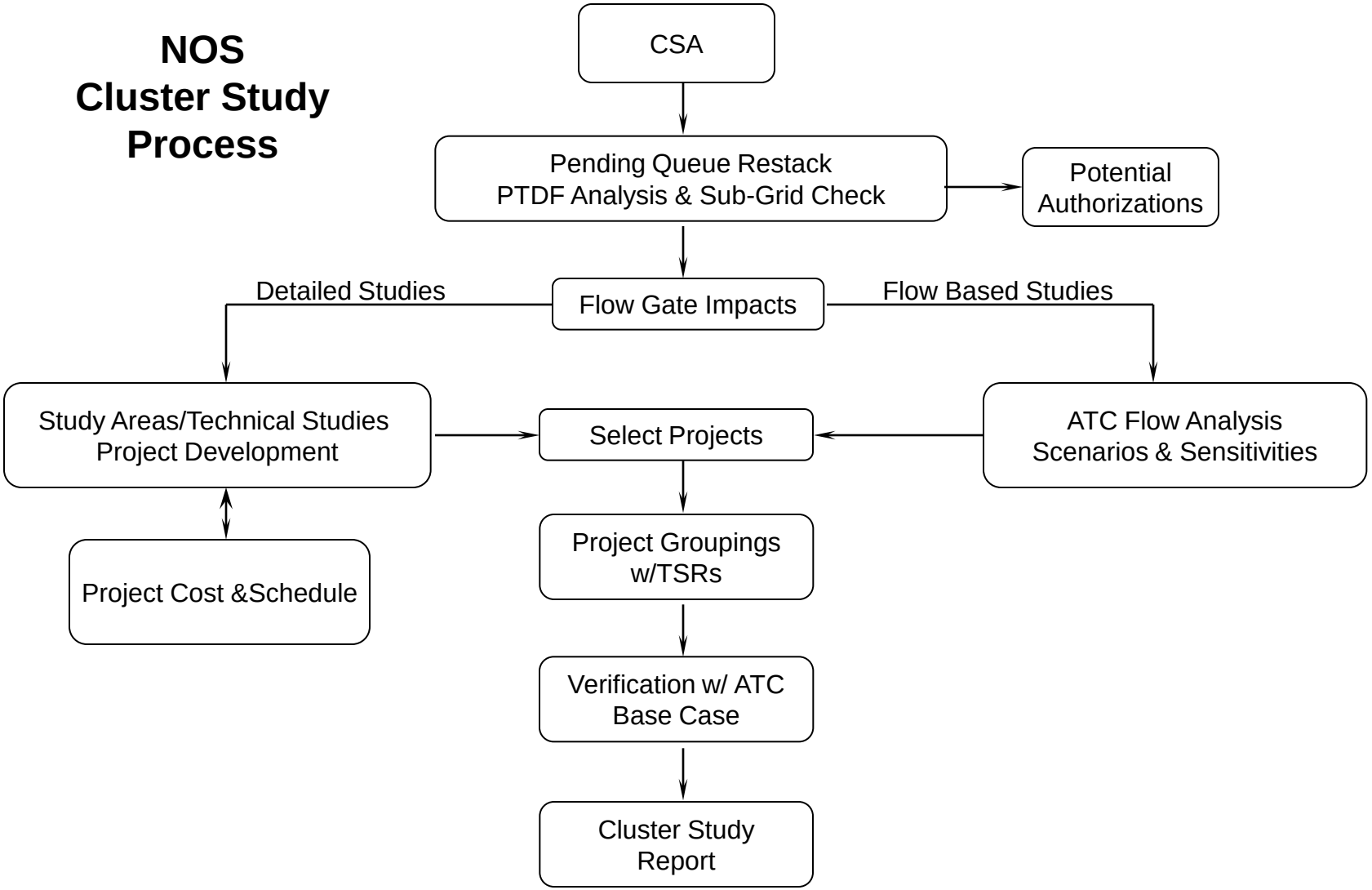
Initial 2013 Cluster Study Summary

Customer	Req's	Dem	SOC	NOEL	CCN	CCS	NOH	NOJD	R2P	P2A	SOA	WOM	WOS	WJD	WLM	NI N>S	NI S>N	WOG E>W
Avista Corporation	1	14	1	0	1	0	2	0	1	1	1	0	0	0	0			14
Bonneville Power Administration	4	278	4	2	3	8	1	5	3	3	4	1	1	136	8			35
Coral Power L.L.C.	1	550	0	38	0	0	0	0	0	155	172	0	0	0	0			
Emerald Peoples Utility District	2	30	0	2	0	4	0	0	0	0	0	0	0	8	0			
Eugene Water & Electric Board	3	63	1	3	0	5	0	0	0	0	10	13	3	7	0			
Invenergy Energy Management	1	500	0	1	0	161	132	45	0	279	326	30	38	57	12			
Kaiser Aluminum Washington	2	50	0	2	7	0	8	2	2	2	3	0	0	0	0			
Mariah Wind	1	20	1	0	3	16	0	1	2	2	3	13	4	6	1			
Mason County PUD	1	4	0	1	0	1	0	0	0	0	0	0	0	1	0			
Morgan Stanley	2	100	4	24	39	5	4	0	0	0	0	2	1	3	15		50	50
OPS Desert Wind	1	75	1	0	5	46	0	1	4	4	5	0	0	23	1			
PacifiCorp	10	549	0	8	0	0	122	23	0	0	388	26	79	0	0			
Peninsula	1	19	0	1	0	2	0	0	0	0	0	0	0	5	0			
PPM Energy, Inc.	1	33	0	1	0	0	9	3	0	0	21	3	5	0	1			
PSEM	7	276	2	0	70	36	54	77	44	5	1	8	8	10	3			
PUD No. 1 of Jefferson	1	106	2	0	64	31	0	41	33	0	0	8	4	9	10			
PWX	8	800	12	36	73	11	276	380	77	107	134	91	109	128	55	200	100	100
Snohomish County PUD	1	6	0	3	1	0	0	0	0	0	2	0	0	0	0			
Total	48	3,473	28	122	266	326	608	578	166	558	1,070	195	252	393	106	200	150	199

- The table above indicates cumulative PTDF impacts from the 2013 NOS Cluster Study TSR's/TSN.
- Since PTSA Reform has not concluded, BPA cannot establish the starting ATC for the 2013 Cluster Study prior to inclusion of the 2013 Cluster Study TSRs/TSN.
- Upon completion of the PTSA Reform, BPA will be able to determine the amount of starting ATC by flowgate. BPA will then be able to identify the Cluster Study areas and be informed on the amount of additional flowgate capacity required to accommodate the incremental requests for service.

NOS Cluster Study Process



Cluster Study Process

- Pending Queue Restack - Determine which TSRs can be met from existing system capability and which TSRs required system reinforcement
  - PUF Analysis and Sub-Grid check
- Identify study areas for those TSRs requiring system reinforcement
  - Perform technical studies to develop projects for the study areas
  - Determine TTC w/ project, cost, schedule and energization date
- Associate TSRs with a project or group of projects
- Model all TSRs in an out-year ATC base case and demonstrate that the interconnected transmission system, together with the required reinforcements, would be able to provide the requested service.

Comparison of Cluster Study Assumptions

Item	2010 Cluster Study	2013 Cluster Study
Basecase	2016 Summer Case: WECC 16HS1 Winter Case: WECC 16HW2A	2018/2022-23 Summer Case: WECC 18HS/23HS Winter Case: WECC 18HW/22HW
Load	Expected 1-in-2 peak	Expected 1-in-2 peak
Hydro	-95th percentile dispatch -Mid-C remained at assumed contract level	-95th percentile dispatch -Mid-C remained at assumed contract level
Thermal	Based upon Thermal Generation Dispatch Study Sequence -Thermal turned down to balance requests for service in the study.	Based upon Thermal Generation Dispatch Study Sequence -Thermal turned down to balance requests for service in the study -After Thermal Generation has been depleted, continue with displacement of hydro
Wind	Base scenario: All wind in Northwest set to 60% of contracted/requested demand Wind in Montana set to 100% of requested demand	Base scenario: All wind in Northwest set to 60% of contracted/requested demand Wind in Montana set to 100% of requested demand
COI/PDCI	4,800/3,100 Summer	4,800/3,220 Summer
Northern Intertie	Contracted demand in N>S direction for summer; Canadian Entitlement Return for Winter	Contracted demand in N>S direction for summer; Canadian Entitlement Return for Winter
Montana>NW; Idaho > NW	Set at agreed to levels from ATC Methodology	Set at agreed to levels from ATC Methodology

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Thermal Generation Dispatch Study Sequence

Generation Project
Beaver Generation
Whitehorn Power Station
Avista Rathdrum CT
Frederickson Generating Station
Fredonia
Klamath Expansion (Peaking)
Northeast Combustion Turbine
Big Hanaford Centralia
Klamath Cogeneration Project
Tenaska Ferndale Cogen Station
Encogen Generating Station
Sumas Cogeneration
River Road Generating Plant
March Point Cogen
Hermiston Generating Plant
Hermiston Energy Center Cogen
Frederickson I
Lancaster (Rathdrum Generating Station)
Coyote Springs Power Station
Coyote Springs II
Goldendale Energy Center
Port Westward Generating Station
Chehalis Generating Facility
Mint Farm Energy Center
Grays Harbor
Centralia G2 Centralia
Boardman

•The sequence (starting generally from least efficient trending to higher efficiency projects) indicates generation that, for study purposes will be assumed to be displaced to accommodate incremental requests for service and maintain balance for NW area generation and load. The sequence was based on age of the plant, heat rate, and past operation.

Thermal Generation Dispatch Study Sequence Considerations

- Developed for use in the 2010 NOS Cluster Study with customer involvement
- The Thermal Generation Dispatch Study Sequence depicts transmission usage in a fashion other than contracted, it is not a true reflection of firm rights behind that resource
  - For example, turning a PGE thermal resource off such as PGE's Beaver project, does not reflect the rights that would be granted to a new request for service from the Slatt area to serve load in the Puget Sound
- Does provide an indication of how market might behave
- Combined with the scenarios in the Cluster Study, use of the Thermal Generation Dispatch Study Sequence allows for consideration of a bracketed set of impacts
- Provides an indication where expansion may be needed to support requests for service while minimizing the risk of curtailment for existing firm users of the system

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2013 Cluster Study Methodology

Scenarios: as developed for the 2010 NOS Cluster Study

- Base
  - Wind modeled at 60% of requested or assumed demand
  - FCRPS Hydro at 95th percentile MW
  - Thermal Generation Dispatch Study Sequence displaced to balance requests for service in the study
- 100% Wind
  - Wind modeled at 100% of requested or assumed demand
  - FCRPS Hydro at 95th percentile MW
  - Thermal Generation Dispatch Study Sequence displaced to balance requests for service in the study
- 0% Wind
  - Wind modeled at 0% of requested or assumed demand
  - FCRPS Hydro at 95th percentile MW
  - Thermal Generation Dispatch Study Sequence displaced to balance requests for service in the study

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2013 Cluster Study Sensitivities

- BPA will conduct additional sensitivities that further show how transmission usage may better inform which reinforcements might be needed to accommodate requests for service.
- Sensitivities being considered to accommodate incremental requests for service in the 2013 Cluster Study:
  1. Increase NW load – continue to grow load beyond 2018 to 2023, or further.
  2. Increase transfers to all areas within WECC beyond the Northwest by reducing generation throughout WECC.
  3. Modified Hydro – Reduce NW hydro

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SILS Asset Exchange

Background

•Long Term Pending Queue shows a Transmission Service Number (TSN) for 500 MW of capacity from Vantage 230 to Slatt 500

•TSN established in order to provide assurance that requests would have their queue priority respected.

•The Cluster Study is to demonstrate that those rights are preserved and to establish the basis for additional reinforcements, if any, for the assets associated with the SILS Asset Exchange as well as any subsequently queued requests.

•Facilities include Vantage to Hanford 500 kV line (part of the North of Hanford Flowgate) and the Ashe – Slatt #1 500 kV line (part of the North of John Day Flowgate)

For the Cluster Study

•For the Cluster Study, BPA will set aside 500 MW of flowgate TTC from its North of Hanford and North of John Day Flowgates

•Since there is no “companion” service on the BPA network, the Cluster Study will not consider any flow to be attributed to the Idaho Power capacity.

Next Steps

- ✓ September 19th, 2013: BPA Customer Meeting
- October 17th, 2013: ColumbiaGrid Planning Meeting
- November TBD, 2013: BPA Customer Meeting
- December 31, 2013: Anticipated delivery of 2013 NOS Cluster Study results