

**Proposal  
Analysis of Congestion in the Western Interconnection**

**Submitted by WECC on behalf of the Western Interconnection to the  
U.S. Department of Energy  
October 12, 2005**

**I. Proposal Overview**

On behalf of the entities in the Western Interconnection, the Western Electricity Coordinating Council (WECC) proposes to perform an analysis of transmission congestion in the Western Interconnection that will meet the U.S. Department of Energy's obligation under Section 1221 of the Energy Policy Act of 2005. WECC will draw on the current work of the Seams Steering Group – Western Interconnection (SSG-WI) and the work of the five western Subregional Planning Groups, supplemented by additional scenario studies requested by DOE. The proposed study will identify specific areas of congestion in the Western Interconnection, based upon recent operating experience, expected congestion over the next 10 year time frame, and congestion associated with various alternative resource development scenarios now under consideration in the West.

WECC will facilitate the analysis and prepare the report to DOE through an open, public stakeholder process. The work will be performed working jointly and in coordination with the Seams Steering Group – Western Interconnection (SSG-WI), the state/provincial Committee on Regional Electric Power Cooperation (CREPC) and the five Subregional Planning Groups in the Western Interconnection, specifically the Colorado Coordinated Planning Group (CCPG), the Northwest Transmission Assessment Committee (NTAC), the Rocky Mountain Area Transmission Study group (RMATS), the Southwest Transmission Expansion Plan group (STEP), and the Southwest Area Transmission group (SWAT).

A joint Task Force will be formed, involving DOE staff and representation from the western planning groups, to oversee the study effort.

**II. Background**

The Energy Policy Act of 2005 requires DOE to conduct a study of electric transmission congestion within one year of enactment of legislation, i.e. by August 2006. After conducting the study, the DOE is to issue a report based upon the congestion study and may designate geographic areas experiencing electric energy transmission capacity constraints or congestion that adversely affects consumers as a national interest electric transmission corridor.

As described below, for several years the Western Interconnection has been performing coordinated congestion studies of the interconnected transmission system. It appears that

it would be most efficient for the U.S. DOE to build upon these ongoing Western Interconnection study efforts to meet its obligations under the Energy Policy Act of 2005.

### **III. Existing Western Interconnection Congestion Studies**

The Western Interconnection is different from the Eastern Interconnection in that one regional reliability council (WECC) geographically encompasses the entire Western Interconnection, whereas the Eastern Interconnection is composed of 8 separate regional reliability councils. As such, the Western Interconnection has developed a functioning interconnection-wide organizational structure that is today dealing with congestion (both operationally and from a planning standpoint) on an interconnection-wide basis through the combined efforts of WECC, SSG-WI and the western Subregional Planning Groups. The coordination of these congestion study efforts will be further enhanced this year by the WECC Board's expected decision to expand its planning function from its traditional reliability role into the area of transmission expansion planning.

To perform the congestion study, a definition of "congestion" will need to be developed. The definition should recognize that in the Western Interconnection there are two types of congestion; (1) actual system flows approaching the system limits and (2) transmission reservation requests or requested transmission schedules which exceed the system scheduling limits. The first type of congestion can be seen with historical path flow analysis and simulated by economic transmission studies. The second type of congestion limits access to the transmission system under the present Western Interconnection ATC determination and contract path scheduling practices and may be viewed as a barrier to efficient use of the transmission system. DOE and the Western Interconnection should work together to determine how the definition of "congestion" would be developed for these congestion studies.

### **IV. Specific Proposal**

It is proposed that the WECC, working with the SSG-WI, CREPC and the western Subregional Planning Groups, provide the following congestion analysis of the Western Interconnection to DOE in the form of a final report to the DOE by June 2006: (WECC will draw on existing studies by SSG-WI and the five Subregional Planning Groups and perform additional studies as requested by the U.S. DOE).

- A. Identification of specific areas of congestion, both current and future, in the Western Interconnection, based upon the following analysis:
  1. Recent operating experience – This analysis will draw upon the following sources of information for the major paths in the Western Interconnection:
    - Historical path MW flow data
    - Historical path schedule data
    - OASIS ATC data
    - Unscheduled Flow curtailment data

- Operator's, Scheduler's and Path User's experience with path availability and usage
- Denied transmission service requests if available

## 2. Transmission Planning Studies –

- a. Identification of transmission congestion in future years using the SSG-WI production simulation database, reflecting resource plans in utility IRPs and state renewable portfolio standards, including sensitivities to gas price and hydro operation. This analysis will rely largely upon study work in the SSG-WI 2005 Study Program.
- b. Identification of transmission congestion in future years for various strategic energy development scenarios, using the SSG-WI production simulation database modified to reflect the various resource strategies in the reference scenario and scenarios run for the Western Governors' Association's Clean and Diversified Energy Initiative.
- c. Identification of transmission congestion in future years associated with providing transfer service to major load areas in the Western Interconnection under various resource scenarios. This analysis will be based upon studies currently being performed by the five Subregional Planning Groups and others (e.g., Frontier Project, the New Mexico wind development, the Tehachapi Wind Project, the Northern Lights Project, the Canada to California study, the Montana to the Pacific Northwest Study, Washington/Oregon wind development, etc.) to the extent that the study results are available from those projects in time to be included in this report.

## 3. Other studies requested by DOE

WECC will perform other congestion studies of the Western Interconnection at the request of DOE, to analyze other scenarios DOE considers important to identify congestion under the Energy Policy Act of 2005. These additional congestion studies requested by DOE must be presented in detail to WECC by the end of March 2006 allowing WECC to perform such studies under the projected timeline. WECC may also expand the plausible scenarios that should be studied and work with DOE to include them in this analysis. For such studies, WECC will work with DOE on the study assumptions, perform the studies and analyze and present the findings. .

WECC will facilitate and coordinate this effort such that the final report to DOE will be a Western Interconnection report, supported by all the interconnection-wide and Subregional Planning Groups in the Western Interconnection, and reviewed by the Committee on Regional Electric Power Cooperation.

## **V. Database**

As part of this proposal, WECC will adopt the production simulation database developed by SSG-WI during the SSG-WI 2005 Study Program. WECC will utilize this database for any additional studies requested by DOE. If any modification of the database is needed, WECC will involve stakeholders in the region in this review and updating process. The database will be publicly available consistent with critical infrastructure information protection requirements, and consistent with WECC confidential databases and public versions of LSE resource plans.

## **VI. Schedule**

The following schedule provides milestones by which DOE will be able to determine if the proposed products can be delivered in a timely fashion.

- A. October 2005 – Obtain WECC Board approval of the 2006 budget, which includes funding requirements for WECC’s expanded transmission planning role and for support of WECC’s involvement with DOE.
- B. October 2005-December 2005 – Finalize the transfer agreement with PacifiCorp enabling WECC to obtain the SSG-WI transmission expansion planning database by December 2005.
- C. October 2005 – December 2006 – While the WECC Board is defining WECC’s expanded transmission planning role, WECC will assume on an interim basis the role of central point of contact with DOE in identifying western congestion areas and western national interest corridors, utilizing work performed by SSG-WI and the Sub-regional Planning Groups.
- D. By January 30, 2006, deliver a historical analysis of congestion in the Western Interconnection by utilizing the existing WECC Extra-High voltage (EHV) DataPool database with the addition of necessary data from OATI. It is estimated that the acquisition of the OATI data will cost \$50,000. We propose that DOE provide the funds for the acquisition.
- E. 1st Quarter 2006 – WECC will have in place staff support personnel to be able to model additional scenarios in the 2<sup>nd</sup> quarter of 2006.
- F. 1st Quarter 2006 – Acquire the necessary production cost model to be able to deliver analysis to DOE by the second quarter, should the Department so request.
- G. 1<sup>st</sup> Quarter 2006 – Compile information from SSG-WI’s analysis of historical congestion, SSG-WI’s 2005 study model reference case for the future years 2008 and 2015, any cases modeled for the WGA Clean and Diversified Energy Initiative, and products from NTAC, STEP, SWAT, RMATS, and CCPG into a coherent draft report that can be provided to DOE.

- H. April 2006 – Provide briefings and solicit additional feedback on study results from the Committee on Regional Electric Power Cooperation.
- I. 2<sup>nd</sup> Quarter 2006 – Complete any modeling analyses requested by DOE.
- J. June 2006 – Submit final Congestion Report to DOE.

## **VII. Proposed DOE/WI Joint Task Force**

It is proposed to create an Ad Hoc Western Interconnection Task Force to oversee the congestion analysis and reporting to the DOE. The Task Force will be composed of a representative(s) from:

SSG-WI  
WECC  
NTAC  
SWAT  
STEP  
RMATS  
CCPG  
CREPC  
U.S. DOE (ex officio)

Specifically, the Joint DOE/WI Task Force will:

- Provide coordination among all the western planning groups
- Provide coordination between DOE and the western planning groups on specific DOE congestion study needs
- Review congestion analyses
- Review final results and recommendations for submittal to DOE
- Resolve issues arising during the analysis
- Ensure the process is impartial, transparent, well planned and well communicated.
- Ensure that regional experts and stakeholders are given the opportunity to participate, including state/provincial energy offices, regulators, resource and transmission developers, LSEs, environmental and consumer advocate stakeholders
- Assure schedules are met.
- Coordinate its work and findings with the proposed WECC Transmission Expansion Planning Committee.

## **VIII. Staffing and Manpower Support**

WECC will commit the necessary manpower resources to complete this project for DOE on schedule, through WECC staff support, contracting for consulting support or WECC member system support.

The WECC Board is proposing to fund and hire additional staff support at WECC to facilitate this work for DOE as defined in this proposal and to take on the new expansion planning function at WECC. Expertise will be required in running production simulation models and analyzing study results, coordinating meetings with a diverse stakeholder group and documenting and effectively presenting results. WECC support would include one senior engineer, one economist and one project facilitator. This additional staff support will be hired during 1<sup>st</sup> quarter of 2006.

If these staff additions are found to be inadequate to perform the functions in this proposal, WECC will find other sources of manpower support including consulting services contracting support and WECC Member staff support.

## **IX. Reports**

From the analysis, results will be consolidated into a listing and graphical presentation of the identified congested areas within the Western Interconnection, reflecting historical experience and future expectations. The report will include:

- Identification of congested areas;
- Identification of major assumptions and drivers causing congestion;
- Identification of economic impact of congestion;
- Identification of the sensitivity of congestion to assumptions such as gas price and hydro levels, and
- Limitations of the analysis.

Draft reports will be developed for review by DOE staff. Final report will be completed by June 2006.

## **X. References to Previous Congestion Reports**

Following is a list of Western Interconnection congestion study reports issued previously by the planning groups in the Western Interconnection:

1. Framework for Expansion of the Western Interconnection Transmission System, October 2003 - - Filed with FERC in October 2003.
2. Western Interconnection Biennial Transmission Plan – May 1998
3. Western Interconnection Path Flow Study – February 2003

4. Western Interconnection Biennial Transmission Plan – July 2000
5. [Conceptual Plans for Transmission in the West](#), August 2001
6. Other reports by SPGs, etc.
  - (a) [RMATS 2004 report](#)
  - (b) STEP economic analysis (several posting on CAISO website)

## **XI. Summary of Current Activities**

Following is a brief summary of the current activities of the western planning groups related to identification of congestion in the Western Interconnection:

### **SSG-WI**

SSG-WI develops the Western Interconnection production simulation database and runs high-level interconnection wide congestion studies. The first congestion report was submitted to FERC in October 2003. SSG-WI is currently performing the 2005 congestion study for the Western Interconnection. The updated database for the 2008 and 2015 systems and the congestion report should be completed by December 2005.

### **NTAC**

NTAC is currently in the process of developing long term transmission options for resources located within the provinces of British Columbia and Alberta and the states of Montana, Washington, and Oregon to serve Northwest loads and Northern California. NTAC is using power flow and stability studies to developed functional plans and will also have credible preliminary cost estimates.

NTAC has completed a detailed review of the congestion that has occurred in the Puget Sound area over the past years. The nominal system can serve the entire load and transfer obligations when all lines are in service. However, when one facility is out of service for maintenance, the transfer capacity is severely restricted. NTAC's study encompassed a detailed engineering review of the causes of reduction in transfer capacity when any of the 230 kV or greater facilities were out of service for maintenance. The study team developed suggested several improvements which are now budgeted and under construction.

### **RMATS**

In September 2004, the Rocky Mountain Area Transmission Study (RMATS) issued its Phase 1 Report which included an in depth analysis of the transmission system in Idaho, Montana, Wyoming, Utah and Colorado. Among other analyses, RMATS studied and modeled congestion and its economic effects to identify the most needed and economically viable projects.

[<http://psc.state.wy.us/htdocs/subregional/FinalReport/Chapter2.pdf>] contains a discussion of the work done in modeling congestion. The Report puts congestion into context, deriving impacts of transmission and generation additions, including generation capacity utilization, path loading duration curves, congestion and power flow implications, and the location and nature of consumer benefits. The next chapter provides congestion and other data on certain identified high value transmission projects.

[<http://psc.state.wy.us/htdocs/subregional/FinalReport/Chapter3.pdf>] Examples of transmission projects using RMATS congestion and other related data include: [i] the public/private partnership to increase capacity and relieve congestion on TOT 3, [ii] the Frontier Line and its expected economic benefits, [iii] a Basin Electric line in northern Wyoming to address coal bed methane industry needs, and [iv] the RMATS-recommended Jim Bridger Expansion project [also called Miners to Midpoint or Ben Lomond] to increase system transfer capacity and paving the way for new wind and thermal generation resources.

## **SWAT**

SWAT performs transmission planning by considering and evaluating a broad range of assumptions and alternatives to cover different strategies and scenarios that the region may encounter and develops an agreed-upon study plan that analyzes the defined range of assumptions and alternatives, comparing how each proposed project and scenario performs with respect to mutually developed base cases. SWAT develop consensus alternatives for the expansions, additions and upgrades that (1) provide the best performance under the agreed-upon range of scenarios, (2) are common to the greatest number of proposed plans and projects, (3) best enable the WestConnect Participants to provide low cost, efficient, reliable and non-discriminatory transmission services on their respective transmission systems from the suppliers of choice, (4) facilitate continued expansion of the competitive bulk power market in the Western Interconnection, and (5) minimize the overall amount of new transmission lines that will be required. The SWAT integrated sub-regional transmission plan is integrated with the expansion of other Bulk Power facilities within the Western Interconnection, complies with the reliability practices utilized within the Western Interconnection, and is consistent with and supports the development of open season solicitation, joint transmission ownership, and both physical and financial transmission rights for transmission projects planned.

## **STEP**

The Southwest Transmission Expansion Planning (STEP) group was formed in October 2002 to develop a transmission system to support competitive, efficient, and seamless west-wide wholesale electricity markets. STEP's geographical focus is on the seams area between the Desert Southwest Area and the CAISO consisting of Southern California, Nevada, Arizona, and Baja Mexico. One of the primary goals is to increase the transmission capability of the EHV system between Arizona and Southern California in order to allow the Southern

California market access to the recent generation additions in Arizona. STEP has developed a Transmission Plan consisting of:

1. Arizona-California Short-term Upgrades (EOR rating increased to 8050 MW)
2. Arizona-Nevada Short-term Upgrades (EOR rating increased to 9300 MW)
3. New Line between Arizona and California (assumes completion of the short-term upgrades)
4. New Line into San Diego for Economic and Reliability Need (assumes completion of the short-term upgrades)

STEP has performed a number of economic congestion studies of the STEP Transmission Plan. STEP also provides a forum for project sponsors to update stakeholders on planned projects and ensure coordination of all area plans.

### **CCPG**

The Colorado Coordinated Planning Group (CCPG) originated in December 1991 as a result of the Colorado-Ute Electric Association bankruptcy proceedings. The Colorado Public Utilities Commission required the filing entities to address coordinated planning as part of the asset divestiture. The Joint Transmission Access Principles and the Electric Transmission Service Policy Statement were part of this filing. The Policy Statement suggests that the filing entities advocate a “single-system” planning concept.

The CCPG is a forum for open exchange of transmission system related information. Meetings are open to the public. A joint planning effort that has risen is named the Colorado Long-Range Transmission Study Group. This study effort looks at high-probability resource expansions within the sub-region and analyzes what efficient transmission expansions should be constructed to inject the resources. The Group jointly explores back-bone level transmission additions that benefit all load-serving entities (LSEs) within the area.