

# Biennial Review of the Fifth Power Plan

## Transmission Issues

### INTRODUCTION

The Fifth Power Plan was the first one to address transmission actions explicitly. This was a major step that recognized the importance of the transmission system, both regional and westwide, in facilitating or hindering regional and western power markets and highlighted the increased stresses on the transmission system, as well as the opportunities, created by the restructuring of the electric power system in recent years.

The Plan identified several kinds of problems facing the Regional transmission system, including:

- Difficulty in managing unscheduled electricity flows over transmission lines leading to increased risks to electric system reliability;
- Lack of clear responsibility and incentives for planning and implementing transmission system expansion resulting in inadequate transmission capacity;
- Inadequate consideration of non-construction alternatives to transmission;
- Inability to effectively monitor the wholesale electricity market, identify market power abuse, or provide mitigation and accountability;
- Difficulty in reconciling actual physical available transmission capacity with that available on a contractual basis, resulting in inefficient utilization of existing transmission and generation capacity;
- Transaction and rate pancaking, i.e. contracting and paying for the fixed costs of multiple transmission segments on a volumetric basis to complete a power sale, resulting in inefficient utilization of generation.

In response to these problems the Plan described several actions. Recognizing that transmission planning and operations are connected importantly to the larger region and to the rest of the western interconnection, the Plan called for actions in both Northwest and larger western arenas. The following sections list the Plan's action items and describe how they have been carried out and what other changes in the transmission system environment have helped to address the problems they were aimed at. The paper will conclude with a reiteration of the list of problems and a summary of the actions that are currently being taken (or not taken) to address them.

### ***ACTION TX-1***

*The Council will work with Bonneville, other transmission providers, permitting agencies, and project developers to plan for long-distance transmission needs to support the resource development called for in the power plan.*

*The Council will work with the Northwest Transmission Assessment Committee [NTAC] and similar organizations to improve the integration of resource and transmission planning. This effort will incorporate the transmission planning assessments into the Council's power plan. Transmission planning should specifically address the needs of wind and other location-bound resource development.*

Council staff has participated, and continues to participate, in various NTAC activities, focusing particularly on the studies involving wind development in central Washington and Oregon and the transmission that would be necessary to integrate it and connect it to west-side load centers. The NTAC effort has consisted of a number of separate areas of study, including the wind study just mentioned, a study focusing on upgrades on the paths from Montana to Northwest load centers, upgrades on the path through the Puget Sound area and various proposals to connect resource areas in British Columbia and Alberta with the Northwest and California.

Several of these efforts have borne fruit. The Montana-Northwest study has resulted in a recently announced agreement by the partners in the Colstrip 500 kV transmission lines (Northwestern Energy, Puget Sound Energy, Portland General Electric and Avista) to identify and develop upgrades to those lines, as a first step in integration of additional generation from Montana with coastal load centers.

Two additional detailed project reviews have been announced in July and August for connections from Canada to the Northwest and Northern California. One, the Northern Lights project sponsored by TransCanada Ltd., will develop a proposal for a high-voltage DC (HVDC) line from the Alberta oil sands area around Fort McMurray to Celilo and the second, sponsored by Pacific Gas and Electric, will investigate several alternate connections, including an undersea HVDC cable, between British Columbia and Northern California, with intermediate substations in the Northwest.

The Western Electricity Coordinating Council (WECC), has begun a larger effort to coordinate and support interconnection-wide transmission planning, which will be based in part on direct WECC staff efforts and in part on supporting existing sub-regional planning efforts, like that of NTAC in the Northwest. This effort is under the direction of a Board-level committee, the Transmission Expansion Policy Planning Committee (TEPPC), and is being supported by WECC staff and a newly formed Technical Advisory Committee (TAS) and associated work groups. This is a major initiative of the WECC Board, responding to various requests, including from the Western Governors' Association. TEPPC was formed this spring and the advisory committee is just in the process of getting going. Council staff is participating in several parts of the TAS.

Some of the major transmission operating issues (as opposed to the planning questions highlighted earlier) posed by the high levels of wind development being proposed for the region

are being studied in the joint Council-Bonneville Wind Integration Action Plan initiative. This is a major effort to comprehensively address wind integration issues for the Northwest.

#### **ACTION TX-2**

*Bonneville and other transmission providers should work to improve the utilization of available transmission capacity.*

*Dealing with this problem across the wider regional grid should be a priority for any regional transmission entity that may be formed. Should this effort fail, transmission providers and control areas should work cooperatively to improve utilization of transmission capacity across the regional grid. This should be completed by 2007. A useful but limited first step could be broader participation in WestTTrans. This Open Access Same-Time Information System (OASIS) site provides a broader mechanism for facilitating a secondary market in transmission capacity than single provider OASIS sites. WestTTrans could begin to address the discrepancy between physical capacity and contract path limitations by developing a common available transmission capacity calculation. Bonneville and other Northwest transmission owners should participate in this initiative.*

This action item is addressed as part of the discussion of the following item.

#### **ACTION TX-3**

*It should be a high priority for regional interests to work through the Grid West RRG process to address emerging transmission issues.*

*While success is not assured, the RRG's regional proposal offers a framework for addressing these problems. However, the Council is concerned that the time to address these issues is growing short. The RRG/Grid West process has important decision milestones during the next year. If it appears unlikely that the Grid West process will reach a successful conclusion by the end of 2005, the Council will work with the region to find alternatives to resolve these regional transmission issues.*

#### **ColumbiaGrid**

Since the publication of the Fifth Power Plan, the Grid West effort has failed, fundamentally through an inability of the various regional parties to agree on the level of independence from direct control by regional interests and the degree of FERC oversight that would be acceptable. Since then, Bonneville and six other control area operators<sup>1</sup> have formed an entity called ColumbiaGrid, which is intended to be an umbrella organization under which a set of multiparty contracts will be put in place to address specific issues, including planning, reliability, congestion management, flow-based Available Transmission Capacity (ATC) calculation and a common OASIS. These contracts, called functional agreements, would be open to both ColumbiaGrid members (who would be expected to sign them) and to non-members who qualify by virtue of operating facilities relevant to the agreement (e.g., other control area operators, transmission owners and/or generation owners).

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<sup>1</sup> Avista, Chelan County PUD, Grant County PUD, Puget Sound Energy, Seattle City Light, and Tacoma Power.

The planning and expansion functional agreement will be the first functional agreement to be finished and is targeted for execution in mid-October. It contemplates a planning staff to coordinate and do multi-system reliability expansion studies for signatories, a biennial plan, and provisions for supporting the plan before FERC or other relevant regulatory agencies in order to aid in its implementation. The functional agreement also contains a commitment to work toward the creation of a common study queue for the signatories.

Under the current FERC pro-forma open access transmission tariff (OATT, which is widely implemented, even by non-FERC jurisdictional transmission providers like Bonneville), applicants for transmission service where there is no available transmission capacity are placed, in order of application, in a study queue for the provider to do the planning studies necessary to determine how to provide the requested service. If the service crosses two or more providers, the applicant will go into multiple queues, for which the study priority is fixed, though there is some attempt by the providers to coordinate studies for the same application, despite different places in different queues. A single, common study queue for multiple providers, such as is targeted by ColumbiaGrid, would be a major step forward in improving the efficiency of the planning process.

WestTTrans has been adopted as an OASIS platform by a number of Northwest utilities<sup>2</sup>. The two major transmission owners that do not participate at this time in WestTTrans are Bonneville and PacifiCorp. The ColumbiaGrid effort at a common OASIS for its members, and any other transmission providers that sign the agreement, proposes the vendor of the WestTTrans platform as one likely provider of the common OASIS services. The ColumbiaGrid work on a common Northwest OASIS contemplates longer-term actions including development of a common flow-based ATC methodology and of a common queue for transmission service and interconnection requests, which would feed into the ColumbiaGrid planning process, and would go beyond what WestTTrans currently provides.

Work on the reliability functional agreement is focused on a near-term real-time congestion management procedure that would assist Bonneville in the summer of 2007, and take over more of the operation of the procedure in subsequent years. Wider scope reliability efforts, aiming to address problems before they show up in real time, will be focused on working with, and complementing as necessary, the larger reliability efforts of WECC. This decision was taken recognizing the magnitude of the effort being undertaken by WECC, both to increase the scope of the reliability coordinator responsibilities and actions and to provide significantly better monitoring and analytical tools, which are intended to be available to control area operators as well.

## WECC

While the regional effort has become less ambitious than that contemplated by Grid West, a larger effort that will address many of the regional problems in the context of west-wide

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<sup>2</sup> Only FERC-jurisdictional transmission providers are required to maintain an OASIS system. Currently Bonneville and BC Transmission Corp. (BCTC) are the only Northwest non-jurisdictional entities that provide an OASIS. (Generally, the other non-jurisdictional entities are not transmission providers in any case.)

problems has emerged. Changing NERC requirements for reliability, prompted by the 2003 Northeast blackout and supported by the legal backstop given by the 2005 Energy Policy Act, drive this effort. This effort shows up in two parts, focused on the role of the reliability coordinator.<sup>3</sup>

The first part is the WECC Reliability Coordinator Initiative. This is an initiative of the WECC Board to ensure that WECC will be able to meet the new NERC requirements for substantial additional pre-operating hour and within operating hour (“real time”) visibility over the state of the system in its footprint.

One of the major potential reliability problems for current operations of the transmission system is the lack of information on what is really going to happen in real time. Transmission schedules can be changed up to 20 minutes before real time, and in real time if allowed by the control area operator. The schedules themselves also often do not contain useful information about where the ultimate generator and load are located (though the load is largely easier to identify than the generation, in those instances without details). A generation source in a transmission schedule may be as large as a control area. The uncertainty about the physical flow impact of scheduled transactions is compounded by the effect of unscheduled flows<sup>4</sup>. This is important to know for the control area to set its net interchange, key to maintaining system frequency, but it is not enough detail to know whether any particular physical transmission path monitored by that control area will be overloaded or not in real time, and thus be a threat to system reliability.

The new NERC requirements will require the reliability centers to have more information about actual generation and load ahead of real time, as well as better tools to do forward and real time analysis of the state of the system.

The second part of the WECC effort is the development of the West-wide System Model (WSM), a computer model of the western interconnection that is intended to be updated with real time data, so that the reliability centers and control areas are able to see what is going on not just in their own footprint but in surrounding footprints as well. For the reliability centers, this gives each of them (there are currently three, though the current plan is to go to two) the ability to be a complete backup for the other(s).

#### ***ACTION TX-4***

*Bonneville and other transmission providers should expand efforts to identify and implement non-construction alternatives to transmission expansion.*

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<sup>3</sup> The NERC requirements are described in terms of a function called a Reliability Authority, but that role is borne by entities called reliability coordinators in WECC. The Pacific Northwest Security Coordinator, PNSC, is the reliability coordinator for the Northwest Power Pool region.

<sup>4</sup> The physical flow impacts of transactions that are scheduled between a sub-set, or even within a single control area show up as unscheduled flows in adjacent, or even distant, control areas. This is a consequence of the mismatch between commercial scheduling practices and physical electric power flows.

*The Bonneville Power Administration has been carrying out an innovative effort to identify and implement non-construction alternatives to transmission expansion with positive results. This effort should be incorporated as a basic element of transmission planning.*

Bonneville's Non-Wires Solutions Round Table continues to meet, with several pilot projects in progress. The pilot projects are providing information on what kinds of approaches are cost-effective, which additional questions need to be answered and where successes are likely to lie. BPA studies have focused on load areas on the Olympic Peninsula, Southern Oregon and the Southern Oregon coast. Other regional utilities, such as Puget Sound Energy, have also participated.

Other regional and west-wide planning efforts (such as NTAC's) have addressed the issue of non-wires solutions. It has most frequently been concluded that, because of the different skill sets and knowledge bases required for addressing demand (non-wires) issues and transmission issues (including such technically "non-wires" solutions as additional capacitors), it is often best that the actual analysis of the two alternatives be a joint effort of the entity responsible for the load service and that responsible for providing transmission, rather than putting the burden solely on the latter.

## SUMMARY

The problems listed in the plan are reiterated below, along with the key points about their current status made in the paper.

- Difficulty in managing unscheduled electricity flows over transmission lines leading to increased risks to electric system reliability:
  - Being addressed for ColumbiaGrid functional agreement signatories by actions to create real time and, in the future, pre-real time congestion management mechanisms,
  - Being addressed for interconnection by WECC Reliability Coordinator Initiative steps, in response to strengthened NERC reliability standards;
- Lack of clear responsibility and incentives for planning and implementing transmission system expansion resulting in inadequate transmission capacity:
  - Being addressed for ColumbiaGrid functional agreement signatories by creation of ColumbiaGrid planning process,
  - Being addressed for interconnection by WECC new transmission planning process and increased coordination and support for sub-regional (like NTAC) planning processes;
- Inadequate consideration of non-construction alternatives to transmission:
  - Being addressed for Bonneville, and potentially for ColumbiaGrid, by Bonneville's Non-Wires Solutions Round Table,
  - Problem is being highlighted in various planning processes, though implementation focused back to load serving entities, e.g., in their integrated resource plans;

- Inability to effectively monitor the wholesale electricity market, identify market power abuse, or provide mitigation and accountability:
  - Institutionalizing a regional market monitor being put on back burner by ColumbiaGrid, in part because it is not proposing to create new markets, and in part because, like Grid West, it is observing the progress of the market monitoring studies being carried out by the states and FERC,
  - FERC has created active market monitoring unit that is coordinating closely with the western states in following western markets as well as the western implications of national markets, e.g., natural gas;
- Difficulty in reconciling actual physical available transmission capacity with that available on a contractual basis, resulting in inefficient utilization of existing transmission and generation capacity:
  - Being addressed in later phases of ColumbiaGrid for signatories of its functional agreement;
- Transaction and rate pancaking, i.e. contracting and paying for the fixed costs of multiple transmission segments on a volumetric basis to complete a power sale, resulting in inefficient utilization of generation:
  - Not being addressed. Would have been addressed by Grid West.