Upgrading the Capacity and Reliability of the BPA Transmission System

Report to the Infrastructure Technical Review Committee

December 7, 2004

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Appendices

Please refer to the August 30, 2001 and the August 20, 2002 Infrastructure Review Committee reports for information on the purpose of this Committee, terms of engagement and general system need.

1.1 Background

Portions of the Northwest transmission system continue to be grid locked. 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 system[1].

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 required 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. 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.

This review is the fourth presented to the ITRC and covers two projects. Review of additional projects will be conducted in subsequent years. There are several additional parallel efforts that provide for review of proposed transmission additions. The 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

1.2 Projects Reviewed in 2004

For the projects submitted for review detailed descriptions are given in Appendix C together with the economic analyses in Appendix D.

- Olympic Peninsula Reinforcement (G12): This project was presented to the ITRC in 2002. However, due to a change in the proposed plan of service, BPA resubmitted this project for review. The need date for first contingency (N-1) outages continues to be 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 review of the proposed transmission fix.
- Lower Valley Area Reinforcement: This project will increase the reliability of maintaining load service to the Lower Valley area. Without this project it would be necessary to curtail load to relieve voltage stability problems during normal winter peak load conditions for first contingency (N-1) outages. The normal winter temperature is –30 degrees Fahrenheit. Temperatures this low make reliable service imperative since the job of restoring load service is extremely difficult. Non-transmission alternatives will be evaluated and implemented in order to reduce peak hour transmission use in conjunction with the proposed project.

Table 1. 2004 Recommended Projects

Project	Capital Cost (loaded) ($M)	Energization Date
Olympic Peninsula Reinforcement	21.5	Fall 2007
Lower Valley Area Reinforcement	24.1	Fall 2008
Total	45.6	

Note: The Lower Valley Area Reinforcement cost estimate includes BPA's portion only.

Table 2. Drivers for 2004 Recommended Projects

	Load Service	Entitlement Return	Generation Integration	Transfers	Reliability	O&M Savings	Bi-Op
Olympic Peninsula	x				x		
Lower Valley	x				x		

1.3 Rate and Budgetary Impacts

As started earlier, there continues to be a compelling need to reinforce portions of the Northwest Bulk Transmission grid and secure funding to meet that need.

- Figure 1 on page 9 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. Therefore, BPA will pursue other alternatives in order to ensure a sustainable capital program.
- BPA will continue to pursue and evaluate third-party financing opportunities for major new transmission projects.
- Preliminary analysis for individual projects could show that in some cases the cost would 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. However, this can be offset depending on whether there are avoided costs or benefits not related to sales. This report is not intended to be a rate projection.
- Where the generation project developers are funding Network upgrades, BPA needs to secure firm transmission service contracts of sufficient duration and with appropriate credit provisions before proceeding with construction in order to prevent stranded costs.
- 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 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.

1.4 Status of Projects Previously Reviewed

In 2003, BPA provided a status report on projects that were previously reviewed by the ITRC. There were no significant changes in circumstances that required any of these projects be returned for a full review. Also, BPA did not submit any new projects for review by the ITRC.

Some of the projects previously reviewed are under construction or have been energized. Other projects have been put on hold or cancelled due to a lack of generation projects being developed. A brief status statement follows on each of these projects**:**

- Project G1 (Puget Sound Area Additions): The Kangley-Echo Lake 500-kV line and Snoking 500/230-kV transformer were energized December 2003.

- Project G2 (North of Hanford): The Schultz-Wautoma 500-kV line is currently under construction. Major portions of Wautoma 500-kV Substation are completed. The energization date is scheduled for December 2005.

- Project G3 (McNary-John Day 500-kV Line): The McNary-John Day 500-kV line is currently on hold due to a lack of generation projects being developed.

- Project G4 (Lower Monumental-Starbuck 500-kV Line): The Lower Monumental-Starbuck 500-kV line has been cancelled due to the Starbuck generation project not being developed.

- Project G5 (Smiths Harbor – McNary 500 kV Line): The Smiths Harbor-McNary 500-kV line has been cancelled due to Wallula generation project not being developed.

- Project G6 (Schultz 500-kV Series Capacitors): The Schultz 500-kV Series Capacitors were energized November 2003.

- Project G7 (Celilo Modernization): The Celilo Modernization was energized December 2003.

- Project G8 (Monroe-Echo Lake 500-kV Line): The Monroe-Echo Lake 500-kV line is currently on hold due to a lack of generation projects being developed.

- Project G9 (Bell-Coulee 500-kV Line): The Bell-Coulee 500-kV Line was energized on December 1, 2004. In addition to the Bell-Coulee 500-kV Line, new series capacitors at Bell and Dworshak Substations are now in service. The complete list of West of Hatwai area projects also includes a number of Avista projects which include the following:

    - Benewah-Shawnee 230-kV Line.
    - Dry Creek 230-kV Substation.
    - Beacon-Rathdrum Double Circuit 230-kV Line
    - Hatwai-Lolo 230-kV Line Upgrade.
    - Hatwai-North Lewiston 230-kV Line Upgrade.
    - Dry Creek-North Lewiston 230-kV Line Upgrade.
    - Benewah 230-kV Shunt Capacitors (200 MVAR)
    - Dry Creek 230-kV Shunt Capacitors (200 MVAR).

The Beacon-Rathdrum double circuit 230-kV line has been energized. The remaining Avista facilities will be energized in the 2005-2007 time frame. All of the facilities listed above have been taken through the WECC Regional Planning Process. The West of Hatwai path is presently in Phase 2 of the WECC Rating Process.

- Project G10 (Portland Area Additions): The Pearl 500/230-kV transformer was energized December 2003.

- Project G11 (South Seattle Transformer): The South Seattle transformer location and need date are yet to be determined.

- Project G12 (Olympic Peninsula Reinforcement): The Olympic Peninsula Reinforcement project was resubmitted to the ITRC for a full review in 2004 since there was a change in the proposed plan of service.
- Project G13 (Paul-Troutdale 500-kV Line): The Paul-Troutdale 500-kV line is currently on hold due to a lack of generation development along the I-5 corridor.
- Project G14 (Hanford-Ostrander 500-kV Loop-In): BPA is currently studying less expensive alternatives in lieu of the Hanford-Ostrander 500-kV loop-in project.

1.5 Glossary of Acronyms and Terms

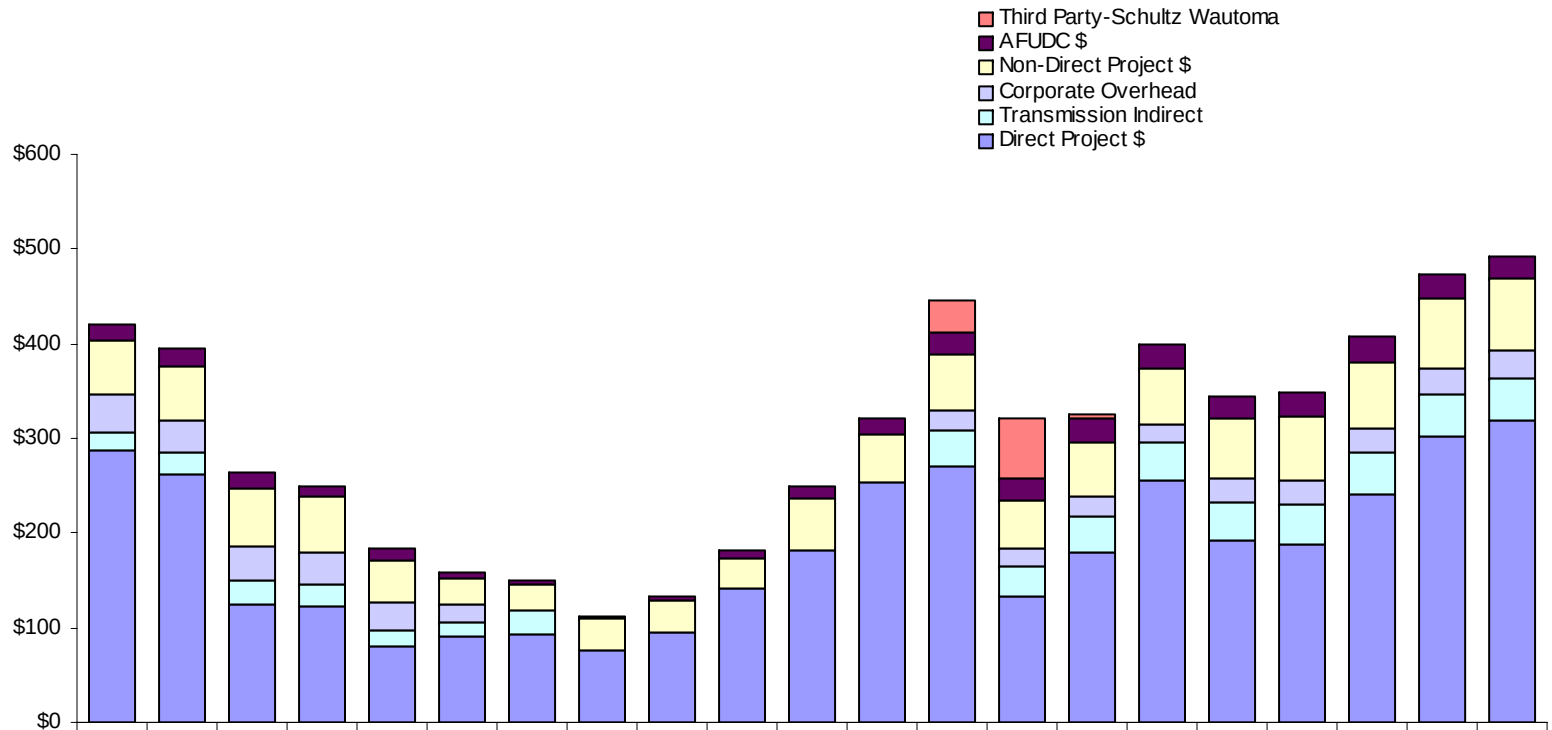
BiOp	Biological Opinion
MW	A unit of power. One MW would serve approximately 700 homes.
NRTA	Northwest Regional Transmission Association
NWPP	Northwest Power Pool
RTO	Regional Transmission Organization
WECC	Western Electricity Coordinating Council

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

1.6 References

[1] "NERC/WECC Planning Standards, Board of Trustees approved April 18, 2002.

Figure 1. TBL Capital Projects Historical & Future Trend



	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05 Forecasted	FY06 Forecasted	FY07 Forecasted	FY08 Forecasted	FY09 Forecasted	FY10 Forecasted	FY11 Forecasted	FY12 Forecasted
Third Party-Schultz Wautoma													34.3	63.9	4.6	0	0	0	0	0	0
AFUDC $	15.4	18.4	15.5	10.5	12.1	6.8	4.0	2.9	4.5	8.6	13.1	17.3	23.1	23.6	24.5	25	22.7	26.1	25.8	25.1	22.5
Non-Direct Project $	58.6	57.3	61.2	57.5	45.5	26.1	27.0	32.9	33.9	32.8	54.5	50.8	59.3	50.9	59.1	59.6	64.9	67.2	69.6	72.2	75.0
Corporate Overhead	38.4	33.7	36.4	35.4	29.6	18.7							20	19.9	19.9	19.4	23.7	25.0	26.4	27.9	29.5
Transmission Indirect	20.2	23.6	24.7	22.1	15.9	16.5	27.0						39.3	31	39.2	40.2	41.2	42.2	43.2	44.3	45.5
Direct Project $	286.8	261.7	125.6	122.9	80.4	90.1	92.0	75.9	95.5	141.3	182.5	253.7	269.5	132.8	178.6	255.4	191.9	188.8	241.8	302.8	318.9