2008 NTTG Stakeholder Meeting

July 24, 2008

Bozeman, Montana

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

NTTG Standard of Conduct Policy

"It is the policy of the Northern Tier Transmission Group ("Northern Tier") not to facilitate the improper distribution of non-public transmission information. In furtherance of this policy, no participant in any Northern Tier meeting shall discuss non-public transmission information unless Northern Tier's Standards of Conduct Safeguards are satisfied."

NTTG Standard of Anti-Trust Policy

It is the policy of the Northern Tier Transmission Group to fully comply with federal and state antitrust laws. Participants shall be mindful that an essential objective of NTTG is promoting or enhancing competition. Discussions in the following areas in particular can be very problematic and in some cases prohibited, and require careful attention for antitrust compliance:

- your company's prices for products or services;
- prices charged by your competitors;
- allocating markets, customers, or products;
- limiting production; and
- excluding dealings with other companies

2008-09 Study Plan

Overview & Progress Report

Presented July 24, 2008 at
Joint Committee and Stakeholder Meeting
Bozeman, Montana

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

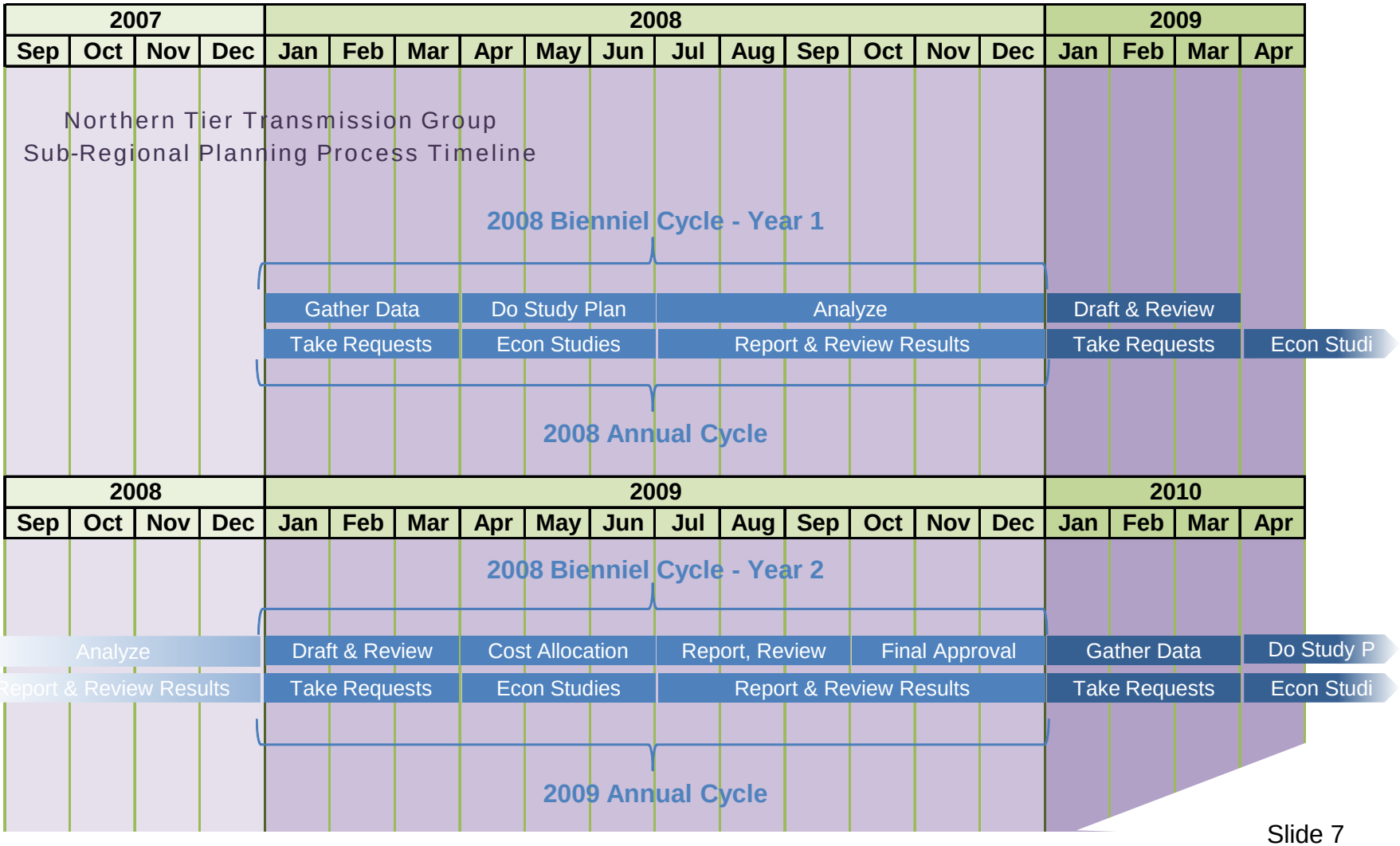
Northern Tier Transmission Group

- Geographically sparse load areas connected and interconnected by high voltage transmission
- Many large resources remote from load areas
- Strong access to diverse climate, economic and resource areas

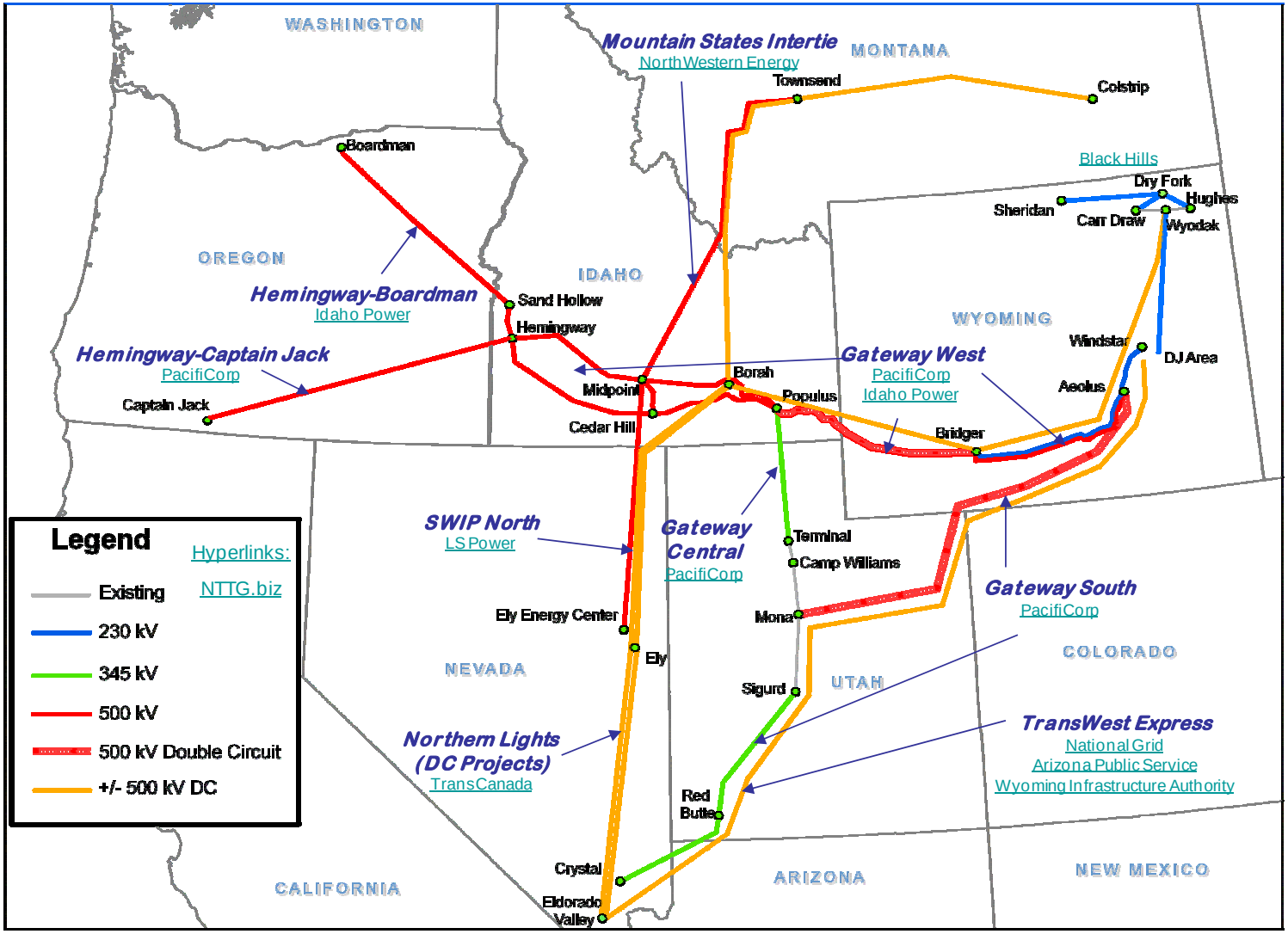
NTTG Transmission Planning

- Power system reliability and adequacy
  - Given forecasted loads, resources and transmission requests, is the existing system adequate?
  - If not, which additions are needed?
- Cost allocation
  - What principles will be applied by the Cost Allocation Committee, based on information produced and provided during the planning process, to increase confidence that transmission costs will be recovered?
- Economic congestion analysis
  - With forecasted loads & resources, fuel costs and transmission requests, how much does congestion cost with alternative additions?

NTTG Planning Cycle



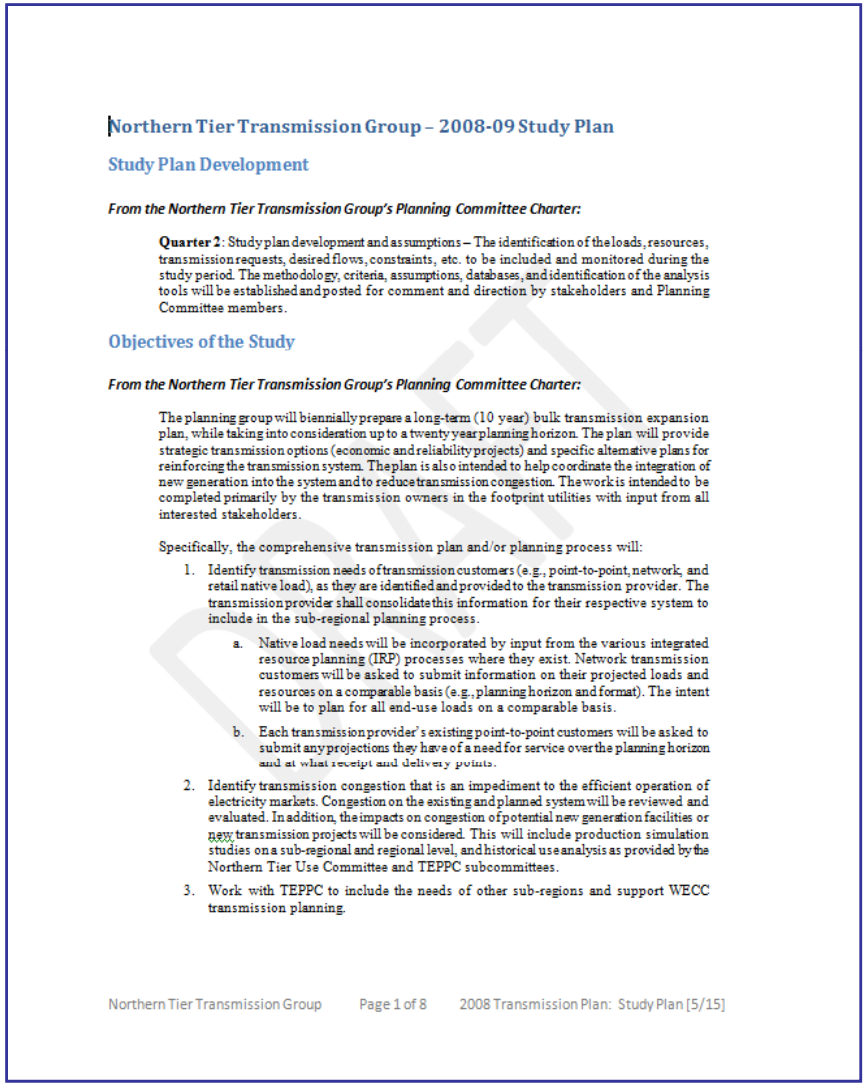
NTTG Portfolio at December, 2007



2008-09 Draft Study Plan

Contents

- Study Plan Development
- Objectives of the Study
- Confidentiality
- General Schedule and Deliverables
- Methodology
- Criteria
- Assumptions
- Databases
- Analysis Tools
- Loads
- Resources
- Transmission Requests
- Desired Flows
- Constraints
- Report Outline



Northern Tier Transmission Group – 2008-09 Study Plan

Study Plan Development

From the Northern Tier Transmission Group's Planning Committee Charter:

Quarter 2: Study plan development and assumptions – The identification of the loads, resources, transmission requests, desired flows, constraints, etc. to be included and monitored during the study period. The methodology, criteria, assumptions, databases, and identification of the analysis tools will be established and posted for comment and direction by stakeholders and Planning Committee members.

Objectives of the Study

From the Northern Tier Transmission Group's Planning Committee Charter:

The planning group will biennially prepare a long-term (10 year) bulk transmission expansion plan, while taking into consideration up to a twenty year planning horizon. The plan will provide strategic transmission options (economic and reliability projects) and specific alternative plans for reinforcing the transmission system. The plan is also intended to help coordinate the integration of new generation into the system and to reduce transmission congestion. The work is intended to be completed primarily by the transmission owners in the footprint utilities with input from all interested stakeholders.

Specifically, the comprehensive transmission plan and/or planning process will:

1. Identify transmission needs of transmission customers (e.g., point-to-point, network, and retail native load), as they are identified and provided to the transmission provider. The transmission provider shall consolidate this information for their respective system to include in the sub-regional planning process.
   a. Native load needs will be incorporated by input from the various integrated resource planning (IRP) processes where they exist. Network transmission customers will be asked to submit information on their projected loads and resources on a comparable basis (e.g., planning horizon and format). The intent will be to plan for all end-use loads on a comparable basis.
   b. Each transmission provider's existing point-to-point customers will be asked to submit any projections they have of a need for service over the planning horizon and at what receipt and delivery points.
2. Identify transmission congestion that is an impediment to the efficient operation of electricity markets. Congestion on the existing and planned system will be reviewed and evaluated. In addition, the impacts on congestion of potential new generation facilities or new transmission projects will be considered. This will include production simulation studies on a sub-regional and regional level, and historical use analysis as provided by the Northern Tier Use Committee and TEPPC subcommittees.
3. Work with TEPPC to include the needs of other sub-regions and support WECC transmission planning.

Northern Tier Transmission Group Page 1 of 8 2008 Transmission Plan: Study Plan [5/15]

Study Plan Development

From the Northern Tier Transmission Group's Planning Committee Charter:

- **Quarter 2**: Study plan development and assumptions
  - The identification of the loads, resources, transmission requests, desired flows, constraints, etc. to be included and monitored during the study period.
  - The methodology, criteria, assumptions, databases, and identification of the analysis tools will be established and posted for comment and direction by stakeholders and Planning Committee members.

Objectives of the Study

- The objective of the 2008 Northern Tier transmission study effort is to perform a Conceptual Study that determines, given a limited number of forecasted and assumed load and resource portfolios, which of the sub-region's set of proposed transmission additions are required to provide a feasible system operation at forecasted stress times, ten years in the future.

- System geography and reduced duplication of effort require that:
  - Transmission Provider members perform individual assessment studies and coordinate their local transmission plans with Northern Tier
  - Western Interconnection system assessment studies are coordinated with the WECC annual study program and with other Sub-Regional Planning Groups
  - Project rating studies are performed by project sponsors via the WECC three-phase rating process

General Schedule & Deliverables

The broad timing of the transmission plan development process and the work products to be delivered are presented in the NTTG Planning Committee Charter.

- **Quarters 3 and 4:** Draft plan analysis – The modeling of the system loads, resources, improvements, etc. to be considered. Technical screening studies using power flow analysis will be used to evaluate preliminary feasibility of and reliability of the system. Addition or modification of transmission elements considering past economic studies, and to meet performance and study criteria established in the study plan will be identified, resulting in a draft transmission plan for public and stakeholder comment.

- **Quarter 5: Draft study results**

- **Quarter 6: Economic studies**

- **Quarter 7: Final plan report**

- **Quarter 8: Final plan approved by NTTG Steering Committee**

Methodology

- Time Frame
- System Conditions to Study
- Base Cases Selected
- Contingencies to be Run

Methodology
System Conditions to Study

- Northern Tier Transmission Group studies will examine the efficacy of alternative transmission expansion scenarios against defined load and resource scenarios at times of system stress ten years in the future.
- The year 2018 will be the focus of the studies.
- Based on experience, historical practice, and qualitative assessment of conditions in 2018, each of the four seasons will be reviewed to determine whether it should be included in the NTTG 2008 Draft Transmission Plan

Methodology
Base Cases Selected

- To perform the necessary studies in a timely fashion and consistent with Planning Principles cited above, Base Cases will be selected from those made available by the Western Electricity Coordinating Council in its Library filed under Base Cases and will be consistent with those used by the entities performing the studies in their local transmission planning.

Methodology
Contingencies to be Run

- The contingencies evaluated by the entities performing studies will be consistent with those examined in their local planning studies, and generally include the following steps:
  a. Perform power flow adequacy runs, analyzing at N-0 (without outages), tuning to meet voltage loading requirements.
  b. No stability studies will be run in the course of these conceptual analyses.
  c. Use automatic load tap changer movement and capacitor switching (if enabled by their controls), then manual manipulation.
  d. Examine single-contingency (N-1) transformer and line contingencies and common-mode outages defined in the contingency list developed by modelers as part of creating the Work Plan.

Criteria

- The viability of power flow studies will be determined in accordance with WECC and NERC criteria.
- The primary metric for power flow success is service of all demand in the Northern Tier Transmission Group footprint and export of a substantial portion of sub-regional surplus generation.

Assumptions

- The study will incorporate the loads, resources and transmission submitted in the Quarter 1 data request.
- Analysts will determine the assignment of data to multiple scenarios as appropriate.

Databases

- The primary source of power flow study data will be the Western Electricity Coordinating Council, which makes such data available in formats familiar to those performing power flow studies in the Western Interconnection.
- Modifications made to the WECC Base Cases will be collected and shared in formats familiar to and agreed to by the persons running the studies.

Analysis Tools

- Studies used in the development of the NTTG 2008 Draft Transmission Plan will employ power flow analysis models mutually agree upon and compatible with those used by the participants performing the studies at the NTTG member utilities.
- Power flow modeling alternatives are General Electric's PSLF model, PTI's PSSE model, and PowerWorld's simulator programs. It is expected that analysts will prefer to use their standard in-house models and convert data as necessary among them, rather than to use common data files and undertake the use of an unfamiliar model.

Loads

- Loads in the selected WECC Base Cases will be modified to reflect the data submitted in the Quarter 1 data collection process and the forecasts produced by Transmission Providers as part of their Integrated Resource Planning or, where no IRP is done, official load forecasts used in other published planning processes.

Resources

- Resources established in the selected WECC Base Cases will be modified to reflect the data submitted in the Quarter 1 data collection process.
- Data will be examined to eliminate duplication or differences in size, location, or characteristics.
- Data will be coordinated and agreed among the study analysts and, upon proper protection via aggregation or other appropriate obfuscation, reviewed and agreed to by stakeholders.
- Resources scheduled to other balancing areas and other such interchanges will be coordinated with other Sub-regional Planning Groups.

Transmission Requests

- Loads and resources and transmission additions not submitted as part of the Quarter 1 data collection process and not otherwise part of the WECC Base Cases and Transmission Provider modifications to those base cases will not be considered in this transmission plan.

Desired Flows

- The path flows, load levels and relevant resource levels from the WECC Base Cases used will be considered in the Work Plan as loads and resources are modified to accommodate Northern Tier data submittals and as scenario details are established.
- Desired flows on relevant paths will be estimated and targeted in producing studies. These flows will be coordinated with adjoining sub-regional planning areas.

Constraints

- Path constraints will be observed when developing the stressed seasonal cases.
- Newly-defined paths resulting from the addition, modification or up-rating of transmission facilities will be kept within their projected Operating Transfer Capabilities.

Report Outline

This is an outline of the 2008 Draft Transmission Plan and the 2009 Transmission Plan to be produced by the Northern Tier Transmission Group, indicating the general content and scope of the plans.

1. Executive Summary
2. Introduction
    a. Background
    b. Motivation for the Plan
    c. Objectives of the Plan
    d. Confidentiality
3. Study Process and Deliverables
    a. Coordination within NTTG Footprint
    b. Coordination with Other Sub-Regional Groups
    c. Coordination with WECC
    d. Milestones and Work Products
4. Study Methodology
    a. Time Frame and Time Scale
    b. Base Cases
    c. Contingencies Examined
    d. Screening Process
5. Load Modeling
    a. Assumptions
    b. Loads Used
6. Resource Modeling
    a. Assumptions
    b. Resources Used
    c. Resource Scenarios
7. Transmission Modeling
    a. Assumptions
    b. Lines Included in Base Cases
    c. Lines Studied
8. Study Analysis and Observations
    a. Details of Failures
    b. Modifications Made
    c. Indications of Adequacy
9. Sources of Uncertainty, Consequent Risks
10. Additions Recommended for Additional Study

2008-09 Work Plan

And Project Overview

Presented July 10, 2008 at
ColumbiaGrid Planning Meeting

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Work Plan Development

- An evolving document
  - To accommodate a nascent and dynamic transmission planning environment
  - To coordinate staff from multiple transmission providers with multiple responsibilities
  - To respond to stakeholder feedback

Work Plan – Outline

- Work Plan: So Far
  - WECC Base Cases selected
  - Technical Work Group convened
  - Work streams established
  - Work allocated to engineers
- Work Plan: To Do
  - Develop coordination with ColumbiaGrid, other regional, sub-regional groups
  - Develop process, plan, resources for hourly economic simulation

WECC Base Cases

- Heavy Summer – 2018 HS1A (13 Jun 2008)
  - Annual maximum one-hour demands for the WECC occur during the summer months of June to August, principally due to high levels of air conditioning and other cooling.
- Light Autumn – 2010 LA1SA (21 Dec 2006)
  - With forecasts calling for the construction of substantial resources in the Inland Northwest – well in excess of local demands – significant transmission will be required to move power to other demand centers. This need is exacerbated by the lack of correlation between wind generation and local demand patterns, and the presence of large amounts of base-load, or flat-loaded, thermal generation. Consequently, the greatest need for inter-regional transmission may occur at times when local load is at its minimum.

Work Streams

- Validating study data
  - Resolving Q1 submittals with WECC data
- Setting up transmission models
  - Building flexible sets of modifications
- Creating load details
  - Allocating and scaling demands
- Creating resource details
  - Identifying scenarios, assigning to buses
- Establishing valid initial cases
  - Integrating loads, resources and transmission

Technical Work Group

- Planners from Transmission Providers
  - To allow open discussion of and work with confidential information
  - The persons doing the actual analyses
- Four Task Teams
  - Transmission Network – Heavy Summer
  - Transmission Network – Light Autumn
  - Loads
  - Resources

Four Task Teams

- Heavy Summer Transmission
  - Lead: Orlando Ciniglio, Idaho Power Company
- Light Autumn Transmission
  - Lead: Ryan Munson, NorthWestern Energy
- Loads
  - Lead: Jeff Newby, Portland General
- Resources
  - Lead: Jamie Austin, PacifiCorp

Loads

- Heavy Summer, 2018
  - As submitted to, developed by Planning Committee
  - Allocated to buses as in WECC 2018HS1A
- Light Autumn, 2010
  - Derived from peak loads using TEPPC hourly load data (five years historical)
  - Allocated to buses as in WECC 2010LA1SA

Developing Light Autumn Loads

System Loads from TEPPC 2017 Database

Hourly Loads from FERC Form 714
Averaged for 5 years: 2003-2007
(Current data are from 2002)

The Rocky Mountain Power Pool is taken as a surrogate for the Northern Tier footprint. The day and hour of the highest summer load and the lowest autumn load are determined.

Historical loads for each sub-area on those hours are found and the ratio of light autumn to heavy summer is calculated.

That factor is applied to the forecasted summer peak, providing an estimate of autumn minimum.

Region	Regional Autumn Minimum	Day	Hr	Regional Summer Peak	Day	Hr	Ratio: Autumn / Summer
WECC Total	83,161	22-Oct	4				
AZNMNV	10,322	29-Oct	5				
CAISO	25,172	2-Apr	5				
NWPP	13,153	4-Sep	4				
RMPP	14,190	24-Sep	4		7-Jul	16	
CANADA-AL	7,627	22-May	5				
CANADA-BC	5,210	2-Jul	6				

State(s)	TEPPC Area	24 Sep 04:00	7 Jul 16:00	Autumn/ Summer	Summer Forecast	Autumn Estimate
ID	FAR EAST	215	471	46%	1,144	526
ID	GOSH	199	518	38%	2,274	874
ID	MAGIC VLY	471	941	50%	521	261
ID	TREAS VLY	909	2,155	42%	2,288	961
MT	NWMT	915	1,727	53%	1,906	1,010
OR	PGN	1,791	3,596	50%	4,331	2,166
OR, WA	PACW	1,668	3,115	54%	3,651	1,972
WY	SW WYO	762	873	87%	1,056	921
WY	BIG HORN	245	235	104%	858	895
WY	CENTL WYO	242	311	78%	723	563
UT N	UT N	2,499	5,663	44%	7,679	3,389
UT S	UT S	297	584	51%	3,132	1,593

Note: Data are preliminary, based on transmission provider estimates.

Loads

Balancing Authority	2018 Heavy Summer	2018 Light Autumn
PacifiCorp West [1]	3,651	1,972
PacifiCorp East [1] [2]	15,721	8,233
Black Hills [2] [3]	728	757
Deseret [2]	357	160
UAMPS [2]	91	42
Idaho Power	3,953	1,748
Portland General	4,331	2,166
NorthWestern Energy	1,906	1,010

Notes:

[1] Published PacifiCorp loads are forecasted through 2016. 2018 loads were estimated by increasing 2016 loads by the 2015 – 2016 growth rate.

[2] Loads for Black Hills, Deseret Power and UAMPS are embedded in the PacifiCorp East forecast.

[3] Loads shown for Black Hills include those of Cheyenne Light, Fuel & Power.

NTTG Load Areas

Load areas defined by the WECC TEPPC modeling process

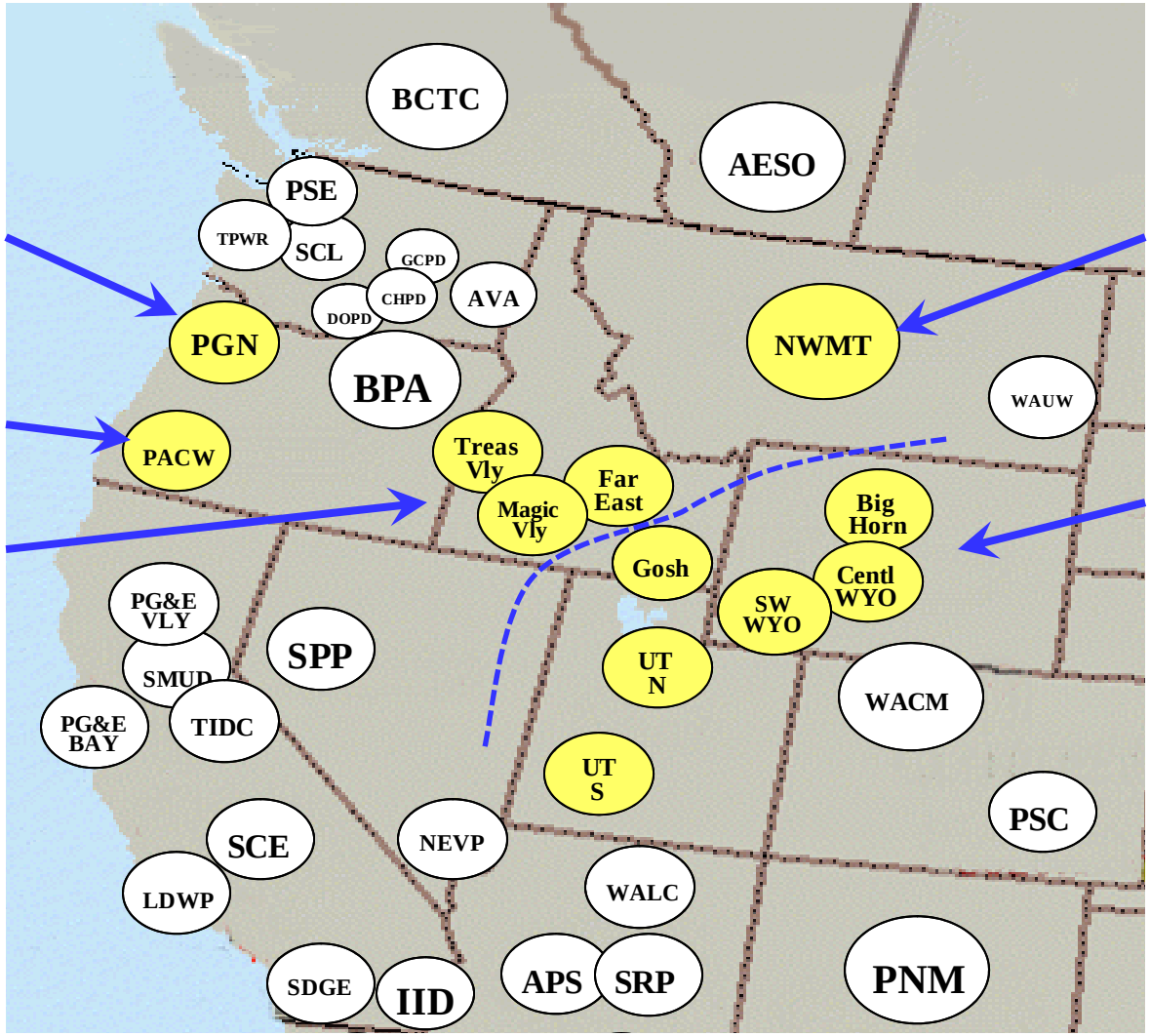
Portland General

PacifiCorp West

Idaho Power

NorthWestern Energy

PacifiCorp East



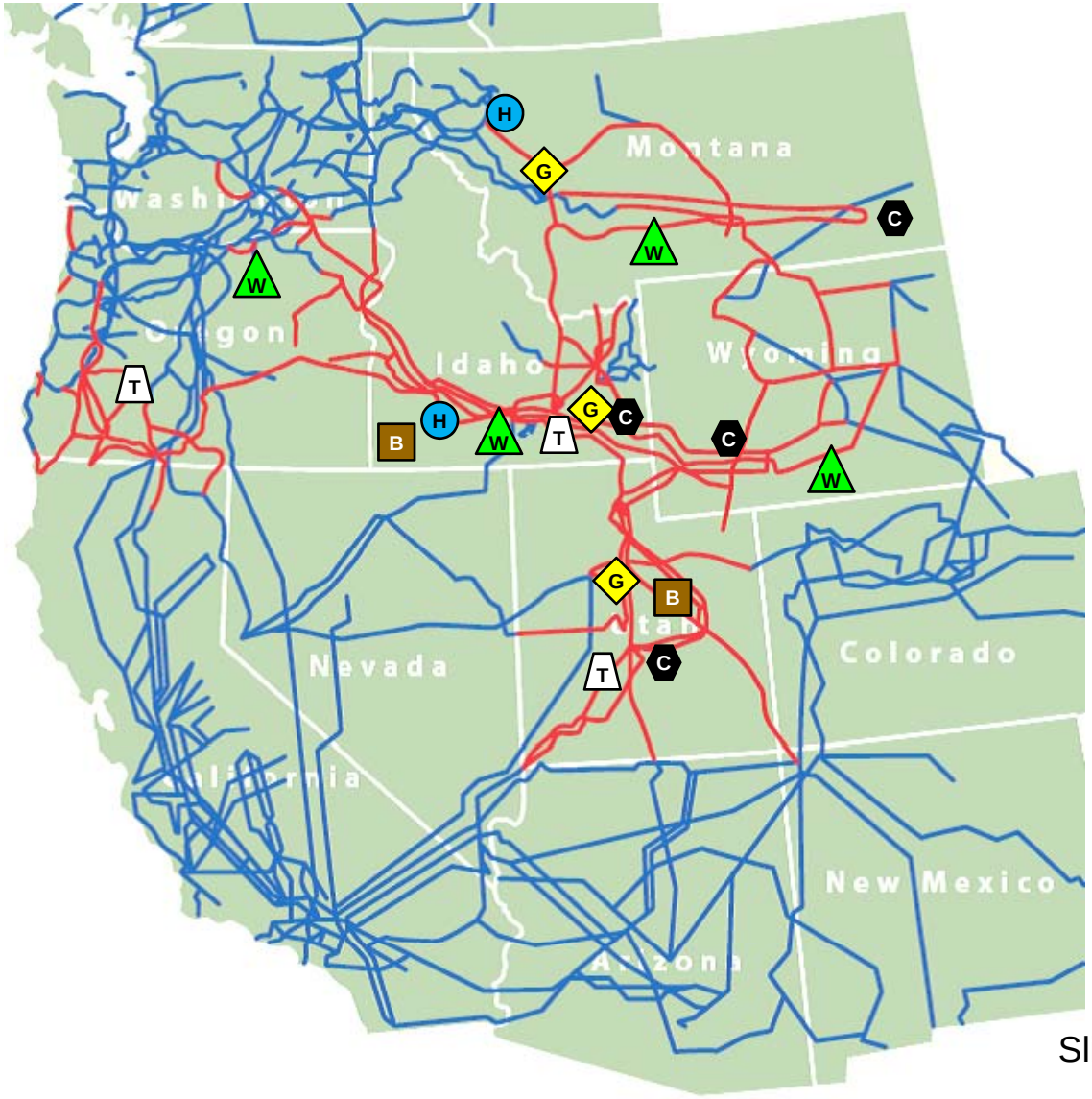
Allocating Loads to Areas

Balancing Authority	Sub-Area	Heavy Summer	Light Autumn
Portland General	PGN	4,331	2,166
PacifiCorp (West)	PACW	3,651	1,972
Idaho Power	Treasure Valley	2,288	961
	Magic Valley	521	261
	Far East	1,144	526
PacifiCorp (East)	Goshen	2,270	874
	Utah North	7,674	3,389
	Utah South	3,133	1,593
	SW Wyoming	1,048	921
	Central Wyoming	723	563
Black Hills	Big Horn	833	895
NorthWestern Energy	Northwest Montana	1,906	1,010

Note: Data are preliminary, based on transmission provider estimates.

SUBMITTED RESOURCES

	Installed Capacity Summer 2018 - MW	
W	Wind	7,076
G	Gas-Fired	2,409
C	Coal-Fired	1,542
B	Other, Unknown	90
H	Hydroelectric	180
T	Geothermal	110
	Total	**11,407**



Resources by Type

Installed Capacity (Nameplate MW; Minimum, if Given as Range)

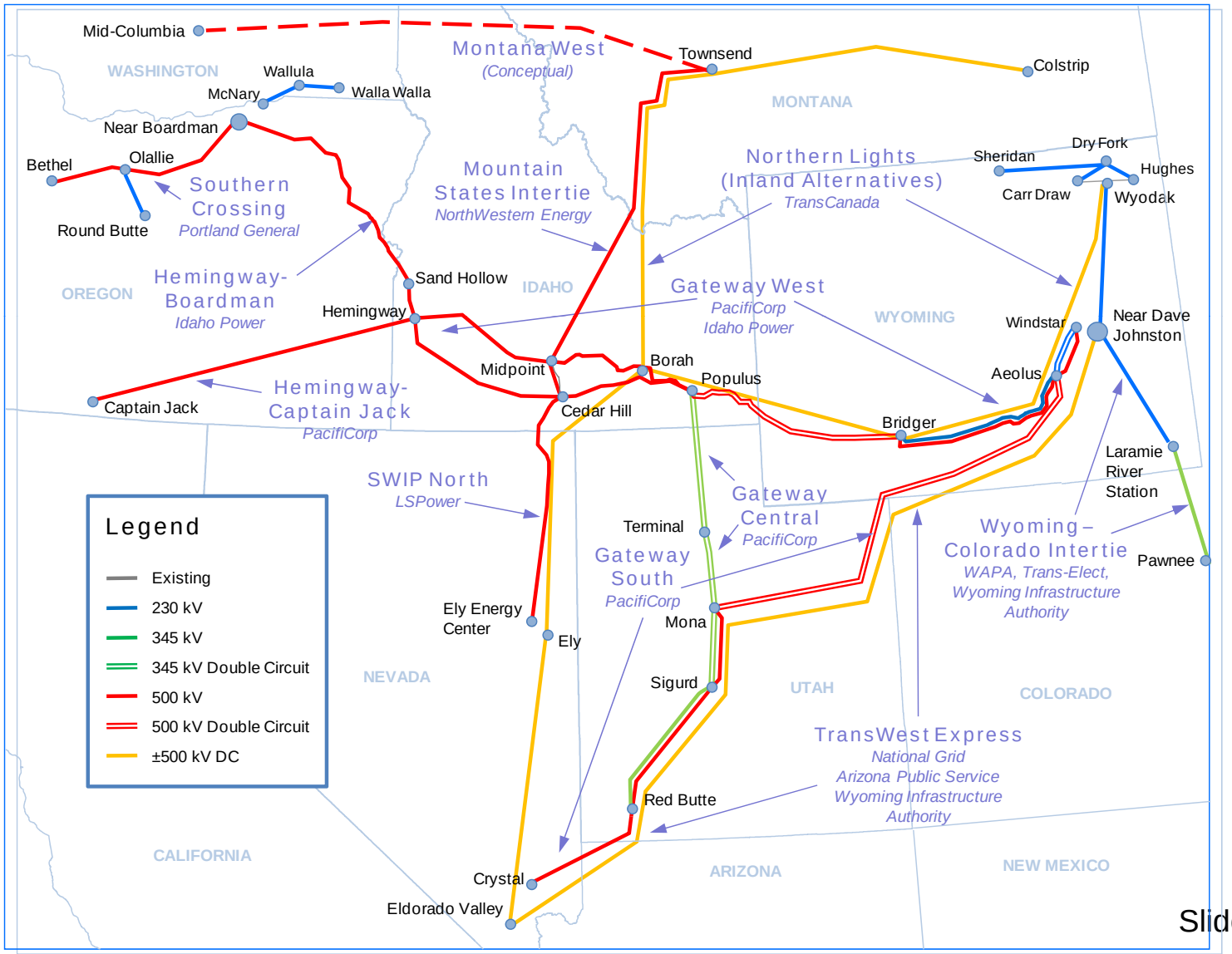
MW	Wash.	Oregon	Idaho	Montana	Utah	Wyoming
Coal	-	-	250	968	86	238
Natural Gas	-	-	543	770	1,096	-
Wind		1,625	571	2,316	-	2,564
Geothermal	-	36	39	-	35	-
Hydroelectric	-	-	66	114	-	-
Other	-	-	71	-	19	-
Total	**0**	**1,661**	**1,541**	**4,167**	**1,236**	**2,802**

1) Data from Northern Tier Transmission Group's 2008 First Quarter Data Request.
2) For projects specified to be in service in or before 2018 (excludes 'unknown' or 'to be determined').
3) Does not yet include data for Portland General.

Resources by Area

Balancing Authority	Sub-Area	Capacity	In Study
Portland General	PGN		
PacifiCorp (West)	PACW		
Idaho Power	Treasure Valley		
	Magic Valley		
	Far East		
PacifiCorp (East)	Goshen		
	Utah North		
	Utah South		
	SW Wyoming		
	Central Wyoming		
	Big Horn		
NorthWestern Energy	Northwest Montana		

NTTG Transmission Portfolio



Cost Allocation Committee

July 24, 2008

Bozeman, Montana

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

Agenda

- Introduction of Committee Members & Assigned Project Leaders
- FERC Order - July 17, 2008
- Update on Committee Process
  - Data Requests to Project Developers
  - Responses to Data Requests
  - Follow-up Process for Project Information
    - Determine Need for Further Information
    - Quarterly Updates
    - Track Effect on Cost Allocation

Committee Process

- Data Requests
  - Sent to project sponsors in May
  - Responses received in June and July
- Need for Follow-up Process
  - In general, quarterly update to responses
  - Determination of specific information needed for some responses
  - Development of follow-up letters to be sent in August

Projects

- Mountain States Transmission Intertie (Northwestern Energy)
  - Merchant Use
    - Transmission Service Request Queue
  - Siting & Permitting
    - Montana Major Facilities Siting Act
      - NEPA

Projects (continued)

- Gateway & Hemingway to Captain Jack (PacifiCorp)
  - Mixed Use
    - Retail Load/Multi-State Protocol
    - Transmission Service Request Queue
  - Siting & Permitting
    - State filings – Utah PSC and Idaho PUC
    - NEPA
  - FERC Filing for Incentive Rate Treatment (Docket No. EL08-75)

Summary

- Developing follow-up letters to data request responses for further information & quarterly project updates
- As projects progress, tracking impact on cost allocation
- Coordination with Planning Committee on Biennial Plan development