Topics

• ColumbiaGrid (CG) planning process
  • 2020 System Assessment
  • 2020 Biennial Transmission Expansion Plan (2020 BTEP)

• Review 2019 System Assessment
  • SA regional Needs identification, summary of study results

• Order 1000

• Information and notifications
CG Planning Process Overview

Study Teams

System Assessment

Sensitivity Studies

System Assessment

Sensitivity Studies

System Assessment Report

Update to the Biennial Transmission Plan

System Assessment Report

Biennial Transmission Plan

Year 1
2019

Year 2
2020
Key activities in the 2019-2020 planning cycle

- 2020 Draft Study Plan posted January 2020
- 2020 System Assessment will be completed in June 2020
- The 2020 Biennial Transmission Expansion Plan will be completed in October 2020
• ColumbiaGrid 2019 Biennial Transmission Expansion Plan
  Approved February 2019

Key Contents

• Ten-year Regional Plan Projects
• Area Coordinator & Base Case Development
• System Assessment Results
• Order 1000 activities
• Study Team activities
• Special Studies
• Economic Planning Study
2019 System Assessment

- Final report posted on ColumbiaGrid website at: [2019 System Assessment Report](#)

- Key Contents
  - Statement of Needs
  - Planning Process
  - System Assessment Results
  - Order 1000 activities
  - Other Planning Activities
  - Special Studies
  - Biennial Ten-year Regional Transmission Expansion Plan (Appendix B)
# 2019 Planning Process – Base Cases

<table>
<thead>
<tr>
<th>Initial WECC Case</th>
<th>Study Year</th>
<th>Study Case</th>
<th>Study Plan</th>
<th>Contingencies</th>
<th>Dynamics</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>19HS3-OP</td>
<td>21</td>
<td>1-2 yr Heavy Summer</td>
<td>Member Use</td>
<td>Yes/Member Use</td>
<td>Yes/Member Use</td>
<td></td>
</tr>
<tr>
<td>19HW3-OP</td>
<td>21</td>
<td>1-2 yr Heavy Winter</td>
<td>Member Use</td>
<td>Yes/Member Use</td>
<td>Yes/Member Use</td>
<td></td>
</tr>
<tr>
<td>21LSP1-S</td>
<td>21</td>
<td>Near Term Light Load</td>
<td>Study</td>
<td>Yes</td>
<td>Yes</td>
<td>Adj Gen/Load Pattern based on feedback to prevent repeat study from 2018</td>
</tr>
<tr>
<td>24HS2</td>
<td>24</td>
<td>5 yr Heavy Summer</td>
<td>Member Use</td>
<td>Yes/Member Use</td>
<td>Yes/Member Use</td>
<td>Obtain &amp; apply Gen/load for year +1, Adjust Dynamics if needed</td>
</tr>
<tr>
<td>24HW2</td>
<td>24</td>
<td>5 yr Heavy Winter</td>
<td>Study</td>
<td>Yes</td>
<td>No (Next Year)</td>
<td>Obtain &amp; apply Gen/load for year +1</td>
</tr>
<tr>
<td>29HS1</td>
<td>29</td>
<td>10 yr Heavy Summer</td>
<td>Study</td>
<td>Yes</td>
<td>No (Next Year)</td>
<td></td>
</tr>
<tr>
<td>29HW1</td>
<td>29</td>
<td>10 yr Heavy Winter</td>
<td>Study</td>
<td>Yes</td>
<td>Yes/Member Use</td>
<td></td>
</tr>
</tbody>
</table>
Four cases were used by ColumbiaGrid in the 2019 System Assessment

- 2021 Light Spring
- 2024 Heavy Winter
- 2029 Heavy Summer and Heavy Winter

<table>
<thead>
<tr>
<th>Initial WECC Case</th>
<th>Study Year</th>
<th>Study Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>21LSP1-S</td>
<td>2021</td>
<td>Near Term Light Load</td>
</tr>
<tr>
<td>24HW2</td>
<td>2024</td>
<td>5 year Heavy Winter</td>
</tr>
<tr>
<td>29HS1</td>
<td>2029</td>
<td>10 year Heavy Summer</td>
</tr>
<tr>
<td>29HW1</td>
<td>2029</td>
<td>10 year Heavy Winter</td>
</tr>
</tbody>
</table>
2019 System Assessment: Loads

- Load forecasts for entire NW area increased an average of 6% over levels in the 2018 SA
- Largest forecast increase occurred with the ten-year Heavy Summer case at about 9%
Comparison of load forecast by load area between 2018 and 2019 System Assessments
Adjustments to generation patterns were made for the following reasons:

- Corrections to better represent expected generation patterns (such as adjusting wind generation output levels) by ColumbiaGrid’s planning participants
- Justified changes to represent a new resource or the retirement of an existing resource
- Adjustments to the hydro system to align levels within historical operational bandwidths provided by participants
In the 2019 system assessment, the following adjustments were made to reflect recent retirement status of several coal units in the Northwest.

<table>
<thead>
<tr>
<th>Modeled Generation</th>
<th>Date</th>
<th>MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boardman 1</td>
<td>2020</td>
<td>600</td>
</tr>
<tr>
<td>Centralia 1</td>
<td>2020</td>
<td>700</td>
</tr>
<tr>
<td>Centralia 2</td>
<td>2025</td>
<td>700</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2000</td>
</tr>
</tbody>
</table>
The 2019 SA modeled future projects that planning participants and neighboring entities are committed to build in the 10 year planning horizon to address known transmission deficiencies.

<table>
<thead>
<tr>
<th>Committed Projects Included in All Cases</th>
<th>Sponsor</th>
<th>Expected In-Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia 230 kV Bus Section Breaker</td>
<td>Bonneville Power</td>
<td></td>
</tr>
<tr>
<td>Raver 500/230 kV transformer and a 230 kV line to Covington Substation.</td>
<td>Bonneville Power</td>
<td>2020</td>
</tr>
<tr>
<td>Santiam-Chemawa 230 kV Line Upgrade</td>
<td>Bonneville Power</td>
<td>2019</td>
</tr>
<tr>
<td>Tacoma 230 kV Bus Section Breaker</td>
<td>Bonneville Power</td>
<td>2021</td>
</tr>
<tr>
<td>Lower Valley Reinforcement (Hooper Springs)</td>
<td>Bonneville Power</td>
<td>2019</td>
</tr>
<tr>
<td>South Cowlitz County Project</td>
<td>Cowlitz County PUD</td>
<td>2019</td>
</tr>
<tr>
<td>Lone Pine Substation</td>
<td>Douglas County PUD</td>
<td>2020</td>
</tr>
<tr>
<td>Rapids-Columbia 230 kV Line and Columbia Terminal</td>
<td>Douglas County PUD</td>
<td>2020</td>
</tr>
<tr>
<td>Rocky Ford - Dover 115 kV Line</td>
<td>Grant County PUD</td>
<td>2019</td>
</tr>
</tbody>
</table>
2019 SA: Transmission Projects

<table>
<thead>
<tr>
<th>Committed Projects in 5 Year &amp; 10 Year Cases</th>
<th>Sponsor</th>
<th>Expected In-Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benton-Othello 115 kV Line Upgrade</td>
<td>Avista</td>
<td></td>
</tr>
<tr>
<td>Irvin Project - Spokane Valley Transmission Reinforcements</td>
<td>Avista</td>
<td>2020</td>
</tr>
<tr>
<td>Big Eddy 230/115 kV Transformer #1 Replacement</td>
<td>Bonneville Power</td>
<td>2020</td>
</tr>
<tr>
<td>John Day-Big Eddy 500 kV #1 Line Reconstructor</td>
<td>Bonneville Power</td>
<td></td>
</tr>
<tr>
<td>Troutdale 230kV Bus Section Breaker</td>
<td>Bonneville Power</td>
<td></td>
</tr>
<tr>
<td>Rocky Reach-Chelan #1 115 kV Re-termination</td>
<td>Chelan County PUD</td>
<td>2022</td>
</tr>
</tbody>
</table>

For a complete listing of transmission projects in ColumbiaGrid’s ten-year plan, please refer to Appendix B of the System Assessment report.
2019 System Assessment: Study Results

- The studies primarily focused on contingency analysis to identify potential multi-system issues
  - Thermal overloads
  - Voltage issues
  - Stability
- Six (6) joint areas of concern (or potential needs) were identified for potential thermal overloads
- Five (5) of these areas were identified last year’s System Assessment (recurring areas)
2019 System Assessment: Study Results

- One (1) new area of concern was identified for the first time in the 2019 System Assessment.
- Two (2) joint areas of concern identified in the 2018 System Assessment no longer have any identified issues and are now considered to be resolved areas.
## 2019 System Assessment: Study Results

<table>
<thead>
<tr>
<th>No</th>
<th>Area of Concern or Need</th>
<th>Identified in</th>
<th>Note/Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2018 SA</td>
<td>2019 SA</td>
</tr>
<tr>
<td>1</td>
<td>Palouse</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>Bend</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>1</td>
<td>Centralia / Olympic Peninsula</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>2</td>
<td>Othello</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>3</td>
<td>Puget Sound</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>4</td>
<td>Spokane</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>5</td>
<td>Quincy in the Mid-Columbia</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>6</td>
<td>North Oregon Coast</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>
Approximated locations of joint areas of concern
Thermal Issues

• Resolved
  Two joint areas of concern that were reported in the 2018 SA were resolved in this year’s SA study
  • Palouse Area – reduced area forecast
  • Bend Area – Pacificorp load tripping operating procedure

• Recurring
  Five joint areas of concern that were reported in the 2018 SA were identified again in the 2019 SA
  • Centralia Area / Olympic Peninsula Area – possible reactive power deficiencies
2019 System Assessment: Study Results

• Recurring (Cont’d)
  • Othello Area – line upgrade project is being planned to address this issue
  • Puget Sound Area – These issues addressed by the Puget Sound Area Study Team
  • Spokane Area - The Westside substation upgrade project addresses the Westside transformer issue. Bonneville and Avista are jointly working together to address the Bell transformer overload issue. No study team is planned.
  • Mid-Columbia Quincy Area – These issues are being addressed by Quincy Area Study Team participants
• **New**

  • North Oregon Coast Area - These issues were alleviated in the 2018 SA due to reduced load projections. An increase in the 2019 SA’s area load projection has caused the issues to return.

  • Since there is only one ColumbiaGrid Planning Party involved, these issues will be the responsibility of the affected Planning Parties to resolve and no study team is proposed.
Voltage issues

This year’s study screened for significant voltage deviation, low or high voltage issues in the 2029 heavy summer and 2029 heavy winter cases. Study results showed no voltage problems.

Voltage stability issues and unsolved contingencies

Study results showed 8 areas that did not solve in one or more of the studied cases and also had no known mitigation plans

- Columbia Falls Area – System reconfiguration (switching) or load tripping could mitigate this issue
Voltage stability issues and unsolved contingencies (Cont’d)

- Rathdrum Area - System reconfiguration (switching) or local generation can mitigate this issue.
- Mid-Columbia Area - Local RAS to run back Wells generation can mitigate this problem.
- Teton Area - The BPA Lower Valley Reinforcement (Hooper Springs) project will mitigate this issue.
- Redmond-Bend Area - A remedial action scheme has been designed to prevent the system from instability.
Voltage stability issues and unsolved contingencies (Cont’d)

- **Wasco Area** - A planned shunt capacitor at De Moss will mitigate this problem.
- **Southern Oregon Area** - Shedding load or voltage support is needed to prevent the issue.
- **Eugene Area** - Low voltages in the heavy winter cases may be mitigated by shedding load.
Transient stability issues

In the 2019 SA, the 2021 Light Spring case was used for the transient stability evaluation. The following table provides a summary of the transient stability assessment and contingencies needing further review.

<table>
<thead>
<tr>
<th>Member System Submission</th>
<th>No. of Submitted Contingencies</th>
<th>Contingencies Needing Follow up</th>
<th>Outage Types</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avista Corporation</td>
<td>1343</td>
<td>2</td>
<td>P1.2</td>
<td>Undamped Oscillations</td>
</tr>
<tr>
<td>Puget Sound Energy</td>
<td>723</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Tacoma Power</td>
<td>160</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Chelan County PUD</td>
<td>73</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Grant County PUD</td>
<td>145</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Snohomish County PUD</td>
<td>55</td>
<td>0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3353</td>
<td>22</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*** CAISO Public ***
Economic Planning Study

- Production Cost Simulation, conducted annually
- Assess potential future system conditions and provide information on projected trends to planning parties

2019 EPS study

- Ten year study scenario (2029)
- 2019-2020 study results will be included in the EPS section of the 2020 BTEP
Order 1000 Update

• Current status
  • Jurisdictional parties notice of withdrawal from CG Order 1000 Functional Agreement effective April 2, 2020
  • Coincides with NorthernGrid parties request to FERC for an April 1 effective date for NG
  • ColumbiaGrid, Avista, and PSE will reassess the Order 1000 FA termination date in the event that FERC does not grant an April 1 effective date for NG

• Key activities
  • Potential Needs submission window
  • Interregional Transmission Project submission window
  • System Assessment: Order 1000 Needs identification
To facilitate input from ColumbiaGrid members and the public, a Suggested Potential Needs submission window was opened

- Suggestions of items to be considered for evaluation as Order 1000 Potential Needs driven by reliability needs, economic considerations or public policy requirements.
- Interested persons may submit written suggestions of items to be considered for inclusion as Order 1000 Potential Needs and, if included, to be evaluated in the 2020 System Assessment.
• **Order 1000 Potential Needs (Cont’d)**
  
  • Potential Needs submission window open January 1, 2020 through March 31, 2020
  
  • To date, no suggestions of Order 1000 Potential Needs have been submitted to ColumbiaGrid during this submittal window.
Concurrently, ColumbiaGrid has developed its draft Study Plan for the 2020 System Assessment
• Posted on ColumbiaGrid website

Technical studies will be conducted after the Study Plan has been finalized

Regional planning activities will be documented in the 2020 System Assessment report to be completed by June 2020
• Interregional Transmission Project (ITP) submission window opened
  • January 1, 2020 through March 31, 2020
  • ITP submission form is available on ColumbiaGrid’s Order 1000 Interregional Overview webpage: ColumbiaGrid ITP Submission Form
  • In order for an ITP to be considered by ColumbiaGrid in this planning cycle, a proponent must submit the completed form to the Order 1000 mailbox at: order1000@columbiagrid.org by the March 31, 2020 deadline.
Three public meetings have been scheduled for 2020

- January 23, 2020, Portland, OR
- May 14, 2020, Portland, OR
- September 17, 2020, Portland, OR
Stay Informed About Future Activities

- Public notifications
  - ColumbiaGrid will notify interested persons regarding future activities through email
  - Self-register system
  - Refer to “Join Interest List” on ColumbiaGrid’s main page
Stay Informed About Future Activities

COLUMBIAGRID is a regional planning entity in the Western Interconnection, going beyond the requirements of FERC’s Order 890 & Order 1000. Learn More

CURRENT PROGRAMS

Mission, Vision & Values
ColumbiaGrid is a membership non-profit corporation providing regional grid planning in the Northwest portion of the Western Interconnection that strives for excellence and exists to:
- ensure and enhance the reliability of the transmission grid via collaborative, cooperative, cost-effective, efficient and insightful long-term regional transmission (‘grid’) expansion planning consistent with planning and reliability standards (i.e. our Core services); and

EVENTS

February 17, 2020
Presidents’ Day - Office Closed

February 19, 2020 8:00 - 9:20
Members’ Roundtable Meeting

February 19, 2020 9:30-12:30
Board Meeting

February 27, 2020 10:00 - 3:00
Annual interregional Coordination Meeting

May 14, 2020 9:00-3:00
Planning Meeting

RECENT ANNOUNCEMENTS

December 17, 2019
2020 Budget & Meeting Schedule Approved

September 30, 2019
ColumbiaGrid has completed the 2010 System Assessment

September 13, 2019
ColumbiaGrid presentation to the WUTC
Additional Information Regarding ColumbiaGrid’s Regional Planning Process is available at:

www.ColumbiaGrid.org
Questions

Presenter Contact Information:

Larry Furumasu, Furumasu@ColumbiaGrid.org