

ColumbiaGrid

Update for Washington Utilities and Transportation Commission

December 7, 2016

Topics

- **Corporate Overview –**
 - Members
 - Mission
 - Funding – Fifth Funding Agreement 2017-2020
- **Transmission Expansion Planning -**
 - 2016 System Assessment
 - 2017 Biennial Transmission Expansion Plan
 - Order 1000

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
- ^ Withdrawing from PEFA Dec. 31, 2018

Corporate Update - Mission

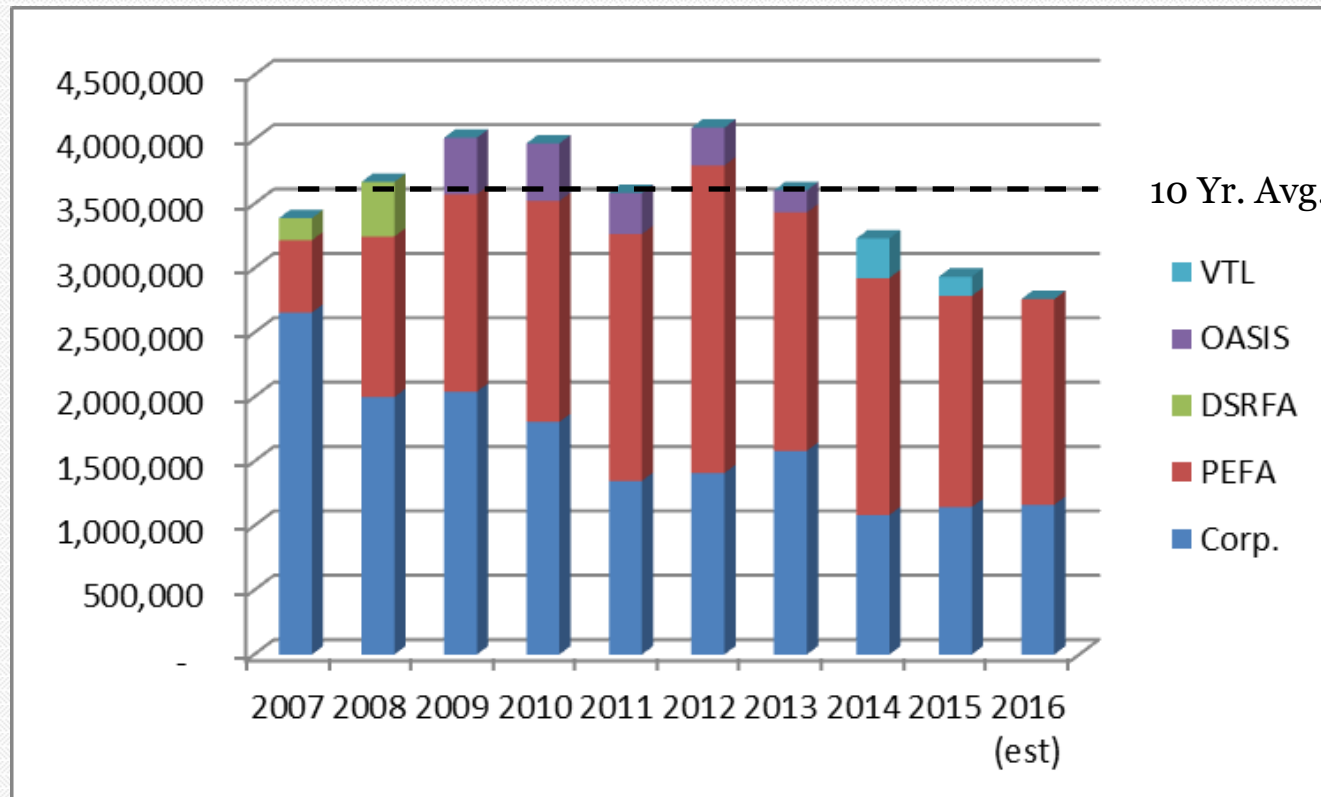
- Grid Planning Excellence – cost-effective grid planning
- New Services – Grow Leveraging Core Strengths
 - South of Allston Independent Review
- Regional Planning Efficiency, Cooperation, and Coordination
 - Western Planning Regions
 - WECC – proposed restructuring

Funding: Actual & Projected Expenses 2007 - 2017

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------------|---------------------|---------------------|---------------------|----------------------------------|---------------------|--------------------------------------|
| Expenses | | | | | | |
| Corp. | 2,656,552 | 1,999,280 | 2,041,581 | 1,806,730 | 1,348,546 | 1,408,173 |
| PEFA | 560,762 | 1,246,886 | 1,532,740 | 1,715,436 | 1,916,712 | 2,389,601 |
| DSRFA | 171,744 | 424,057 | - | - | - | - |
| OASIS | - | - | 438,778 | 447,566 | 319,128 | 294,432 |
| VTL | - | - | - | - | - | - |
| SOA | - | - | - | - | - | - |
| Total | \$ 3,389,058 | \$ 3,670,223 | \$ 4,013,099 | \$ 3,969,732 | \$ 3,584,386 | \$ 4,092,206 |
| | | | | | | |
| | 2013 | 2014 | 2015 | 2016 | 2017 | Average |
| Expenses | | | | <i>Forecasted as of 10/31/16</i> | <i>Draft Budget</i> | <i>10-yr time span (2007 - 2016)</i> |
| Corp. | 1,581,597 | 1,083,436 | 1,145,241 | 1,163,348 | 1,072,922 | 1,573,401 |
| PEFA | 1,852,059 | 1,841,124 | 1,640,239 | 1,597,376 | 2,209,814 | 1,682,068 |
| DSRFA | - | - | - | - | - | 54,164 |
| OASIS | 171,209 | - | - | - | - | 151,919 |
| VTL | - | 306,823 | 149,125 | - | - | 41,450 |
| SOA | - | - | - | TBD | - | - |
| Total | \$ 3,604,865 | \$ 3,231,383 | \$ 2,934,605 | \$ 2,760,724 | \$ 3,282,736 | \$ 3,503,002 |

Actual & Projected Expenses 2007 - 2016

Expenses have steadily declined since peaking in 2012 due to streamlined mission, focus, and staffing. 2015 actuals and 2016 estimate are both under \$3M, which is more than 25% reduction from 2012.



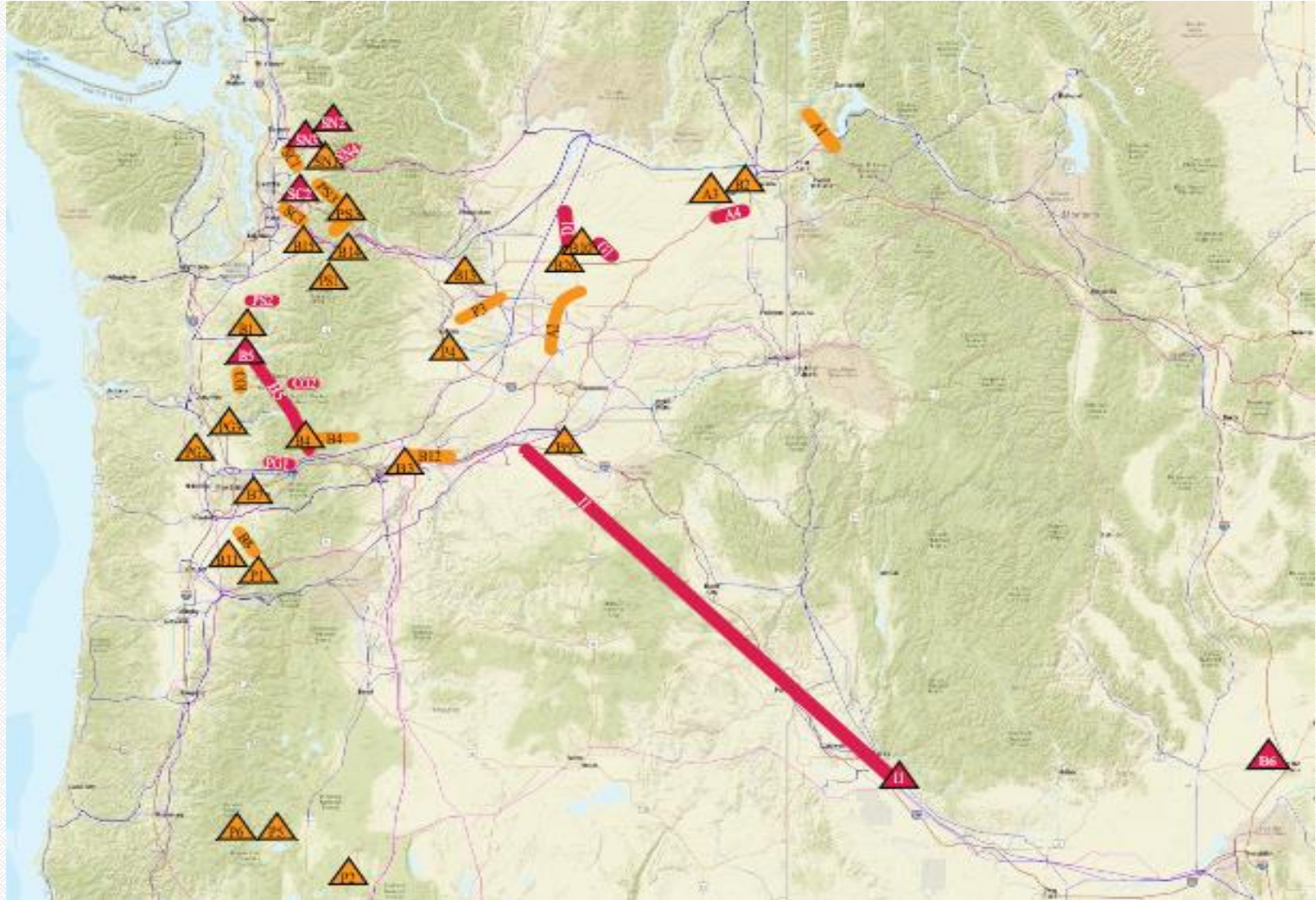
ColumbiaGrid – Grid Planning

2016 System Assessment

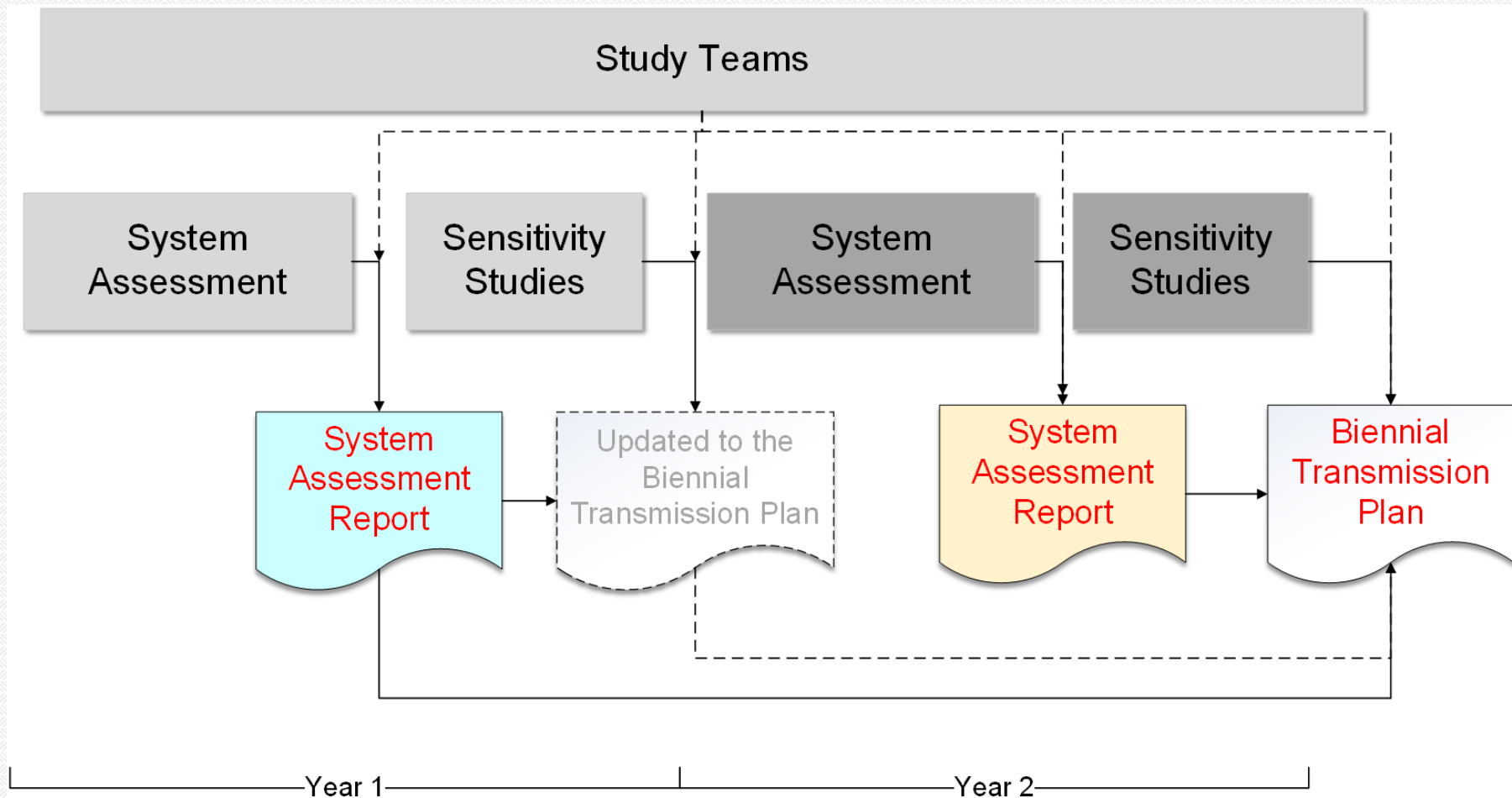


- Independent board and staff
- Open stakeholder process
- Develops Biennial Transmission Expansion Plan & Annual System Assessments
- Conducts studies focused on specific issues
- Planning and Expansion Functional Agreement (PEFA) and Order 1000 Agreement (O1K)
- \$2.4B new transmission investment in ColumbiaGrid planning region 2016 U-BTEP

ColumbiaGrid Ten-Year Plan



ColumbiaGrid Planning Process: Overview



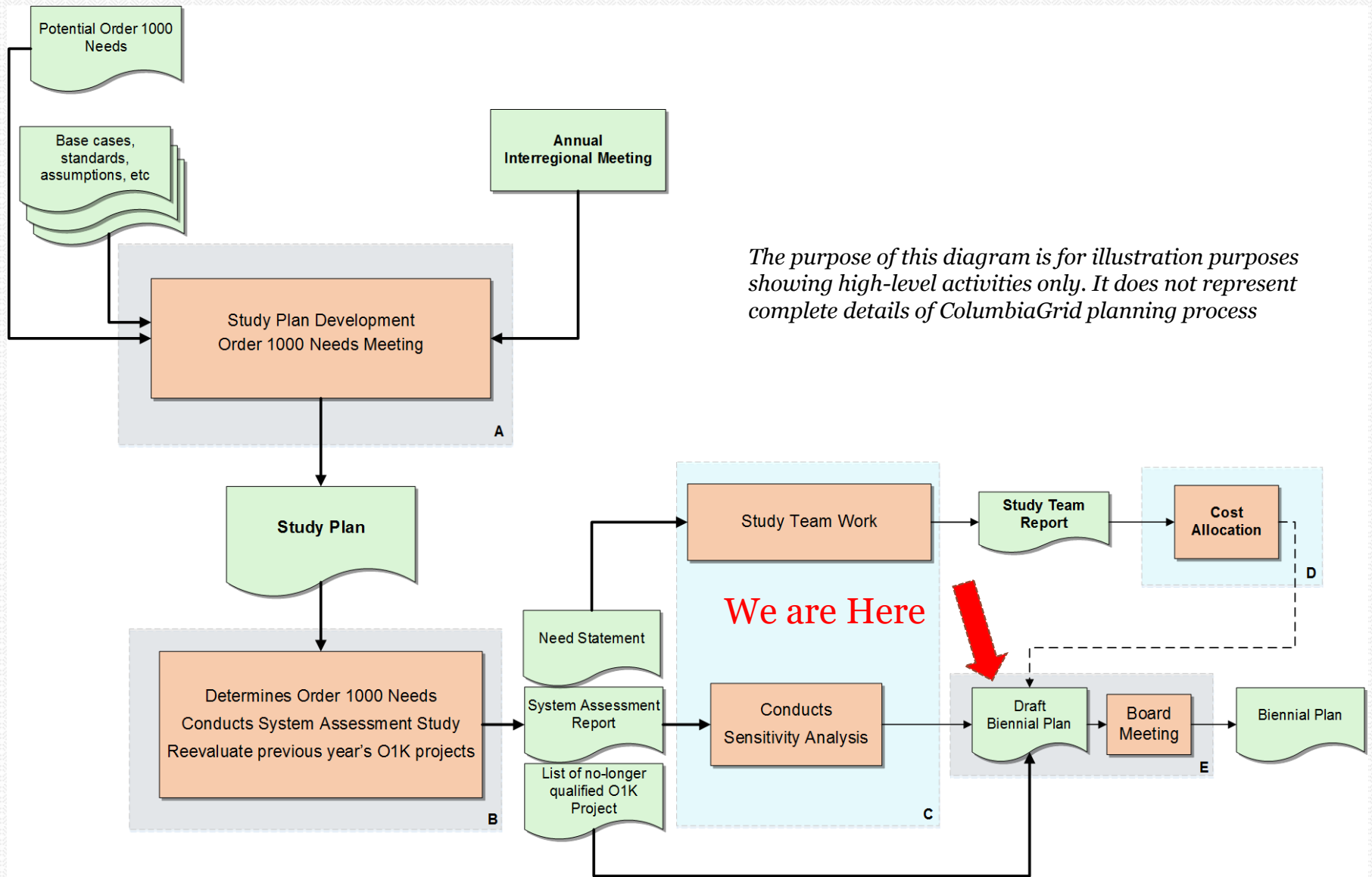
2016 Planning Activities: Status

- **Started in January 2016**
 - Involve both regional and inter-regional activities
 - Issue notifications
 - Develop Study Plan
 - Prepare 2016 base cases, contingencies, data, etc.
- **Kick off meeting was held on February 11, 2016**
 - For both PEFA and Order 1000
 - Discussed planning activities under PEFA
 - Seek input for Order 1000 (Order 1000 Needs Meeting)

2016 Planning Activities: Status

- System Assessment Study has been completed
 - System Assessment study report published in Aug 2016
- Development of 2017 Biennial Plan is ongoing
 - Anticipated completion: Feb 2017
- Other ongoing development
 - Study teams (Puget Sound, Mid Columbia)
 - Regional project review
 - Regional coordination
 - Preparation for 2017 activities

2016 Planning Activities: Where we are today?



Focused Studies & Activities

- 2016 System Assessment
- 2016 Sensitivity Studies
- Transient Stability
- Economic Planning Study
- Study Teams
- WECC Project Coordination
- FERC Order 1000
- Regional Planning Coordination

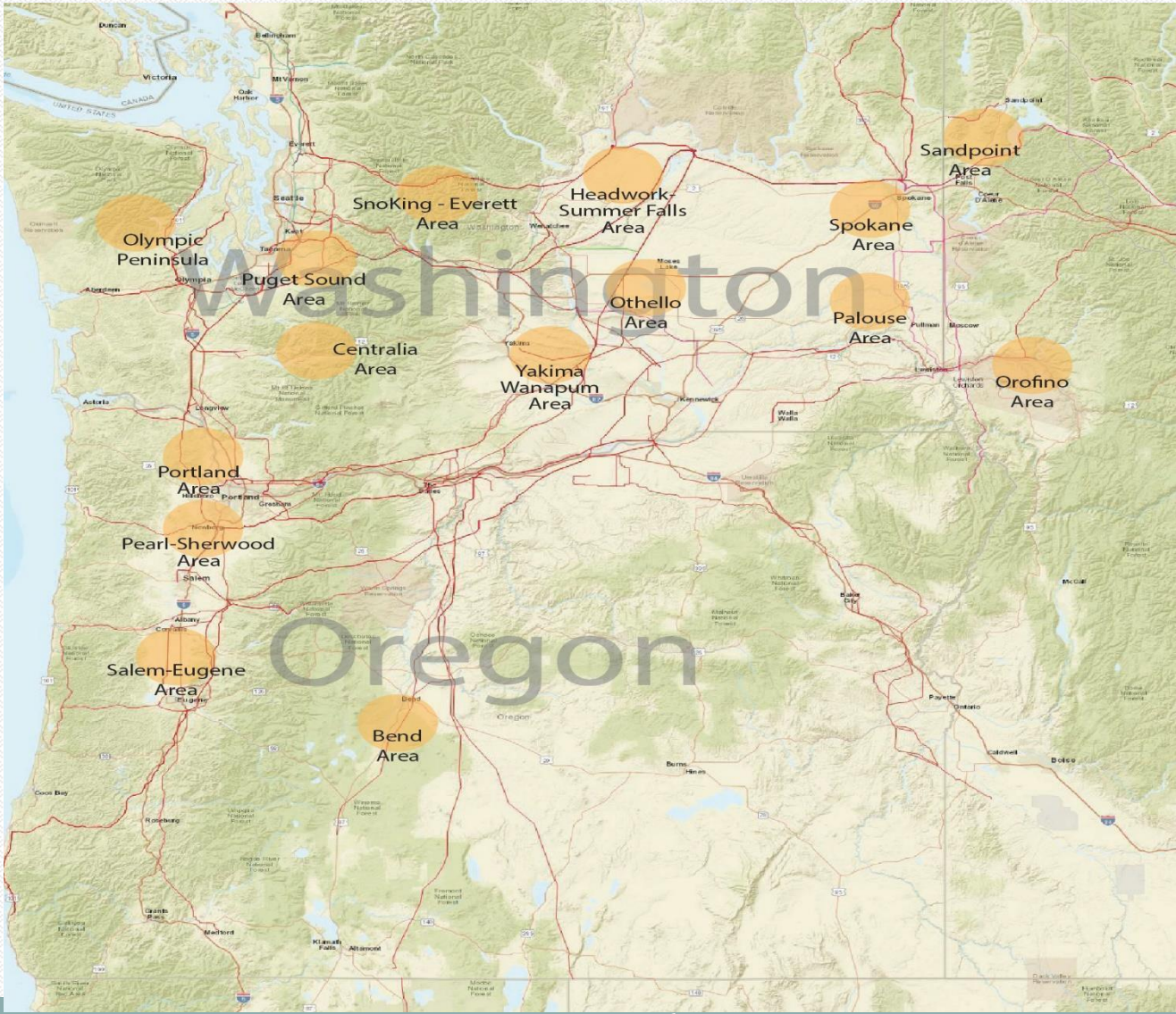
Focused Study: 2016 System Assessment

- Annual study program: Reliability focus
- Include components that satisfy both PEFA and O1K requirements
- Cover major scenarios over the next 10 years
 - Heavy Summer
 - Light Spring
 - Heavy Winter
- Most identified issues are related to load serving
- No major regional/Order 1000 needs identified
- Status: Completed

Focused Study: 2016 System Assessment

- **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
- **Mitigation plans have been proposed/evaluated**

Focused Study: 2016 System Assessment



Focused Study: 2016 System Assessment

- 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
 - Load reduction could lead to potential deferral of transmission projects

Focused Study: 2016 System Assessment

| 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 |

Focused Study: 2016 Sensitivity Studies

- **Special studies**
 - Each year's study scope is defined by planning parties
- **Status: Completed**
- **Three studies for 2016**
 - N-1-1
 - Extra-Heavy Winter Case
 - High renewable case
- **No major reliability issue has been identified**

Focused Study: Transient Stability

- **New study recently added to the study program**
 - Capability to evaluate system behavior during transient period (e.g. 0-20 secs after major outages)
- **Focus on 2 major areas**
 - Model validation: Validate WECC dynamic data, identify and correct data issues
 - Assess system performance: During transient period
- **Support NERC standards compliance**
 - Transmission Planning standards
 - Model Validation standards

Focused Study: 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)

Focused Study: EPS – 2015 Study Results

- **Key changes to study assumptions**
 - 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

Focused Study: Study Teams

- **Three active Study Teams in 2016**
- **Othello Study Team**
 - Evaluated potential impacts to neighboring systems from Saddle Mountain Transmission Project (Avista)
 - Completed its activities in early 2016
- **Puget Sound Study Team (PSAT)**
 - Evaluated potential impacts due to load reduction in Puget Sound area
 - Recommended deferral of the Delridge – Duwamish upgrade
 - Continue to monitor system conditions due to potential load changes
- **Sensitivity of Alcoa load**
 - Evaluated potential impacts due to load reduction in Mid Columbia area
 - Just started

Focused Study: WECC Project Coordination

- **Pacific DC Intertie (Phase II - Ongoing)**
 - Ongoing, led by BPA
 - Capability could initially increase to as high as 3800 MW
 - WECC Path Rating – Phase II
 - Currently, the study report has been issued

Focused Activities: FERC Order 1000

- In 2016, two submission windows were created for stakeholder participations
 - Order 1000 Needs suggestion (regional process)
 - Interregional Transmission Project proposal (ITP, Inter-regional process)
- No submission was received
- However, ColumbiaGrid has been coordinating, sharing information, and assisting other regions in the ITP evaluation process

Focused Activities: FERC Order 1000

- Two major upcoming activities in early 2017
- ColumbiaGrid Order 1000 Needs Suggestion window
 - Regional process
 - Opportunity to suggest study scenarios to ColumbiaGrid as part of Order 1000
 - Will be opened between Jan-Mar 2017
- 2017 Annual Interregional Coordination Meeting
 - Interregional process
 - Hosted by ColumbiaGrid
 - February 23, 2017 in Portland, Oregon

Focused Activities: Regional Planning Coordination

- **ColumbiaGrid has been coordinating and sharing information with other regions**
 - Part of Order 890, 1000 process
 - Sharing study assumptions, models, results with other regions
 - Participate in weekly coordination call with representatives from other regions
 - Participate in Bi-Weekly technical calls with Subject Matter Experts from other regions
 - Other issues as required by the Orders



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