

Upgrading the Capacity and Reliability of the BPA Transmission System

Report to the Infrastructure Technical Review Committee

August 20, 2002

Table of Contents

1.1 Background	3
1.2 Projects Reviewed in 2002	5
1.3 Projects Reviewed in 2001	6
1.4 Rate and Budgetary Impacts	6
1.5 Status of Projects Reviewed in 2001	7
1.6 Glossary of Acronyms and Terms	8
1.7 References	8

Appendices

A. Review Committee Participants	A-1
B. Master Schedule	B-1
C. Project Summary Sheets	C-1
D. Economic Analysis Methodology	D-1

Please refer to the August 30, 2001 Infrastructure Review Committee report for information on the purpose of this Committee, terms of engagement and general system need. Also please refer to this report for system maps.

1.1 Background

Portions of the Northwest transmission system are gridlocked. An adequate and affordable electric supply is not possible without sufficient transmission capacity. An unreliable system puts public health, safety and the economy at risk. Confirmation of these findings is contained in the National Grid Study (U. S. Department of Energy, May, 2002). Problems with transmission in the region are manifested in several ways:

- Chronic congestion existing on a number of transmission paths requires curtailment of both firm power deliveries and economy energy.
- Continued resolution of the Western energy crisis requires development of new generating resources. The vast majority of proposed Northwest resources cannot obtain firm transmission service, or be integrated, without additional Bulk Transmission.
- It is extremely difficult to meet obligations when facilities are removed from service to conduct normal maintenance or to construct new facilities.
- While power loads have been growing steadily at 1.8% annually and the use of the transmission system is up by over 2% annually, few Bulk Transmission lines were added in the past 15 years.
- It will take much longer to site and build transmission to deliver needed new generation than it will take to build and site the generation. New transmission is needed to meet statutory, treaty and contractual obligations and comply with national and regional standards that ensure a reliable power system¹.

As the operator of three-quarters of the Bulk Transmission in the Northwest, the Bonneville Power Administration (BPA) developed a transmission infrastructure proposal that builds upon BPA's previous transmission expansion plans. Undertaking a capital program of this magnitude will require an increase in BPA's borrowing authority. A diverse group of Northwest electric power interests, in an August 8, 2001 letter to Vice President Cheney, strongly endorsed increased borrowing authority in order to ensure that sufficient financial resources are available to accomplish transmission expansion needed to ensure an adequate and affordable electricity system for the Northwest.

The Infrastructure Technical Review Committee (ITRC) was formed in 2001 at the behest of some of BPA's customers to support BPA's efforts to secure funding for BPA's infrastructure proposals. Once a year, the ITRC evaluates and prioritizes BPA's proposed improvement projects in a manner that will provide the most cost-effective, reliable service for the region's consumers. The committee draws on individuals who are also members of the Northwest Power Pool (NWPP) Transmission Planning Committee (TPC), Operating Committee (OC) and the Northwest Regional Transmission Association (NRTA) Planning Committee (PC). The committee's review is one of several reviews for BPA's proposals. BPA participates in the committee's work by submitting proposed transmission investments and by facilitating the committee's review of those proposals. BPA does not vote on the committee's findings and does not fund the work of the ITRC.

The committee was asked to report its initial recommendations by August 30, 2001 to enable BPA to install necessary system facilities as soon as possible.

This review is the second in an annual process to coincide with BPA's annual budget cycle. It covers four projects of BPA's infrastructure proposal. Review of additional projects will be conducted in subsequent years. There are several additional parallel efforts that provide for review of proposed transmission additions. This committee's analysis and recommendations will be shared and further analyzed in the following forums.

- Northwest Power Pool (NWPP) Transmission Planning Committee
- Western Electricity Coordinating Council (WECC) Regional Planning Group
- National Environmental Policy Act (NEPA) review for individual projects

During the first part of 2002 the committee met twice to review additional infrastructure proposal developed by BPA. While some of the proposals have been under development in previous forums with outside participation, other proposals were presented for the first time. BPA conclusions and recommendations given on the following pages.

1.2 Projects Reviewed in 2002

There continues to be a compelling and immediate need to complete the projects reviewed in 2001 and to further upgrade portions of the Northwest Bulk Transmission grid. Solutions proposed by BPA in coordination with others address the identified problems. Detailed descriptions are given in Appendix C together with the economic analyses in Appendix D.

- Project G10 (Portland Area Additions) is high priority and should be implemented as soon as possible.
- Project G11 (South Seattle Transformer) is not addressed at this time and will be submitted for future ITRC review.
- Project G12 (Olympic Peninsula Reinforcement) is also important. The need date to prevent area problems for first contingency (N-1) outages is later than initially estimated based on the most recent load forecasts. Planned curtailment of area load is permitted under the NERC/WECC Planning Standards for the exposure to double contingency (N-2) and bus outages provided that system cascading does not result. Opportunities for non-transmission alternatives are being pursued in parallel with the continued review of the proposed transmission fix.
- Projects G13 (Paul – Troutdale 500-kV Line) and G14 (Hanford-Ostrander 500 kV loop-in) were examined on a preliminary basis. Project G13 is critical to integration of new generation in the I-5 corridor. BPA will complete details of the plan of service over the next 60 days and bring this through the WECC Regional Planning Process. In addition, coordination with PGE and PacifiCorp is required in relation to their respective transmission and generation expansion plans.
- The benefits of project G14 are not clear given proposed I5 generation development and potential higher costs to route around the Columbia Gorge Scenic Area. BPA will bring these projects forward to the committee for consideration in 2003 after further examination of alternatives and need.

Table 1. 2002 Recommended Projects

Project		Capital Cost (loaded) (\$M)	Energization Date	Capacity Added MW
Portland Area Additions	G10	9	2003	300
Olympic Peninsula Reinforcement	G12	26	2005	430
Total		35		

Table 2. Drivers for 2002 Recommended Projects

	Load Service	Entitlement Return	Generation Integration	Transfers	Reliability	O&M Savings	BiOp
G10	x				x		
G12	x				x		

1.3 Projects Reviewed in 2001

- Projects evaluated in previous years should continue on the revised timetable proposed by BPA. BPA will continue to reevaluate project need and timelines, particularly for projects driven by generation integration.
- In accordance with provisions in the January 15, 2002 guidelines² BPA provided a status report on projects that were reviewed last year. There were no significant changes in circumstances that necessitated any of these projects be returned to the committee for a full review.
- Section 1.5 provides a status report on these projects G1-G9.

1.4 Rate and Budgetary Impacts

As started earlier, there continues to be a compelling and immediate need to continue to upgrade portions of the Northwest Bulk Transmission grid and capital to meet that need.

- Figure 1 illustrates the historical and projected transmission capital requirements forecasted by BPA over a ten-year planning horizon. The capital outlay from 2001 and beyond, including the infrastructure proposals, is well above BPA's remaining borrowing authority. Accordingly, the need still remains to increase BPA's borrowing authority for *transmission* by at least \$1 billion in order to ensure that sufficient financial resources are available.
- BPA will continue to pursue and evaluate third-party financing opportunities for major new transmission projects.
- Preliminary analysis for the individual projects show that in some cases the cost will be fully recovered by increased usage and may put downward pressure on rates. Other projects that are driven by reliability needs may put upward pressure on rates. Details on the economic analysis are given in Appendix D. This report is not intended to be a rate projection.
- Where the generation project developers are not funding Network upgrades in advance of construction, BPA should secure firm transmission service contracts of sufficient duration and with appropriate credit provisions before proceeding with construction.
- Additional reinforcements by BPA and others are needed to maximize reliability and transfer capability from the proposals. Other Northwest utilities have planned and in some cases committed to transmission additions, and maximum benefits will be achieved through coordinated development.

Future reviews will be conducted annually to evaluate and prioritize BPA proposed major transmission projects in a manner that will provide the most cost-effective, reliable service for the region's consumers.

1.5 Status of Projects Reviewed in 2001

Projects G1-G9 reviewed in 2001 remain in the construction program but in some cases with revised energization dates, or subject to commitments from proposed generation plants. A brief status statement follows on each of these projects:

G1 Puget Sound Area Additions (Kangley – Echo Lake 500 kV Line)

The energization date for this project has set back one year to Fall 2003 to allow a full analysis of alternatives through the environmental process. Based on approval by WECC the outage of the Raver – Echo Lake and Schultz – Echo Lake lines on common rights of way has been granted an exception from two-line outage requirements and reclassified as NERC/WECC Category D (exploratory). The Snoking 500/230 kV transformer energization has also been delayed by one year to Fall 2003.

G2 North of Hanford (Schultz – Wautoma 500 kV Line and Wautoma Substation)

This project is proceeding forward on the Fall 2004 schedule with no change in status.

G3 McNary – John Day 500 kV Line

This project is proceeding forward on the Fall 2004 schedule with financial commitments having been received from generation projects for preliminary design and environmental work.

G4 Lower Monumental – Starbuck 500 kV Line

Need for this project is presently uncertain due to delay of the Starbuck generation project. Continuation of this project will depend on resumed development of this site and agreements for financing of the transmission project.

G5 Smiths Harbor – McNary 500 kV Line

Work is proceeding on plans for construction of the substation at Smiths Harbor based on commitments from the Smiths Harbor generation project. Need for the transmission project depends on plans to move forward with the Starbuck generation project or other generation in the area.

G6 Schultz Series Capacitors

This project is proceeding ahead for completion in Fall 2003 per the original schedule.

G7 Celilo Modernization

Work is proceeding on this project with the expected energization revised from Fall 2003 to Summer 2004.

G8 Monroe – Echo Lake 500 kV Line

Non-transmission solutions are being reviewed by BPA as possible alternatives for this project scheduled for Fall 2005.

G9 Bell – Coulee 500 kV Line

This project, which is intended to increase capacity across the West of Hatwai bottleneck, is on schedule for Fall 2004 energization as reported in last year's report. Since that time,

agreement has been reached on additional Phase 1 facilities (many of which were included on the list of potential Phase 2 projects in the 2001 Infrastructure Technical Review Committee Report), which are presently planned for energization between 2003 and 2007. These facilities and modifications, which will be constructed/implemented by the Avista Corporation, include the following:

- Benewah-Shawnee 230 kV Line.
- Dry Creek 230 kV Switching Station.
- Beacon-Rathdrum Double Circuit 230 kV Line.
- Increase operating limits on Hatwai-Lolo 230 kV Line.
- Increase operating limits on Hatwai-North Lewiston 230 kV Line.
- Increase operating limits on Dry Creek-North Lewiston 230 kV Line.
- Install 230 kV shunt capacitors at Benewah (200 MVAR).
- Install 230 kV shunt capacitors at Dry Creek (200 MVAR).

All of the facilities listed above will be taken through the WECC Regional Planning Process. Since the Bell-Coulee 500 kV line has already been through the process, it is expected that this will be an abbreviated process with comments only for the additional facilities. Any additions or changes to the above list of projects will be identified through the Regional Planning Process. The complete slate of Phase I facilities reinforcing the West of Hatwai Path including the Coulee – Bell 500 kV line will then be taken through the WECC Path Rating Process. Additional (West of Hatwai Phase II) facilities, which may be necessary in the Northern Idaho / Western Montana area will be identified in a follow up effort.

1.6 Glossary of Acronyms and Terms

BiOp	Biological Opinion
MW	A unit of power. One MW would serve approximately 700 homes.
NRTA	Northwest Regional Transmission Association
NWPP	Northwest Power Pool
RTO	Regional Transmission Organization
WECC	Western Electricity Coordinating Council

Bulk Transmission – Transmission lines that serve as the backbone of the grid, typically operated at voltages of 230-kV and above.

1.7 References

- [1] “NERC/WECC Planning Standards, Board of Trustees approved April 18, 2002.
[2] “Annual BPA Transmission Infrastructure Review,” January 15, 2002.

Figure 1. TBL Capital Projects Historical & Future Trend

