Northwest **Power** and **Conservation** Council

October 4, 2016

MEMORANDUM

TO: **Power Committee**

FROM: **Ben Kujala**

SUBJECT: **ColumbiaGrid Transmission Update**

BACKGROUND:

Presenter: Paul Didsayabutra, Manager of Grid Planning

Summary: Paul will update the Council on the planning activities of ColumbiaGrid regarding the regional transmission system. Council staff coordinates on planning assumptions with the regional transmission planners, including ColumbiaGrid.

Relevance: Planning for adding new generating resources, energy efficiency, and demand response has significant implications for the transmission system expansion. And transmission system expansion can have significant implications for the resources available to serve regional load. Council staff coordinates with the regional transmission planners, including ColumbiaGrid, to account for these interactions in the power planning process. Council members heard from Northern Tier Transmission Group, the other regional transmission planning organization, in May of 2016. This presentation provides context on the other half of the regional transmission planning equation.

Workplan: A. Implement the Seventh Power Plan and related Council priorities

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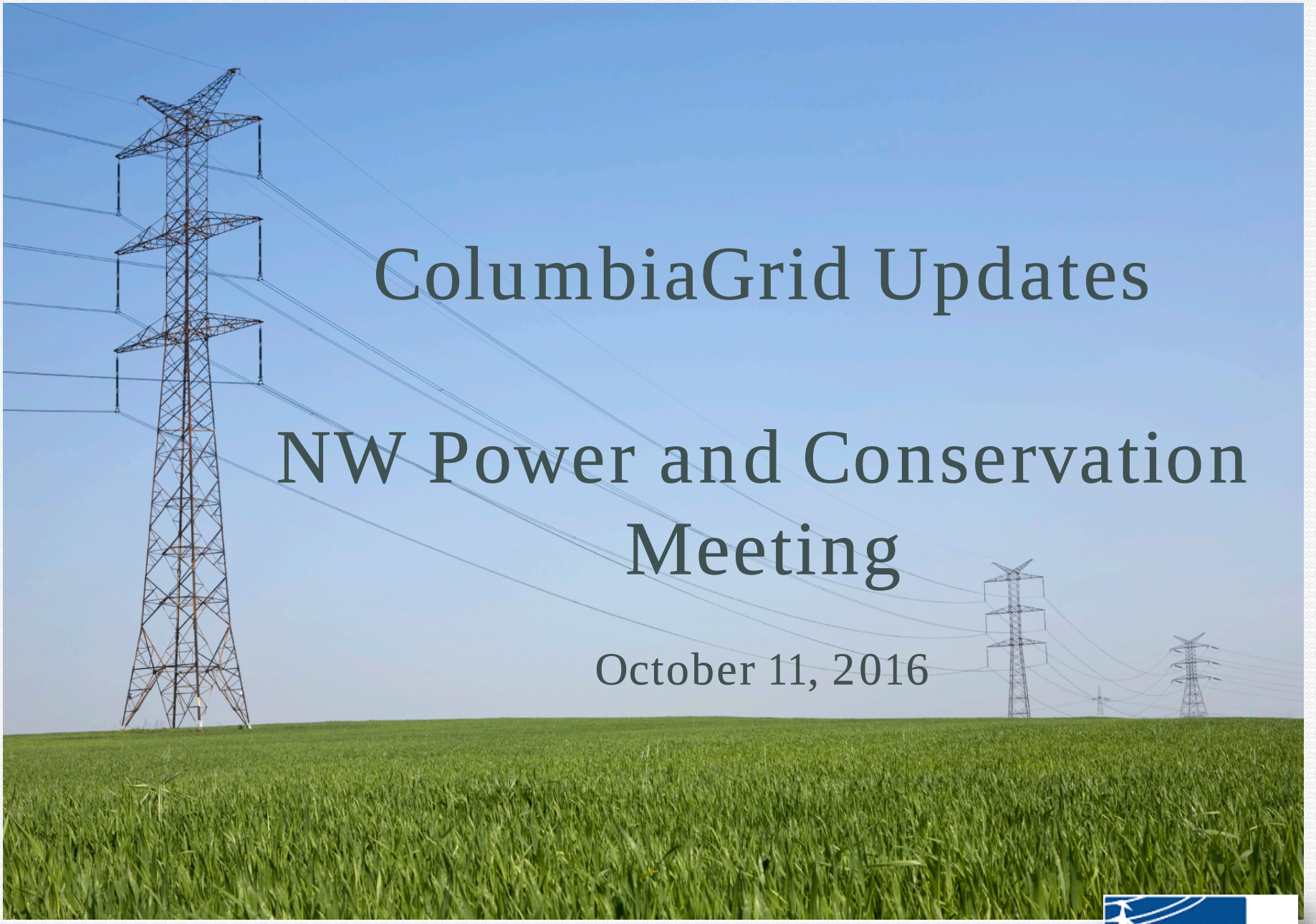
Background: ColumbiaGrid's mission is to improve the reliability and efficient use of the Northwest's transmission grid. ColumbiaGrid performs grid expansion planning, and develops and implements solutions related to the expansion, operation, reliability, and use of the interconnected Northwest transmission system. In carrying out its mission, ColumbiaGrid endeavors to provide sustainable benefits for its members and the region, while considering environmental concerns, regional interests, and cost-effectiveness.

More Info: https://www.columbiagrid.org/



ColumbiaGrid Updates

NW Power and Conservation Meeting

October 11, 2016

In This Presentation

- Overview of ColumbiaGrid
- ColumbiaGrid Planning Process
- 2016 System Assessment
- Economic Planning Study
- Order 1000 and other studies
- Current Activities & Next steps

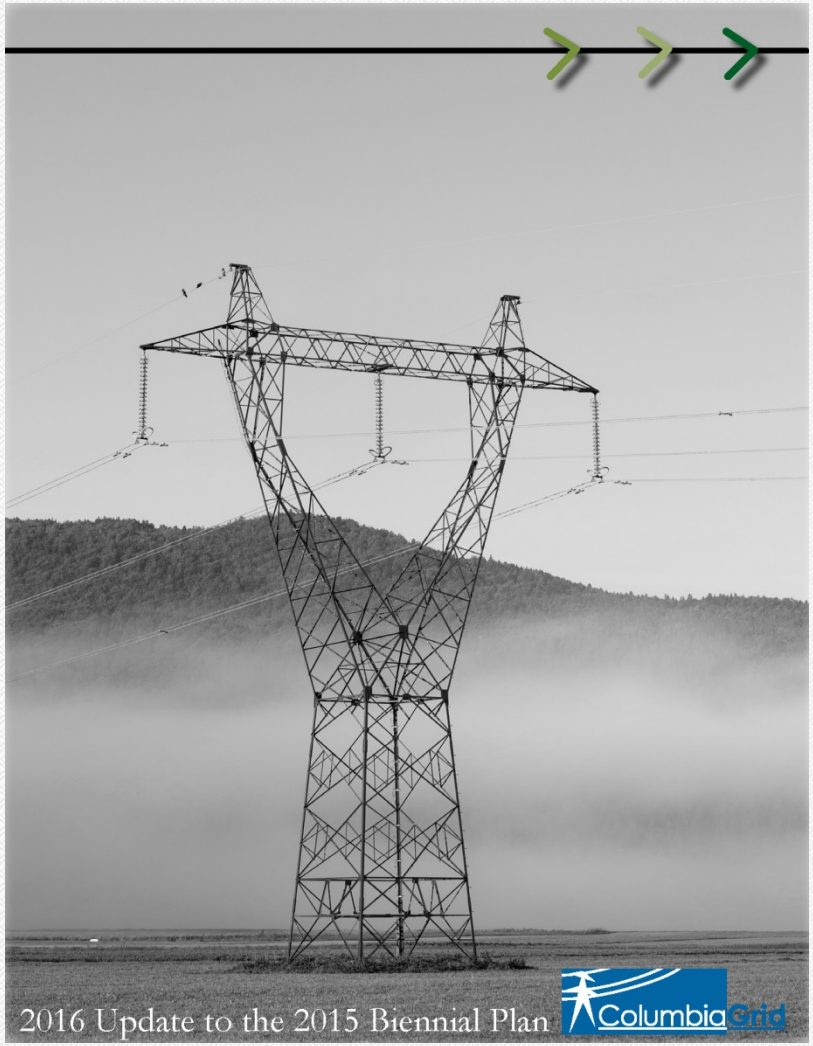
Members and Planning Participants

- Avista Corporation
- Bonneville Power Administration
- Chelan County PUD
- Cowlitz County PUD*
- Douglas County PUD*
- Grant County PUD
- Puget Sound Energy
- Seattle City Light
- Snohomish County PUD
- Tacoma Power

* Non-Member PEFA Planning Participants

ColumbiaGrid

ColumbiaGrid – Grid Planning

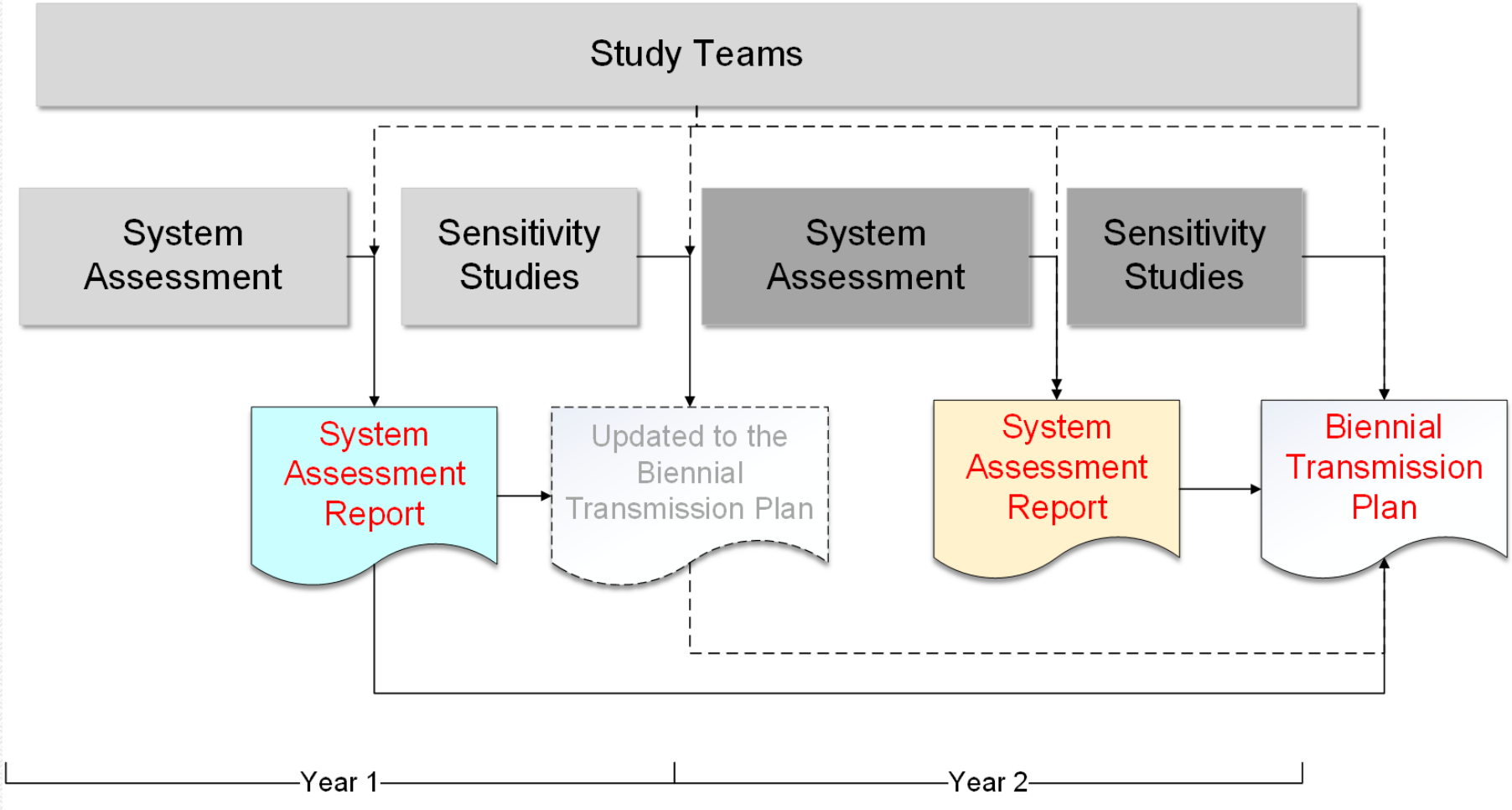


- Member- and Participant-funded & focused Corporation (founded 2006)
- Independent Board (three Directors) and staff
- Open stakeholder process
- Develops Biennial Transmission Expansion Plan (and updates to the plan), Annual System Assessments
- Studies focused on specific issues
- Planning and Expansion Functional Agreement (PEFA) and Fourth Amended and Restated Order 1000 Agreement

ColumbiaGrid Planning Process: Overview

- Two-year Planning Cycle
- Single process complies with FERC Orders 890 and 1000
- Order 1000 (O1K) planning started on Jan 1, 2015
  - Regional and inter-regional planning
  - There are 4 O1K planning regions in the West
- Activities culminate in:
  - System Assessment Report (annual)
  - Sensitivity and other studies (annual/as needed)
  - Biennial Transmission Expansion Plan (every two years, updates in alternate years, as needed)

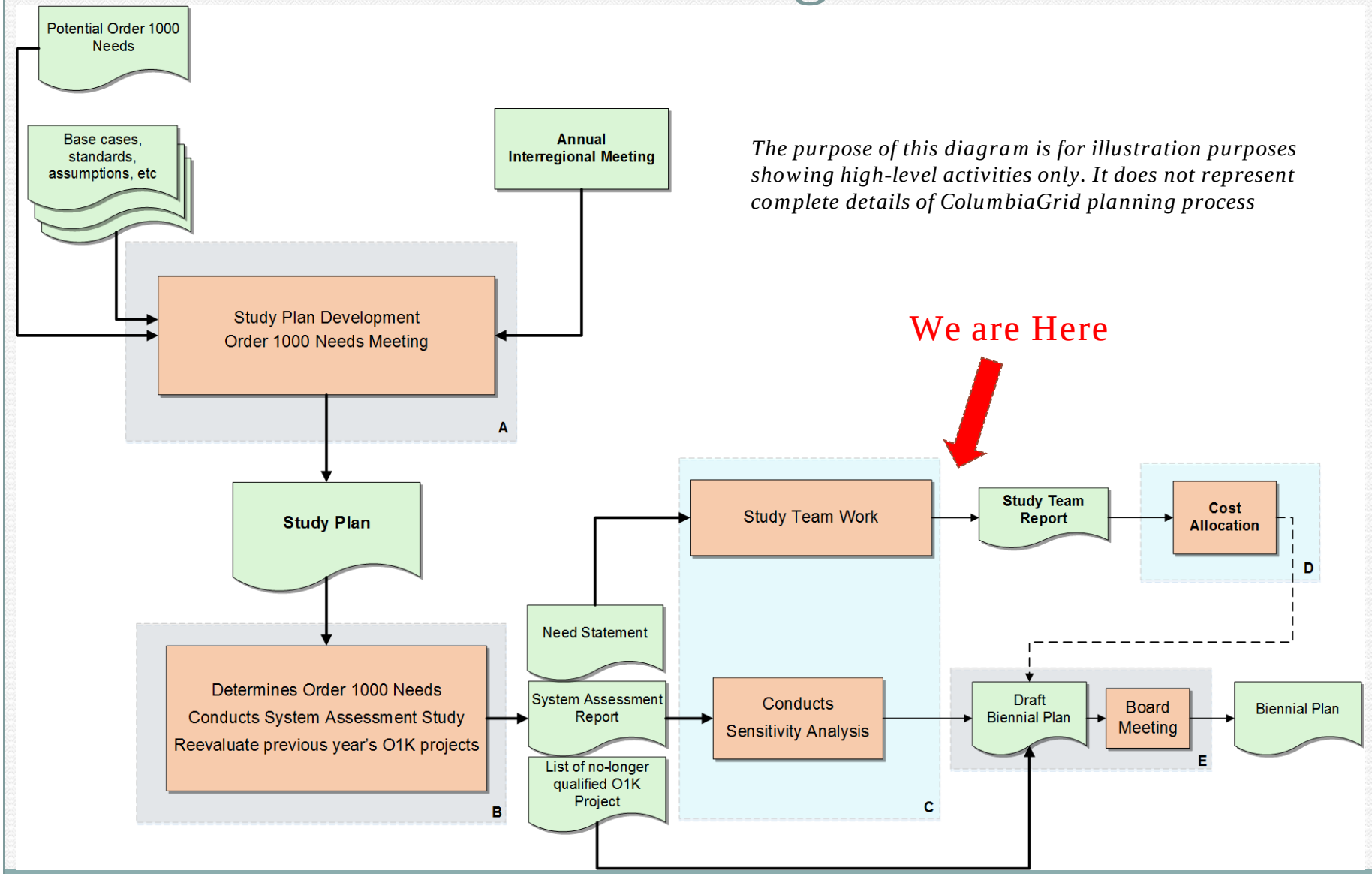
ColumbiaGrid Planning Process: Overview



ColumbiaGrid Planning Process: Overview

- Planning studies conducted by CG (minimum)
  - Power flow analysis
  - Transient stability
  - Production cost simulation
- 56 new transmission projects were identified in the latest CG's Biennial Transmission Plan
  - Issued in early 2016
  - Estimated costs > $2.5 Biliion
- Currently, CG is finalizing its 2016 studies & start developing the next Biennial Plan
  - Scheduled publication: Feb 2017

ColumbiaGrid Planning Process: Status



The purpose of this diagram is for illustration purposes showing high-level activities only. It does not represent complete details of ColumbiaGrid planning process

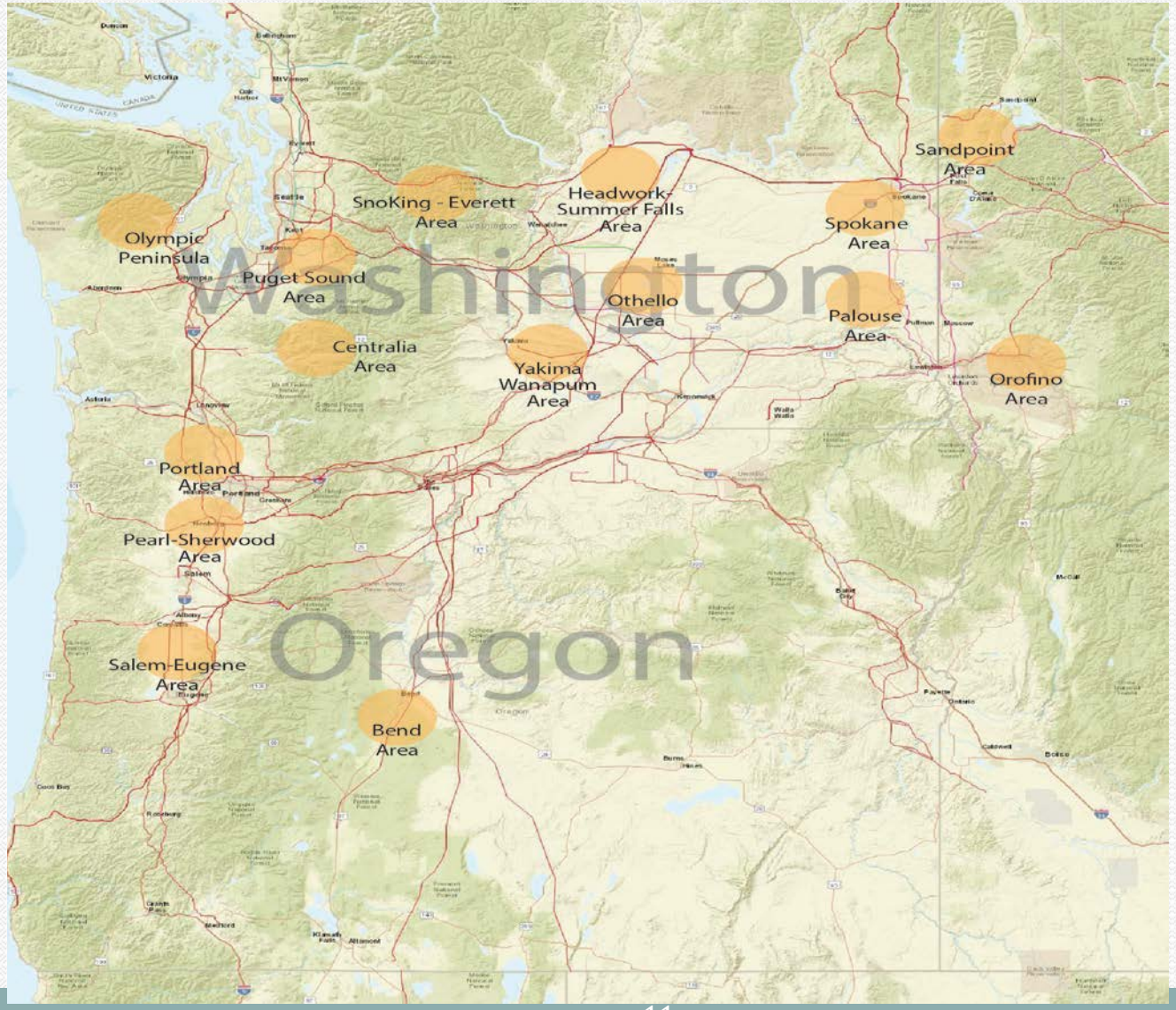
2016 System Assessment: Overview

- Annual study program: Reliability focus
- Covered 7 major scenarios over the next 10 years
  - Heavy Summer
  - Light Spring
  - Heavy Winter
- Most identified issues are related to load serving
- Mitigation plans have been proposed/evaluated
- Results from Production Cost Simulation are being incorporated as additional information

2016 System Assessment: Results

- Need Statement: Reliability Assessment identified 15 areas of concerns (same as last year)
  - Olympic Peninsula
  - Puget Sound
  - SnoKing – Everett
  - Centralia
  - Headwork / Summer Falls
  - Sandpoint
  - Spokane
  - Palouse
  - Orofino
  - Othello
  - Yakima/Wanapum
  - Portland
  - Pearl-Sherwood
  - Salem-Eugene
  - Bend

2016 System Assessment: Results



2016 System Assessment: Results

- Compare to 2015 System Assessment results
  - No new area of concern
  - No major concern regarding system stability (for the contingencies evaluated by CG)
  - Load reductions were observed in several areas
  - Low load growth, reduction of significant industrial loads, deployment of Energy Efficiency (EE) and other demand-side activities are likely to be the primary factors causing load reduction
  - Recent study results indicated potential deferral of transmission projects

System Assessment: Results Comparison

Areas	Five-Year Heavy Summer Load			Five-Year Heavy Winter Load		
	Load in 2015 SA (MW)	Load in 2016 SA (MW)	Difference (MW)	Load in 2015 SA (MW)	Load in 2016 SA (MW)	Difference (MW)
Central & South OR	2024	2045	22	2268	2292	23.38
Lower Columbia	2505	2532	27	2221	2244	23.05
Portland Eugene	7108	7266	158	8363	8447	84.00
Spokane	2580	2680	100	3266	3235	31.20
Mid Columbia	2509	2402	107	2914	2642	272.02
Seattle Tacoma	6618	6312	306	9197	8767	429.96
Longview Centralia	2454	2500	46	3731	3793	62.00
Snake	0	0	0	0	0	0.00
Total	**25798**	**25738**	**60**	**31960**	**31420**	**540.75**

Areas	Ten-Year Heavy Summer Load			Ten-Year Heavy Winter Load		
	Load in 2015 SA (MW)	Load in 2016 SA (MW)	Difference (MW)	Load in 2015 SA (MW)	Load in 2016 SA (MW)	Difference (MW)
Central & South OR	2187	2210	23.21	2392	2416	24.23
Lower Columbia	2660	2688	27.97	2301	2325	23.71
Portland Eugene	7584	7655	70.82	8801	8871	70.04
Spokane	2928	2884	44.45	3356	3325	31.34
Mid Columbia	2679	2602	76.69	3123	2873	250.47
Seattle Tacoma	6918	6590	328.47	9423	9134	289.22
Longview Centralia	2502	2537	35.00	3679	3665	14.00
Snake	0	0	0.00	0	0	0.00
Total	**27458**	**27165**	**293**	**33075**	**32608**	**467**

ColumbiaGrid

Economic Planning Study (EPS)

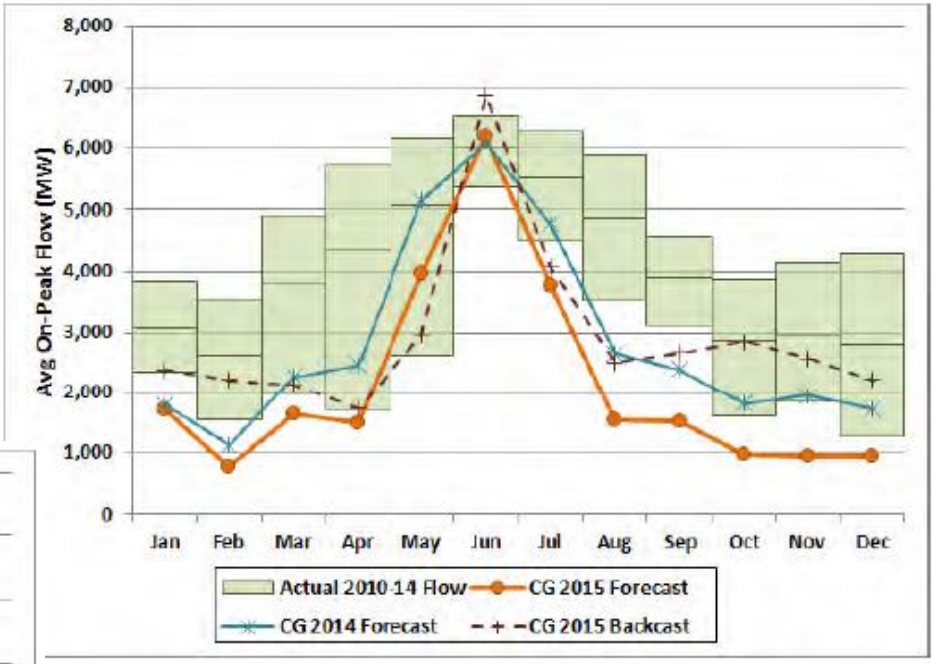
- ColumbiaGrid initiated EPS in 2013
  - Production cost simulation
  - Provide additional information to reliability assessment
  - Also support other planning activities such as Order 1000
- Three studies were completed & One ongoing
  - 2013: Test run & setting up study process
  - 2014: Potential impacts from Centralia shutdown
  - 2015: Short-term system assessment (2017 scenarios)
  - 2016: Long-term system assessment (2026 scenarios)

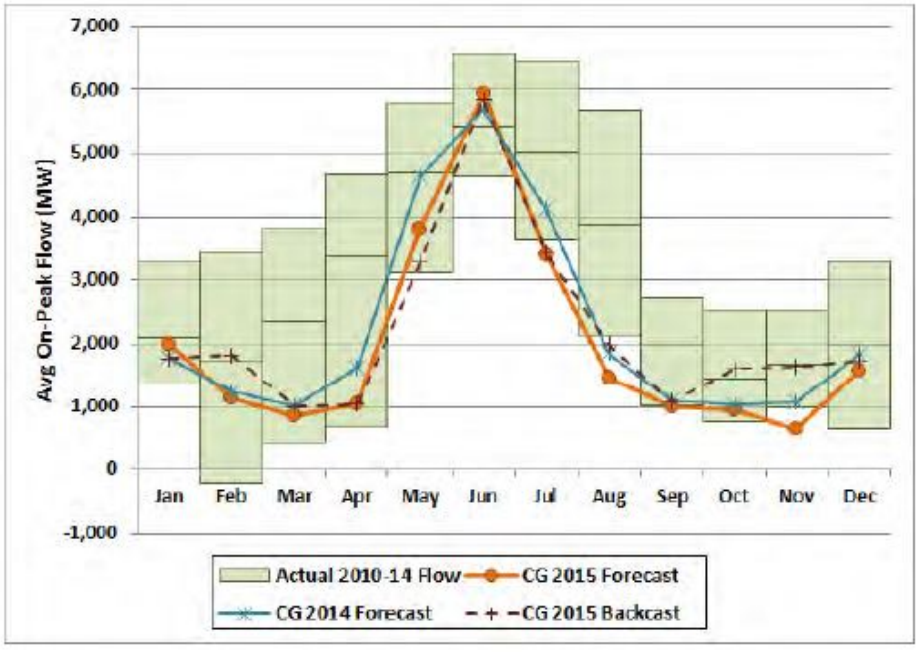
Economic Planning Study: 2015 Study Summary

- Key changes to the assumptions in 2015 studies
  - Supply changes: Based on the latest information such as EIA, PPA, announcements, etc
  - Fuel cost: Updated gas & coal prices
  - Hydro models: Using the most recent updated version
- Summary of findings
  - Minor changes in power flow pattern (compared to historical and previous year's results)
  - NW coal generation dropped ~21% (price increased)
  - NW gas generation increased & replaced ~57% of coal reduction

Economic Planning Study: Example of the Results

West of Cascades Flow





PDCI + COI Flow

Order 1000 and Other Activities

- Order 1000 includes both the regional and inter-regional activities (public process)
  - Need Assessment
  - Development of plan of service
  - Transmission project evaluation e.g. ITP
  - Project re-evaluation
  - Cost allocation
  - Information exchange & coordination
- Other studies can be included in the study program
  - As needed/agreed by the members
  - Examples are CIP-014, VTL, MOD-032, GIC etc

Current Activities and Next Steps

- 2017 Biennial Transmission Plan
  - Ongoing, Target completion Feb 2017
- 2017 System Assessment study scope
  - Ongoing, target completion Dec 2016
  - Define the study scope, assumptions, scenarios, etc
- 2017 System Assessment studies
  - Future activities: Mar – Jul 2017
- Interregional coordination & Order 1000 activities
  - Ongoing, Next major meetings Feb 2017 (2 meetings)

Contact:

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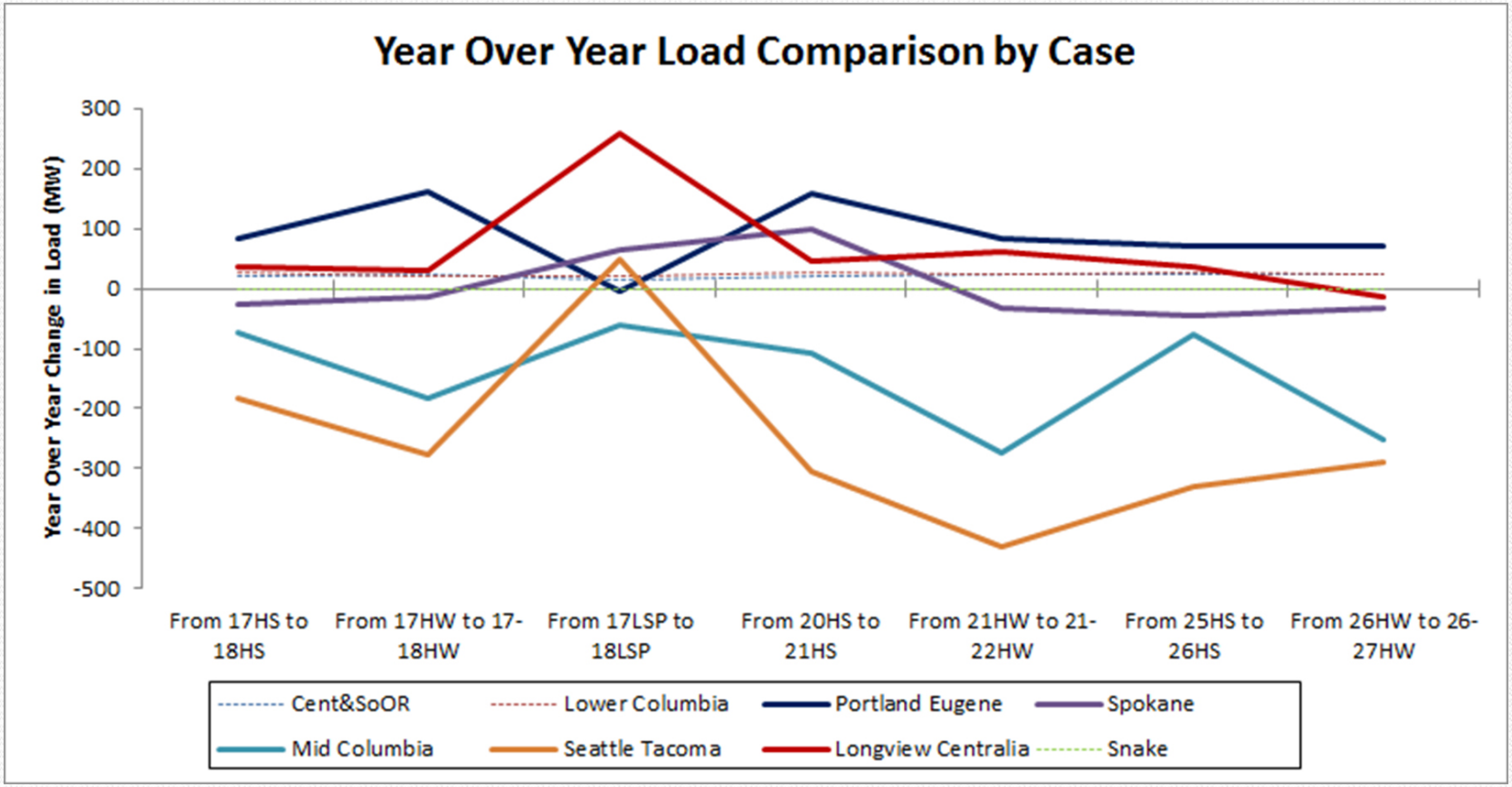
Backup Slides

System Assessment: Results Comparison



Major load changes:

- Mid Columbia: Alcoa Wenatchee plant idled
- Seattle/Tacoma: Alcoa Intalco plant to idle