Northwest Power and Conservation Council

October 25, 2012

MEMORANDUM

TO: Council Members

FROM: Charlie Black, Power Planning Division Director

SUBJECT: Briefing on Regional Transmission Organization Activities

At the meeting in Coeur d'Alene on November 7, the Council will hear presentations by two of the region's power transmission organizations. Allen Burns, ColumbiaGrid CEO will report on his organization's activities. A representative of the Northern Tier Transmission Group will also report on its activities. Brief descriptions of both organizations are attached.

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ColumbiaGrid

ColumbiaGrid is a non-profit membership corporation formed in 2006 to improve the operational efficiency, reliability, and planned expansion of the Pacific Northwest transmission grid. The corporation itself does not own transmission, but its members and the parties to its agreements own and operate an extensive network of transmission facilities.

ColumbiaGrid has substantive responsibilities for transmission planning, reliability, Open-Access Same-Time Information System (OASIS), and other development services. These tasks are defined and funded through a series of "Functional Agreements" with members and other participants. Development of these agreements is carried out in a public process with broad participation.

ColumbiaGrid members include: Avista Corporation; Bonneville Power Administration; Chelan County PUD; Grant County PUD; Puget Sound Energy; Seattle City Light; Snohomish County PUD; and Tacoma Power.

Northern Tier transmission Group

The Northern Tier Transmission Group (NTTG) is a group of transmission providers and customers that are actively involved in the sale and purchase of transmission capacity of the power grid that delivers electricity to customers in the Northwest and Mountain States. Transmission owners serving this territory work in conjunction with state governments, customers, and other stakeholders to improve the operations of and chart the future for the grid that links all of these service territories.

NTTG coordinates individual transmission systems operations, products, business practices, and planning of their high-voltage transmission network to meet and improve transmission services that deliver power to consumers.

Northern Tier Transmission Group members are committed to working with stakeholders and state officials to increase efficient use of the grid and to develop the infrastructure needed to deliver new renewable and thermal power resources to customers. NTTG is a proactive group devoted to a collaborative, step-by-step, approach to achieve prompt and cost-effective results.

Northern Tier Transmission Group members include: Deseret Power Electric Cooperative; Idaho Power; NorthWestern Energy; PacifiCorp; Portland General Electric; and Utah Associated Municipal Power Systems.

ColumbiaGrid Presentation

Regional Transmission Issues
NWPCC Meeting

Allen Burns, President and CEO

November 7, 2012

What is ColumbiaGrid?

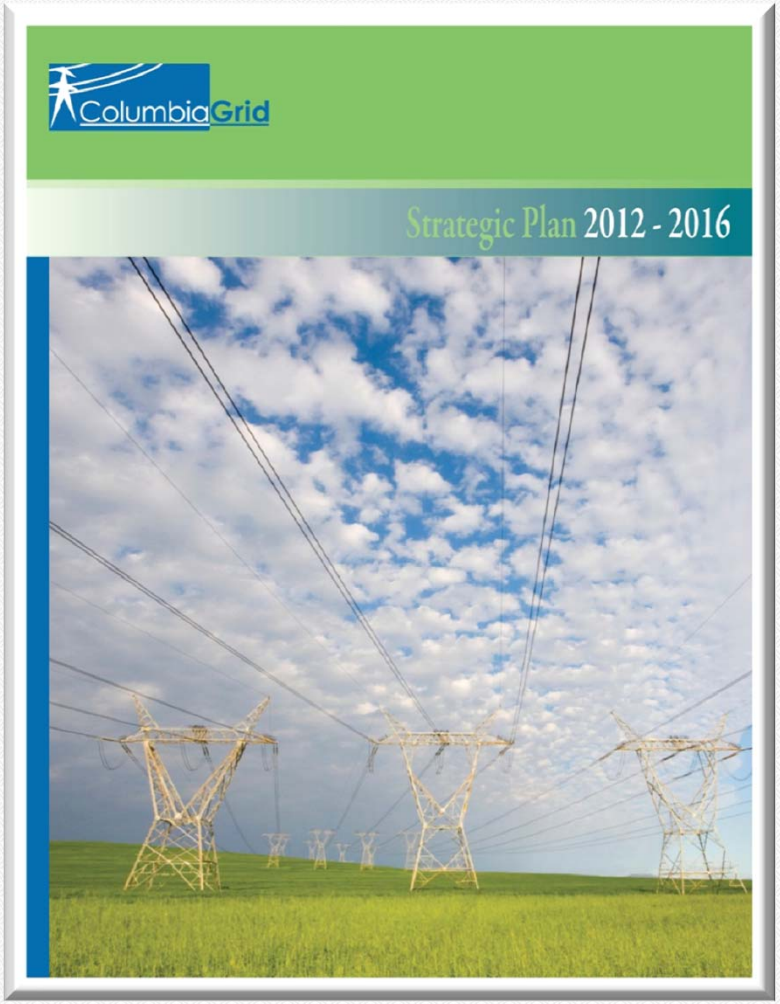
- Non-profit membership corporation, formed by utilities in the region in 2006 (www.columbiagrid.org)
- Purposes
  - Improve reliability and efficient use of the regional transmission grid
  - Cost-effective regional transmission planning and expansion
  - Develop and facilitate the implementation of solutions to transmission-related issues
- ColumbiaGrid does not
  - Own, construct, or operate transmission facilities.
  - Advocate or lobby
- Independent 3 member board elected by members
- Members control work scope via Functional Agreements

Members and Planning Participants

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

* PEFA Planning Participants

Strategic Plan



http://www.columbiagrid.org/books/interactive/2012SP/index.html

Mission and Vision

- Mission Statement:
  - ColumbiaGrid's mission is to improve the planning, expansion, and efficient use of the Northwest Transmission Grid.
- Vision Statement:
  - ColumbiaGrid is a catalyst for developing innovative solutions to the challenges facing the Northwest transmission grid.

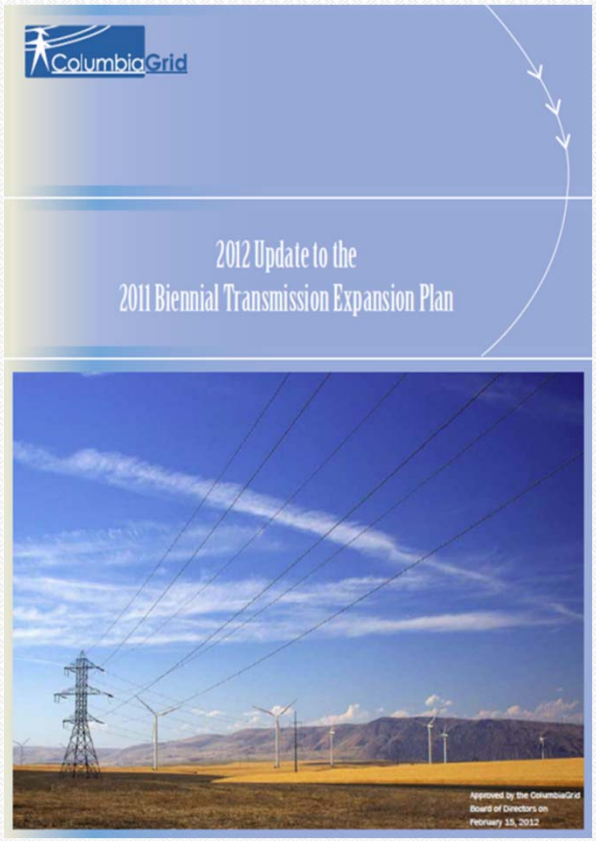
Core Values

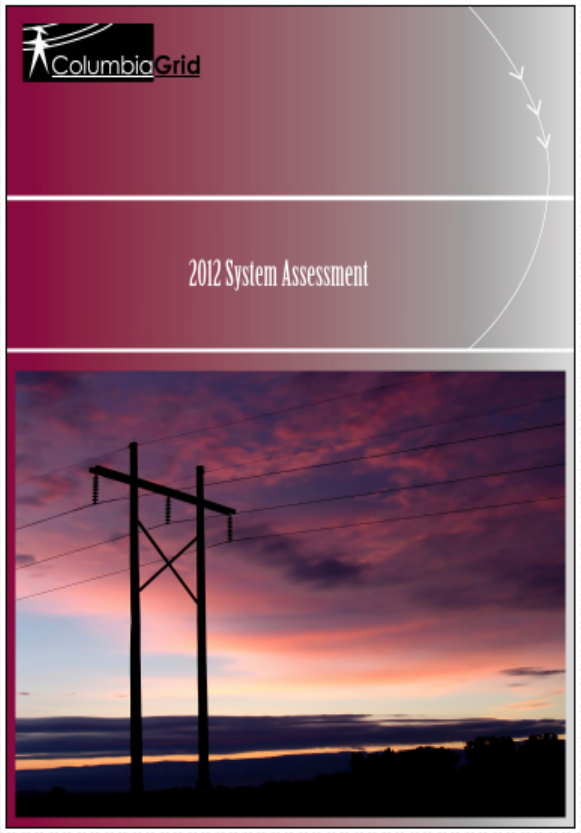
- Collaboration
  - We are recognized for exceptional collaboration with stakeholders throughout the NW and WECC regions.
- Transparency and Independence
  - Independent 3 member board elected by members.
- Technical Excellence
  - Staff is recognized for expertise and neutral, forthright, respectful manner in which they perform their jobs.
- Member Driven
  - The work we do is defined by what our members and participating parties want and need.
- Solutions Oriented
  - As a think tank, ColumbiaGrid works with members and participating parties to facilitate the development of ideas and solutions.

Long Term Goals

- Create partnerships and enhance regional collaboration.
- Excel at transmission planning that drives efficient grid expansion.
- Be a leader in conceiving, developing, and analyzing solutions that optimize grid use.
- Ensure ColumbiaGrid has a team of versatile, talented, and industry-leading experts, that delivers high value to our members.

ColumbiaGrid Planning



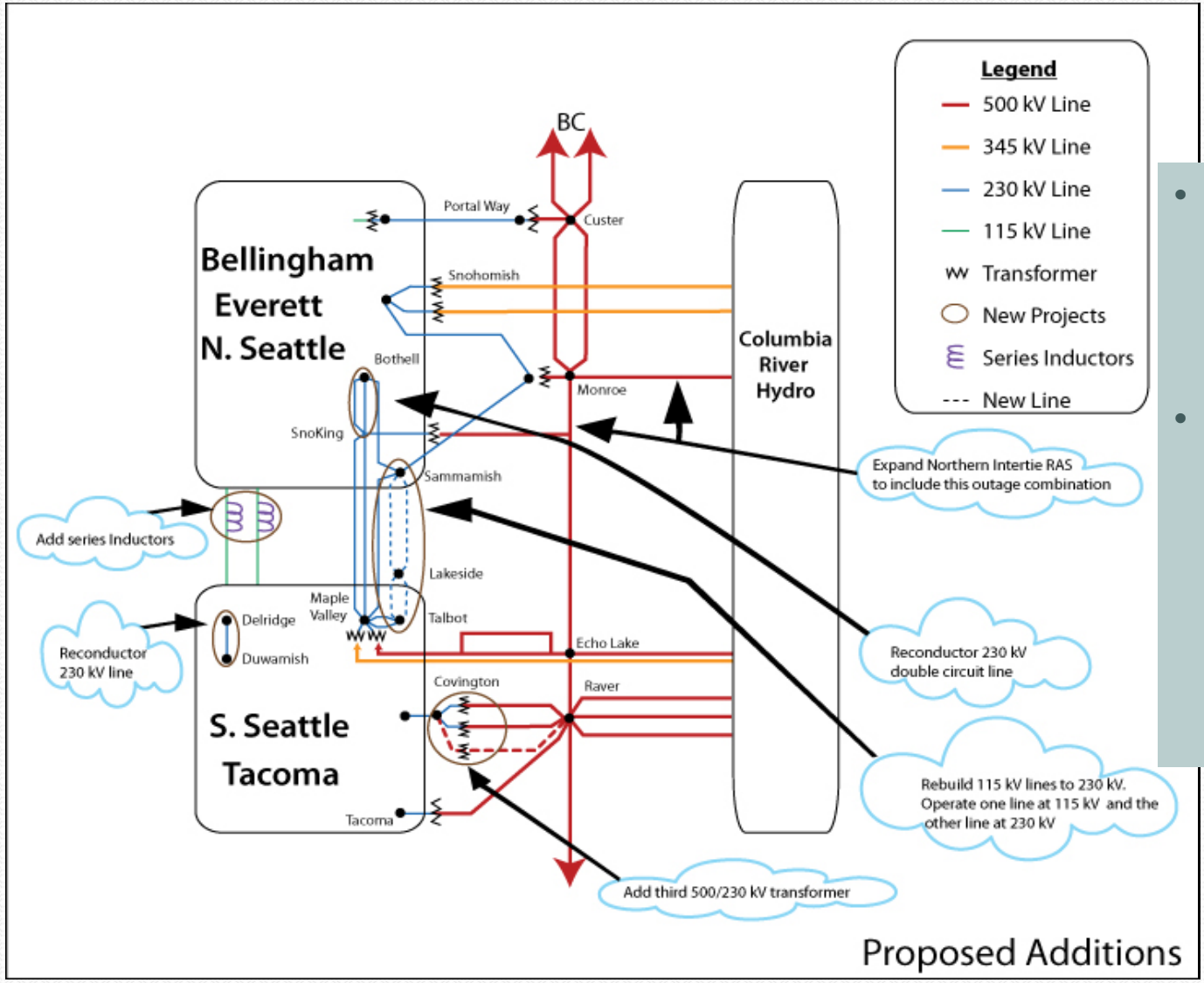


- Independent Staff
- Open Stakeholder Process
- Develops Biennial Transmission Expansion Plan
- Conducts Studies Focused on Specific Issues
- Cost Allocation

Planning Overview

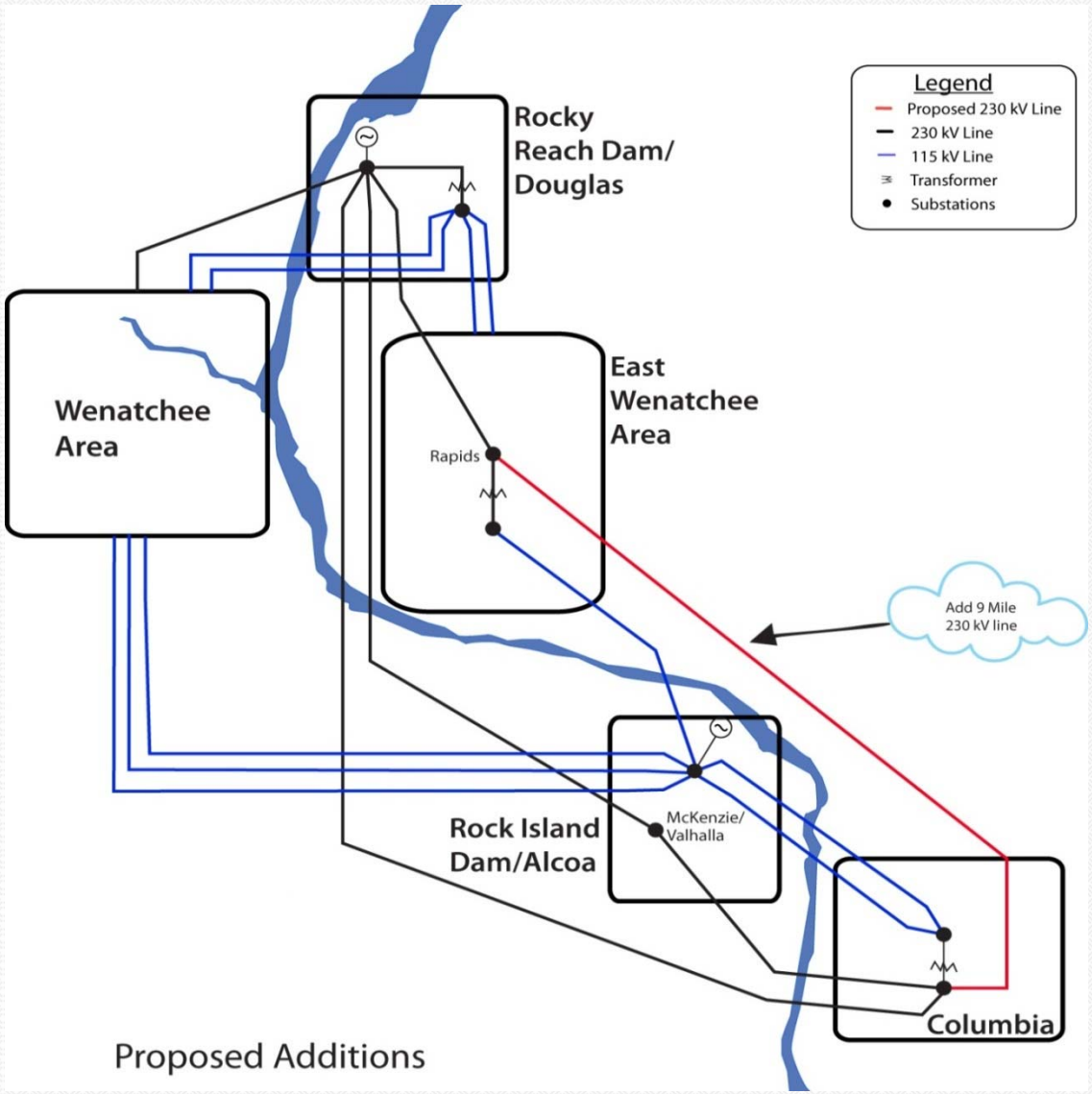
- Study Team Reports
  - Puget Sound
  - Northern Mid-C
  - Wind Integration
  - Gas-Electric Interdependency
  - Proposed Sensitivity Studies
- Subregional Planning Group Coordination
- Order 1000
- Interregional Development

Puget Sound Area Study Team



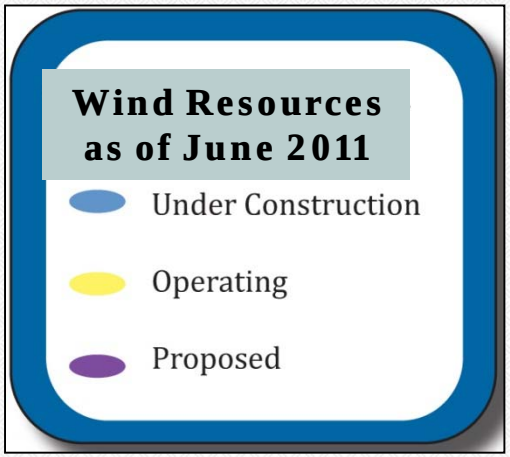
- Continuing to refine plan and study north to south transfer capability
- Small group working on IEEE paper on Transmission Curtailment Risk Measure (TCRM) study approach

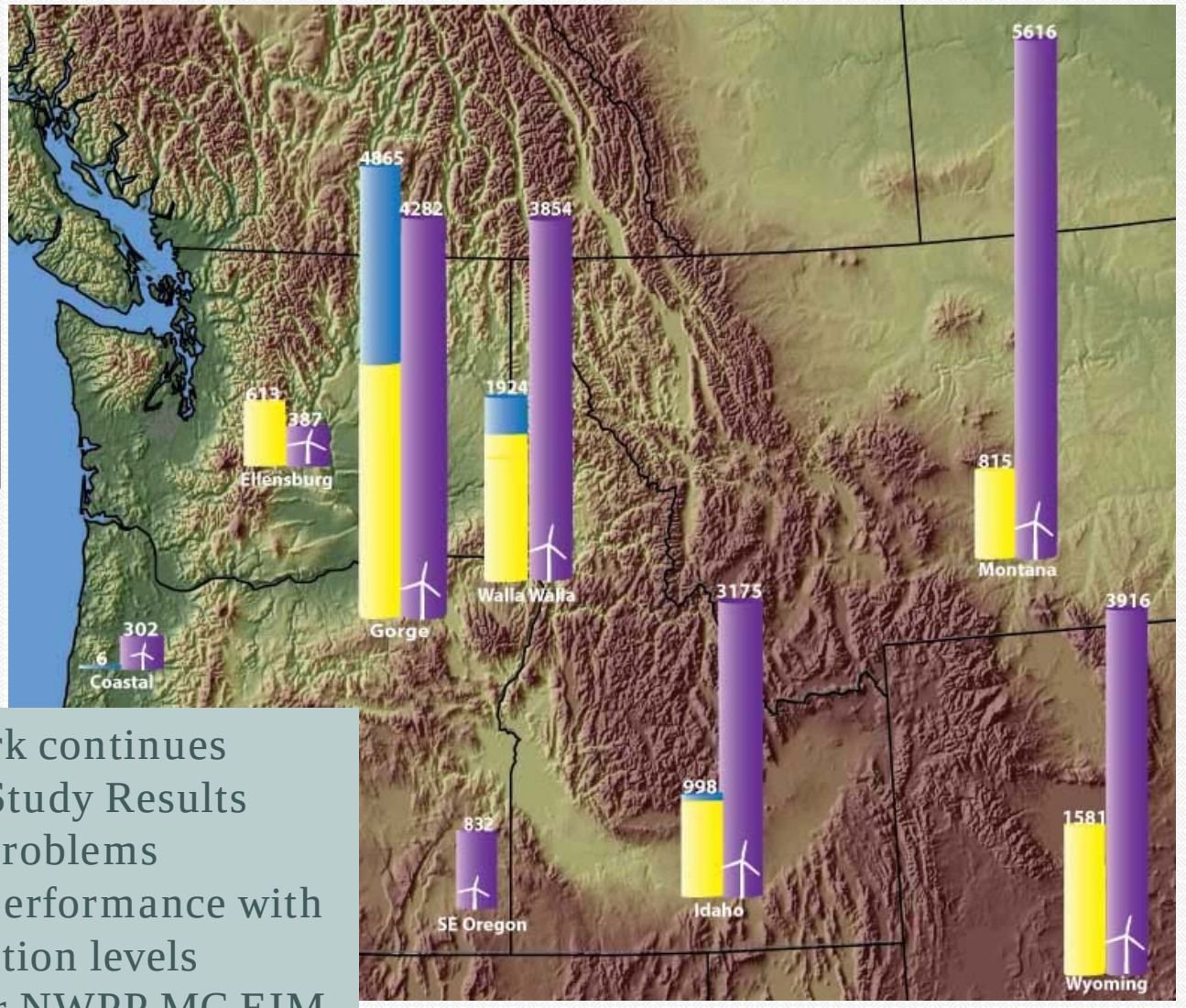
Northern Mid-Columbia Study Team



- Cost allocation agreed upon
- Construction could begin in 2014
- Sensitivity study proposed in System Assessment

Wind Integration Study Team





- DTC Task Force work continues
- Reviewing Phase 3 Study Results
- Documenting past problems
- Extrapolating past performance with higher wind penetration levels
- Developing TVLs for NWPP MC EIM

ColumbiaGrid

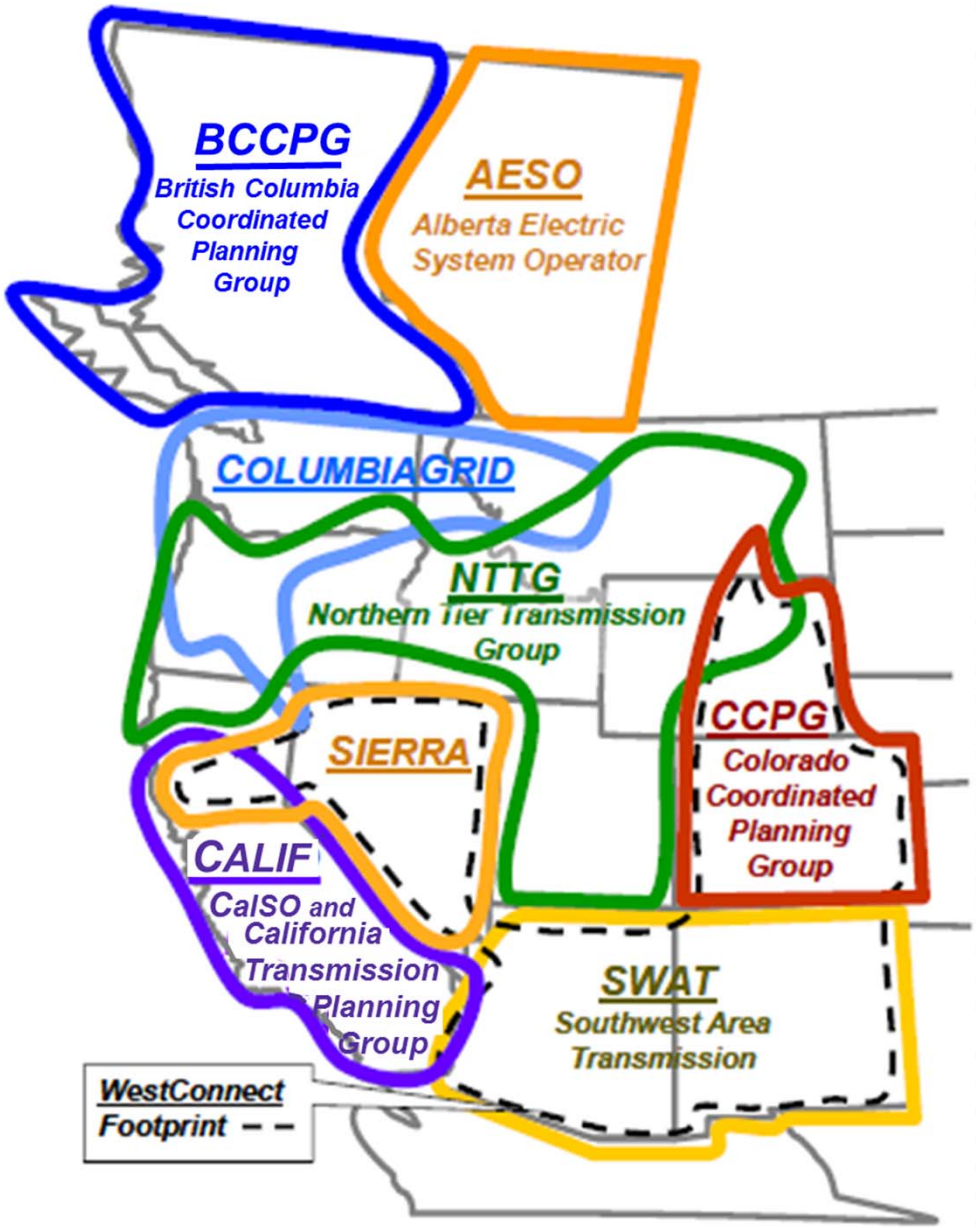
Gas-Electric Interdependencies Study Team

- I-5 corridor reliability is dependent on natural gas fired generation
  - Critical period is winter peak
- Traditional studies assumed an unlimited natural gas supply to these plants
  - Study Team will determine if this is a correct assumption
- Working with the Pacific Northwest Utilities Conference Committee (PNUCC) and the Northwest Gas Association (NWGA)
- First phase will be to determine whether plants with dual fuel capability are sufficient to ensure reliable service
  - About half of the natural gas generation in this area has dual fuel capability

Proposed Sensitivity Studies

1. Further study of unsolved outages and voltage stability issues
2. Impact of Starwood transformer on Tacoma substation bus section outage
3. Transmission assessment of NWPCC Sixth Power Plan*
4. Follow-up Northern Mid C study*
5. Transient Stability Studies on high wind case
6. Natural Gas Dual Fuel sensitivity study*

*Study Teams planned



Subregional Planning Group Coordination Group (SCG)

Status:

1. Developing more formal procedures for coordinating between SPGs
2. Coordinating plan development timelines
3. Facilitating compliance with FERC Order 1000

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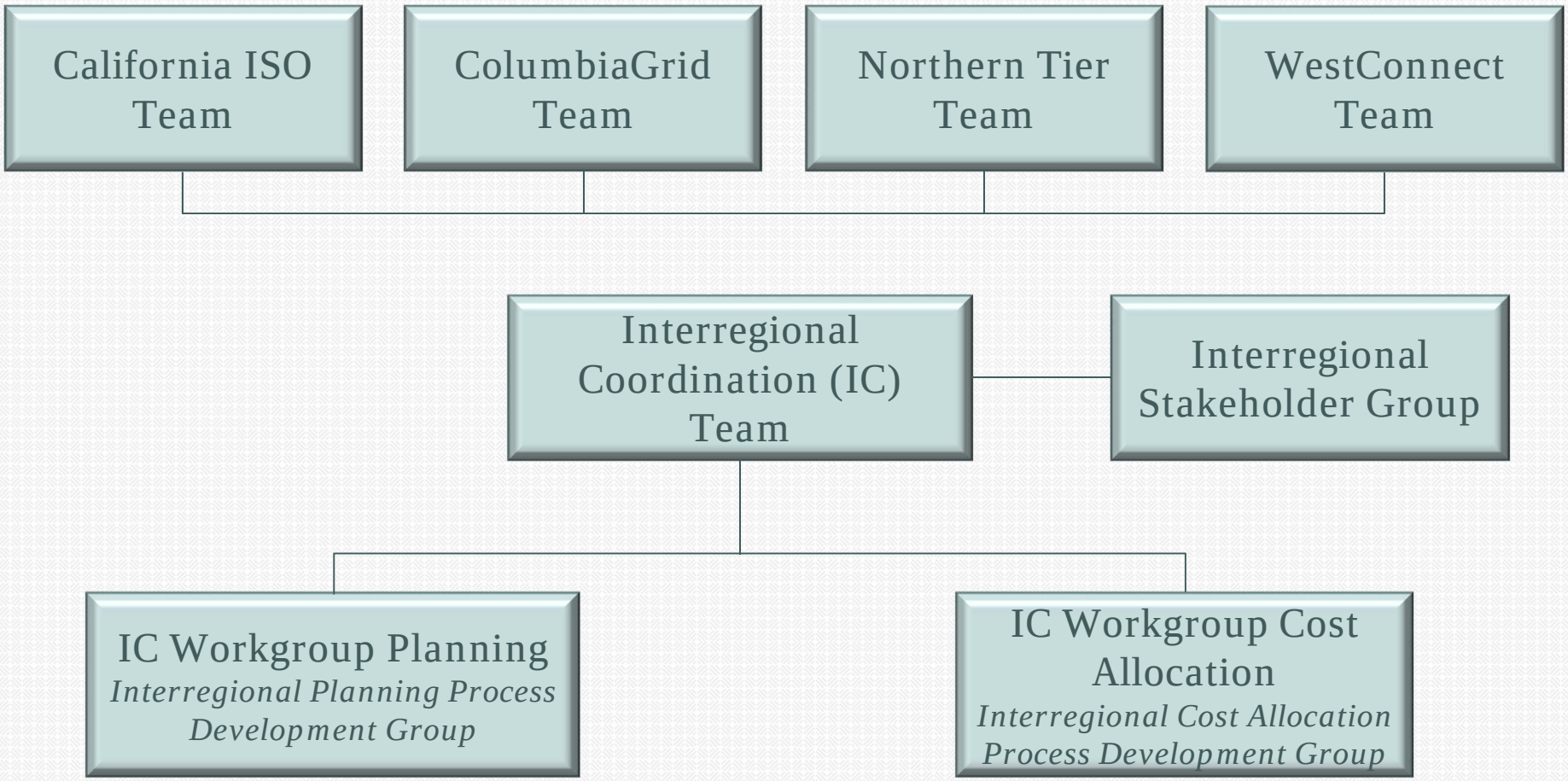
Compliance with Order 1000 (Intra-regional)

Major Order 1000 Planning Elements	Compliance Through ColumbiaGrid/PEFA
Requires participation in a regional transmission planning process.	Jurisdictional public utility transmission providers and non-jurisdictional and federal entities participate in regional transmission planning process under PEFA.
Requires regional transmission planning process to provide opportunity to consider transmission needs driven by Public Policy Requirements.	Clarified that transmission needs driven by Public Policy Requirements are considered in regional transmission planning process.
Requires removal of rights of first refusal and ability for non-incumbents to participate.	ROFR not applicable. Any entity may participate in ColumbiaGrid regional transmission planning.
Requires development of qualification criteria for sponsors and projects (including determination that Project is a more cost effective and efficient solution) for projects selected for purposes of cost allocation ("Order 1000 Projects").	Amended PEFA provides Order 1000 Sponsor and Order 1000 Project qualification criteria, including determination that Order 1000 Project is a more cost effective and efficient solution.
Requires transparent and not unduly discriminatory process for selection of a proposed transmission facility in the regional transmission plan for purposes of cost allocation.	Amended PEFA describes a transparent and not unduly discriminatory process for selecting a proposed transmission facility for purposes of Order 1000 Cost Allocation.
Requires method or set of methods for allocating the costs of new transmission facilities selected for cost allocation purposes.	Amended PEFA includes Order 1000 Cost Allocation methodology for allocating costs of Order 1000 Projects.

Order 1000 (Inter-regional)



ColumbiaGrid Joint Initiative

- Partnership with NTTG and WestConnect
- Products and Services
  - ITAP/webExchange (Intra-hour Transaction Accelerator Platform)
  - Intra-hour Transmission Scheduling
  - Dynamic Scheduling System (DSS)

ColumbiaGrid Products & Services

- Oasis Portal (operational July 2011)
  - One-stop access for transmission services across Avista, BPA, and Puget
  - Transmission resale and related postings by Chelan, Grant, SCL, Snohomish and Tacoma
- Energy Imbalance Market (EIM Analysis)
  - Analyze EIM costs and benefits
- Variable Energy Resources (VER) Diversity Analysis
  - Analyzing the potential with wind data from BPA, PSE and SCL

NWPP MC Initiative Collaboration

- EIM Workgroup
- EMT Workgroup
- Analysis Team
  - ColumbiaGrid is adding Production Cost Modeling Capability

NWPP MC Initiative Timeline

Launch

- Define Problem Statement
- Complete Contractual Arrangements
- Develop Work Plan
- Recruit Utility Staff and Other Resources

Education

- Other Region's Same-Day Market Design
- Existing and Emerging Market/ Operational Tools
- Review Existing Benefits Studies

Define Alternatives

- Energy Imbalance Market Alternative
- Enhanced Market/ Operational Tools Alternatives

Evaluation

- "Measuring Stick" is Problem Statement
- Modeling Tools and Assumptions
- Gather Data/Refine Alternatives
- Iterate Runs of Benefits Model and Refining Inputs and Methodology
- Estimate Implementation Costs

Decision Quality Assessment

- Comparison of Alternatives
- Recommend Best Strategy to Address the Identified Problems

*** December 2012**
EC meets in November to discuss timeline

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Questions/Discussion

NTTG Transmission Planning

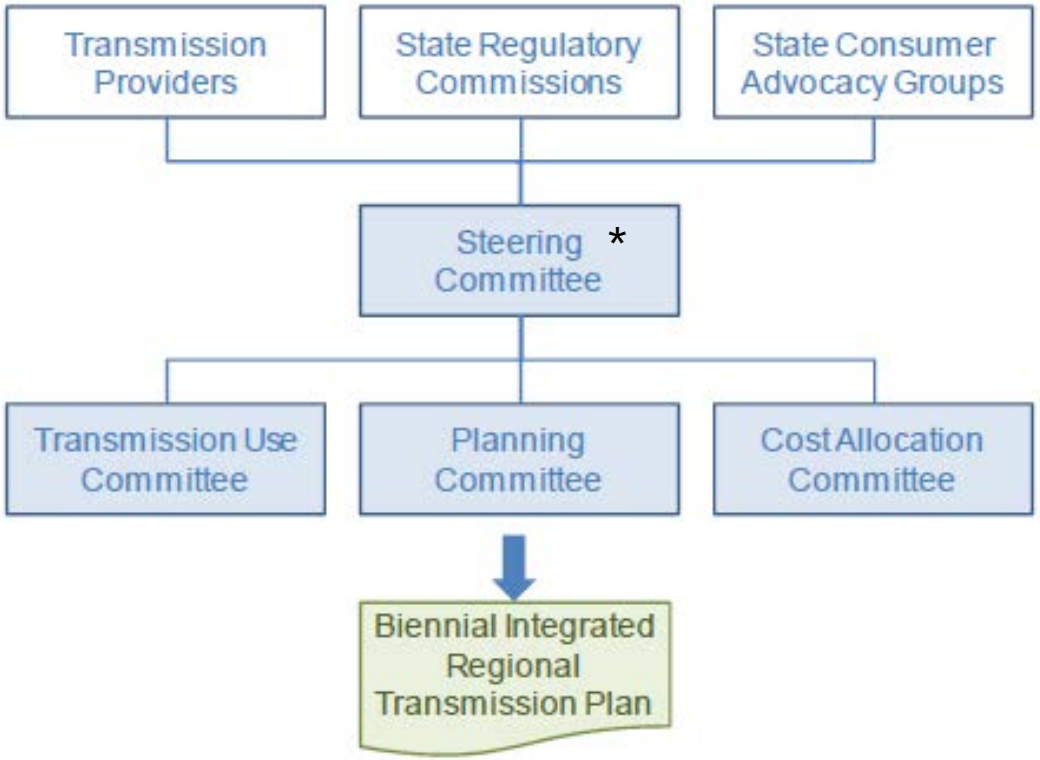
Ray Brush
NW Power and Conservation Council
November 7, 2012
Coeur d'Alene, ID

"To ensure efficient, effective, coordinated use & expansion of the members' transmission systems in the Western Interconnection to best meet the needs of customers & stakeholders."

NTTG Origins

- Formed from the remains of RTO West/GridWest to capture benefits:
  - Joint Planning
  - ACE Diversity
  - Other efficient and economic joint transmission initiatives
- 2007: Reformed to meet Sub-Regional requirements of FERC Order 890

Northern Tier Transmission Group Structure



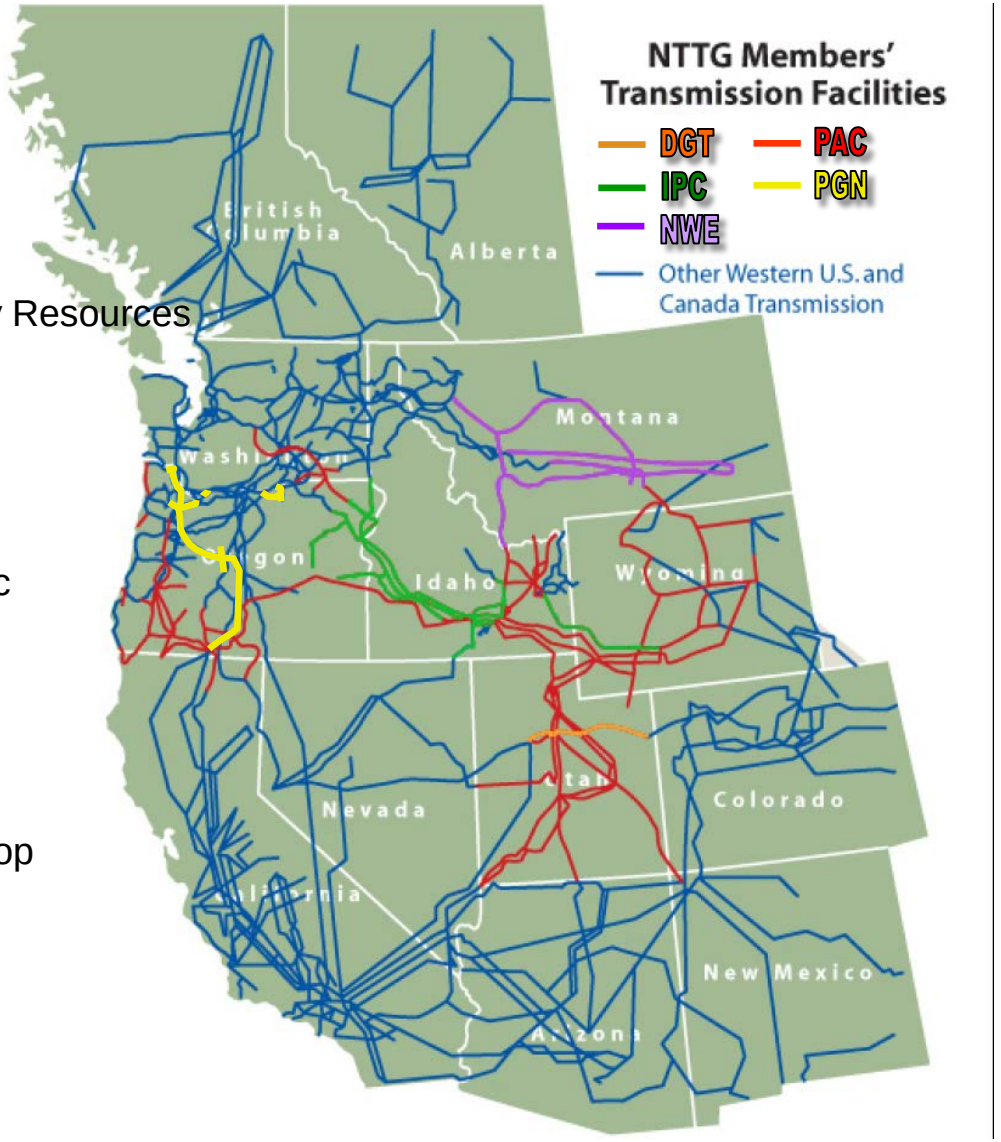
* Multi-State Commissioner and multi-TP Executive representatives form Committee which provides governance and direction on the initiatives undertaken by the NTTG members and provides a forum for facilitation of dispute resolutions, to the extent agreed to by its member utilities.

NTTG Planning Committee

Planning Committee Membership

- **Dave Angell**- Chair, Idaho Power
- **Darrell Gerrard** - Vice Chair, PacifiCorp

- **John Chatburn** – Idaho Office of Energy Resources
- **Chris F. Collins -** NextEra Energy
- **Doug Cox** – Idaho PUC
- **Brian DeKiep** - Montana PSC
- **Marshall Empey** - UAMPS
- **Bill Hosie** - TransCanada
- **Don Johnson** - Portland General Electric
- **Kim Johnson** - Riverbank Power Corp.
- **John Leland** – NorthWestern Energy
- **Rodney L. Lenfest** - Sea Breeze Pacific
- **Jerry Maio** – Utah PSC
- **Matthew Stoltz** - Basin Electric
- **Jim Tucker** - Deseret Power Electric Coop
- **Scott Waples** - Avista
- **Dan Wheeler** - Gaelectric, LLC
- **Wes Wingen** – Black Hills Power
- **TBD** – Grasslands Renewable Energy



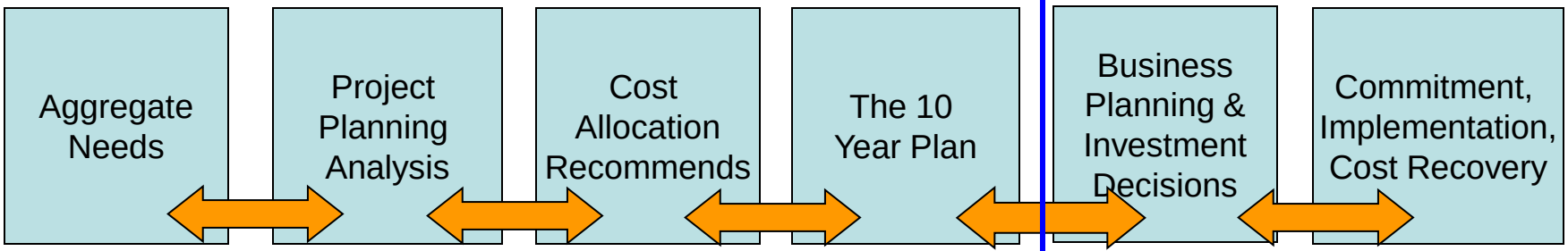
FERC Order 890 Transmission Provider Planning Obligations

- Transmission Planning Process Obligations – FERC Order 890 Attachment K: TPs must have a planning process that complies with the 9 principles of Order 890
  a) Coordination
  b) Openness
  c) Transparency
  d) Information Exchange
  e) Comparability
  f) Dispute Resolution
  g) Regional Participation
  h) Economic Congestion Study
  i) Cost Allocation

NTTG Development Process

Northern Tier Transmission Group

Project Sponsors



Open Season Solicitation of Stakeholder Xmssn needs
✓Native/network estimates
✓Queue Requests
✓IRPs
✓Gen Connects
✓Public Policy translation
✓Other

Aggregate/Clusters Needs

Produces:
L&R Cases

Perform Econ Analysis
•System with new L&R
•Existing Transmission
•Proposed Projects added

Extract Powerflows
•Identify POD & POR
•Stress cases for Reliab

Collect & Test Generic Transmission Expansion Projects

Collect & Test Specific Projects

Perform Power Flow & N-1 Reliability Studies

Develop Project Info
•Electrical & Econ Perf
•Capital Costs
•Operating Costs

Select projects to recommend for "Plan"

Cost Allocation Committee collects project information

Collects recommendations from Project Sponsors on CA

Applies Cost Allocation Principles to projects

Recommends cost allocation methods for projects in the "plan"

Projects into the WECC Rating Process

Project Lists to SCG & RTEP:
•Foundational
•Potential

Project Info
•Electrical & Econ performance of projects
•Capital Cost Est
•Operating performance
•Cost & congestion relief estimates
•Cost Allocation recommendations
•Planning info as needed for permitting process

Sponsors, customers, investors estimate
•Cost impacts
•Risks
•Rate impacts

Review investment models

Explore financing

Permitting issues and "do-ability"

Business & Participation Decisions

Open Season Subscription Processes

Long Term Service Contracts

OATT Service Requests

Project participation agreements

Shipper & LSE agreements

Design Studies

Permitting

Construction Plans & construction

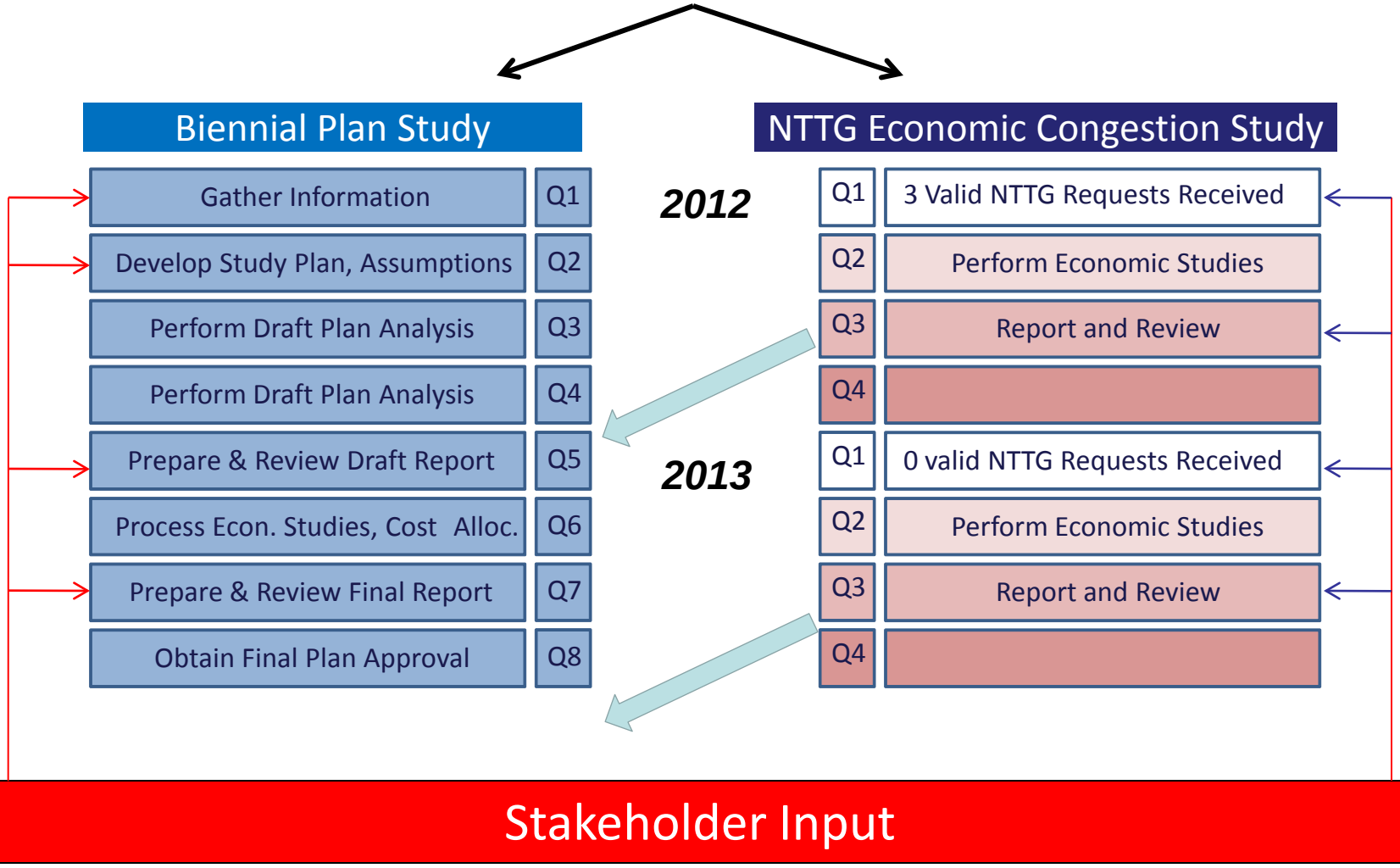
Rate hearings for cost recovery & rates

NTTG Transmission Plan: Informational

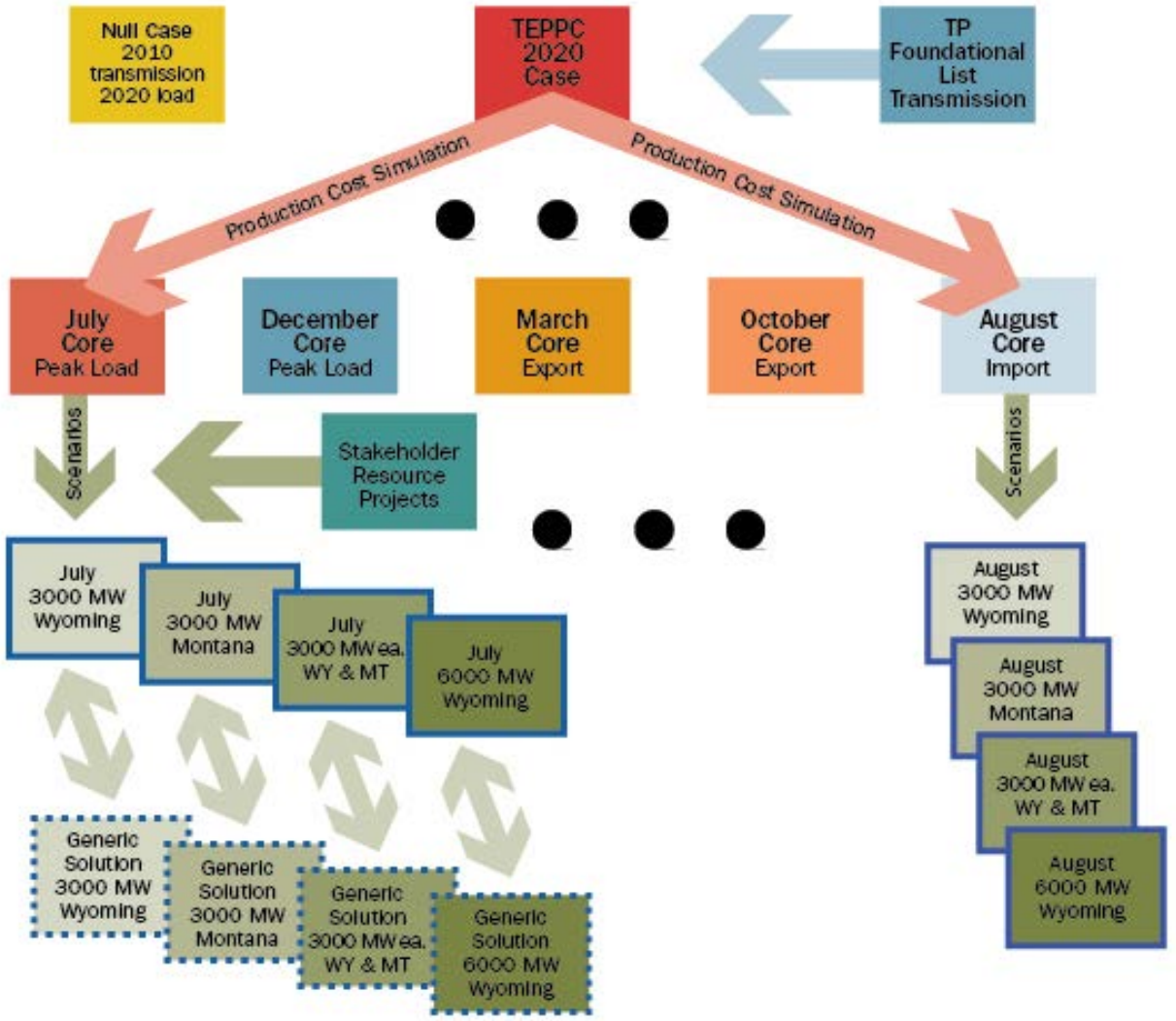
- To inform customers & investors of transmission projects needed to meet their requested needs
  - Ala FERC 890 and NERC TPLs – Compliance
  - Not a Binding Construction Plan as per ISO's
- Selection of Transmission Projects to meet aggregated 890 stakeholder needs
- Performance comparison of alternatives
  - Electrical performance (flows, voltage, stability)
  - Economic Congestion analysis
  - Planning estimates of transmission capital costs
- Cost Allocation Review

NTTG Study Cycle

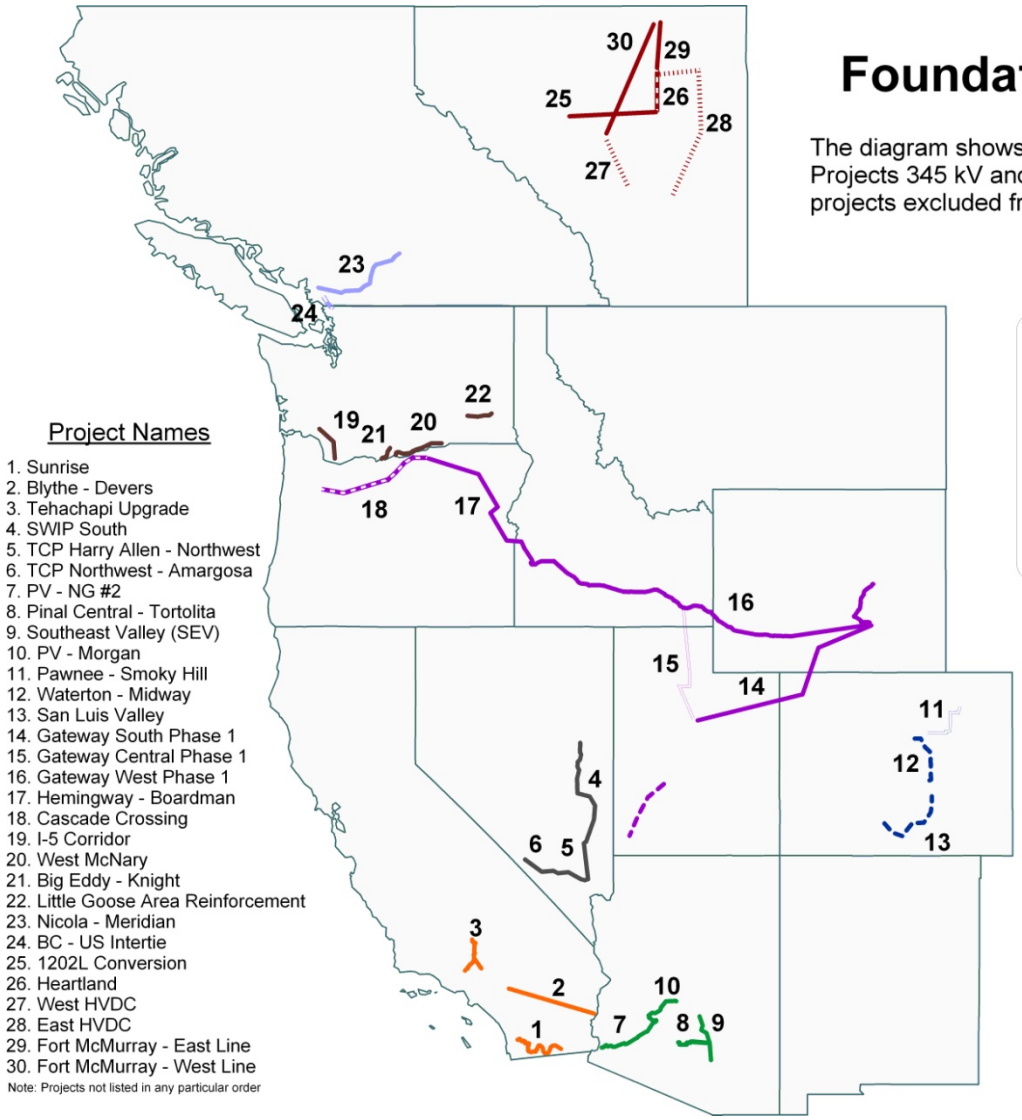
Completed 2010-2011 Plan



NTTG Study Method



Foundational Projects



Foundational Projects - 2020

The diagram shows illustrative routings for 30 SCG Foundational Projects 345 kV and higher. There are 14 lower voltage/reinforcement projects excluded from the map for clarity.

Transmission Key

- 500 kV Single Circuit Line
- 345 kV Single Circuit Line
- 500 kV Double Circuit Line
- 345 kV Double Circuit Line
- DC Circuit (various voltages)

Sub-Region Key

CAISO	NTTG
SSPG	CG
SWAT	BCH
CCPG	AESO

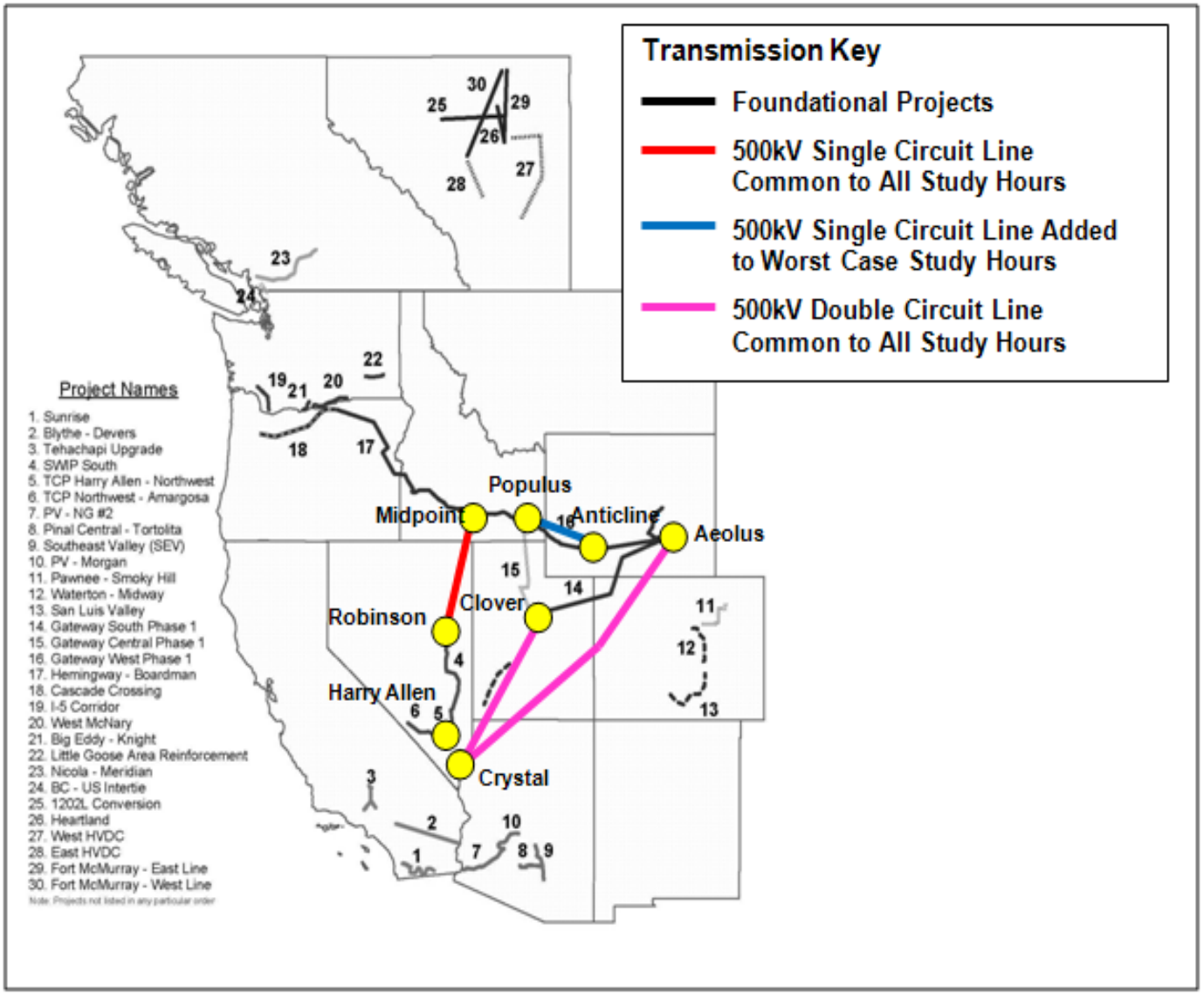
Project Names

1. Sunrise
2. Blythe - Devers
3. Tehachapi Upgrade
4. SWIP South
5. TCP Harry Allen - Northwest
6. TCP Northwest - Amargosa
7. PV - NG #2
8. Pinal Central - Tortolita
9. Southeast Valley (SEV)
10. PV - Morgan
11. Pawnee - Smoky Hill
12. Waterton - Midway
13. San Luis Valley
14. Gateway South Phase 1
15. Gateway Central Phase 1
16. Gateway West Phase 1
17. Hemingway - Boardman
18. Cascade Crossing
19. I-5 Corridor
20. West McNary
21. Big Eddy - Knight
22. Little Goose Area Reinforcement
23. Nicola - Meridian
24. BC - US Intertie
25. 1202L Conversion
26. Heartland
27. West HVDC
28. East HVDC
29. Fort McMurray - East Line
30. Fort McMurray - West Line

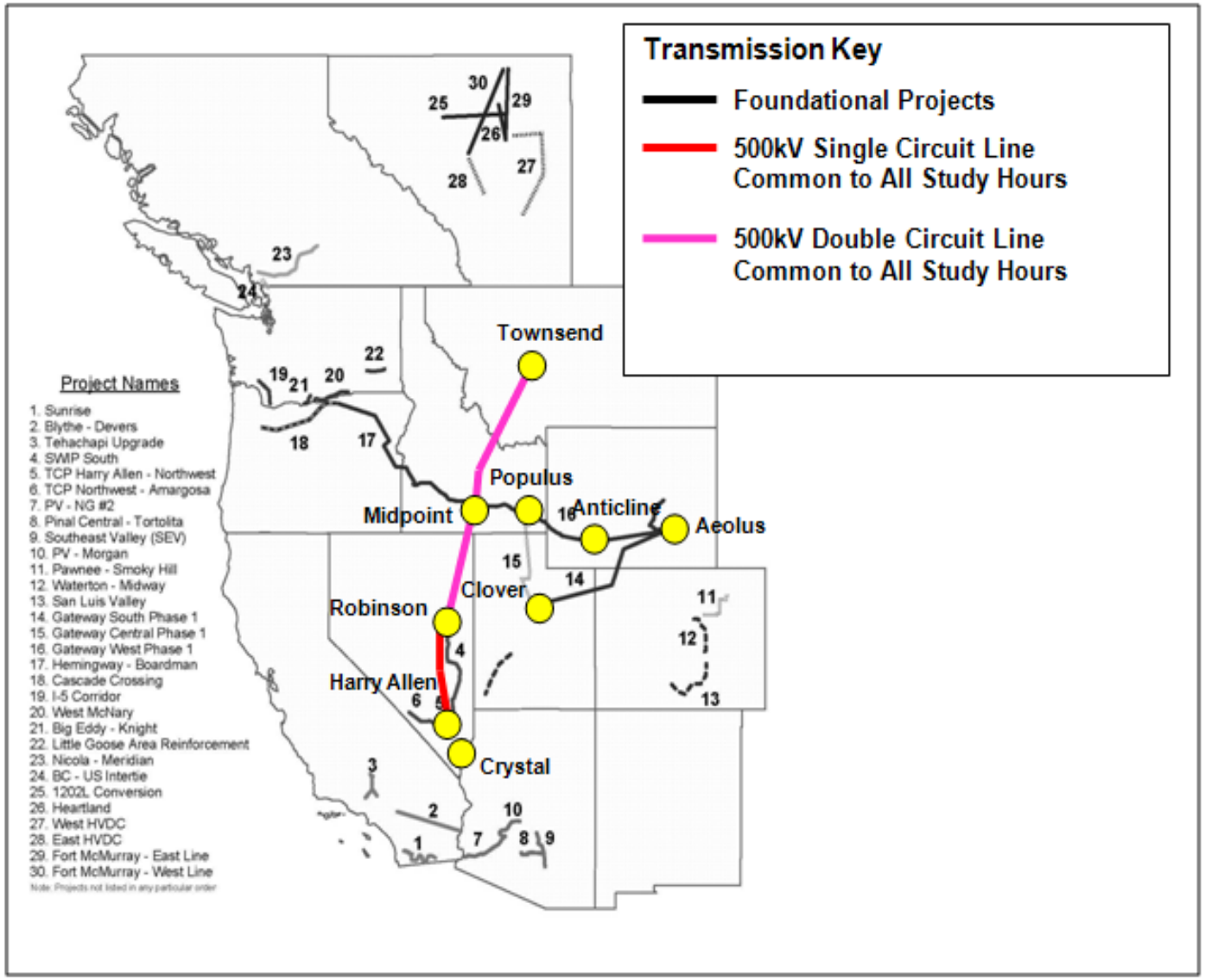
Note: Projects not listed in any particular order

WECC

6000 MW in Wyoming



3000 MW Montana



2010-2011 Results

- Null Case study identified insufficient transmission to meet future load demand
- Foundational Transmission Projects increase the system capability to reliably integrate planned energy resources and serve the forecasted NTTG System Load.
- Additional transmission required to accommodate large wind integration in Montana and Wyoming
- Economic Studies
  - Upgrading Paths 8 and 18 provides some benefit
  - The Mountain States Transmission Intertie provides the ability to transmit most of the added wind generation out of Montana.

FERC Order 1000

PLANNING HIGH LEVEL SUMMARY

- Define a single, regional transmission plan that is more efficient and/or cost effective than the NTTG transmission providers collective local plans
  - Biennial Planning Cycle with annual update
  - “Bottom up plan” with a 10 year horizon
  - Study plan, developed with stakeholder input, defines specific study requirements and methodologies for project evaluation and selection
  - Projects driven by reliability, economic , public policy and non-transmission alternatives will be evaluated on a comparable basis

COST ALLOCATION HIGH LEVEL SUMMARY

- Eligibility Requirements
  - Sponsor requests the project be considered for cost allocation
  - The project and the sponsor meet appropriate qualification criteria
  - The project is selected in the regional transmission plan for cost allocation

- Evaluation Metrics
  - Change in annual capital-related costs
  - Change in energy losses
  - Change in reserves
- Evaluation of Production Cost Modeling continues
- Metrics may be modified or augmented in each Study Plan

COST ALLOCATION HIGH LEVEL SUMMARY

NTTG uses a three step process to allocate costs

1. Identify entities that may be affected by the project based upon initial benefit metric calculation

2. Adjust, as appropriate, the initial net benefits
   a) Net benefits attributed to any scenario are capped at 150% of the average of the unadjusted, net benefits across all allocation scenarios
   b) If the average of the above adjusted net benefits across the allocation scenarios is negative, the average net benefits to that beneficiary is set to zero;

Allocation of Costs to Beneficiaries (continued)

c) Based on the above adjusted net benefits across the allocation scenarios, if the ratio of the standard deviation to the average is greater than 1.0, the average net benefit to that beneficiary is set to zero.

3. Cost Allocation Committee uses the adjusted net benefits calculated above to allocate project costs proportionately to each identified beneficiary (subject to certain limitations)