Meeting Summary: Non-Wires Round Table

Friday, April 15, 2011
Bonneville Power Administration
905 NE 11th Ave, Portland, OR

Attendees

Round Table members

Brian Silverstein, Co-chair	BPA, Senior VP Transmission Services
Mike Weedall, Co-chair	BPA, VP Energy Efficiency
Hardev Juj	BPA, VP Planning and Asset Management
Larry Bekkedahl	BPA, VP of Engineering and Technical Services
Darrell Gerrard	PacifiCorp, Director of Demand Side Services
Ken Canon	Canon and Hutton
Ralph Cavanagh	Natural Resources Defense Council, Co-Director Energy Program
Tom Foley	Consultant
Nancy Hirsh	NW Energy Coalition, Policy Director
Steve LaFond (by phone)	The Boeing Company, Energy Resources Utilities Management
Booga Gilbertson	Puget Sound Energy, VP of Operation Services
Kris Mikkelsen	Inland Power & Light Company, CEO
Paul Cartwright	Montana Department of Environmental Quality, Senior Energy Analyst
Bill Pascoe	Pascoe Energy, Consultant
Chris Deschene	Affiliated Tribes of NW Indians, Economic Development Corp, Consultant
Jim Webb	Lower Valley Energy
Robert Kahn	NW Independent Power Producers Coalition, Executive Director
Mark Smith	Calpine
Cal Morris	Clark Public Utilities, Director of Engineering
Steve Hawke	Portland General Electric, Senior Vice President, Customer Service
Nancy Baker	Public Power Council
Carl Linvill	Western Grid Group
Fred Huette	NW Electric Cooperative

Others in attendance

Ottie Nabors	BPA Energy Efficiency
Luanna Grow	BPA Public Communications
Steve Weiss	BPA Regional Relations
Steve Mason	BPA Distribution and Generation
Kendall Rydell	BPA Transmission Planning
Melvin Rodrigues	BPA Transmission Planning
Larry Furumasu	BPA
Lee Hall	BPA Energy Efficiency
Josh Warner	BPA Energy Efficiency Planning and Evaluation
Richard van Dijk	Another Way BPA
Terry Constance	Another Way BPA
Diane Adams	EnviroIssues, Facilitation and meeting support
Ryan Orth	EnviroIssues, meeting support

Welcome, Introductions and Agenda Review

Brian Silverstein, Senior Vice President of Transmission Services (TS) and Mike Weedall, Vice President of Energy Efficiency (EE) introduced themselves as co-chairs of the Bonneville Power Administration (BPA) Non-Wires Round Table and welcomed attendees. The agenda for this meeting includes discussion of the round table purpose and objectives, an overview of the updated non-wires process and overviews of two current non-wires screening analyses for proposed transmission projects.

Diane Adams introduced herself as facilitator of the round table and attendees introduced themselves.

Review Round Table objectives and purpose

Co-Chairs Brian Silverstein and Mike Weedall provided an overview of the Non-Wires Round Table purpose and objectives. Mr. Silverstein described the origins of the round table process. The round table first met in 2003 as BPA embarked on a major transmission infrastructure program. The purpose of non-wires solutions approach is for TS to ensure it is providing the most cost-effective solution to the region's transmission problems from an engineering, economic and environmental standpoint before proceeding with the construction of transmission projects.

Mr. Silverstein explained that three major transmission projects have been built of the approximately 20 that were originally identified. The focus of these non-wires solutions has been on the consumer side of managing demand, talking advantage of consumer generation and re-dispatch of generation from private utilities or large power producers. BPA has gone through a number of evaluations that for many reasons were not successful in identifying cost-effective deferral of a major transmission project. In one case, the South Oregon Coast, BPA deferred aproposed transmission reinforcement by installing a Static Var Compensator. While not a demand side approach, it was a non-wires fix.

Utilities in many jurisdictions around the country and across the world are asked to do non-wires type evaluations to find the most-effective solutions from an economic, engineering and environmental standpoint. There are some cases where a utility has been able to delay distribution and sub transmission investments using non-wires solutions through use of technologies such as demand response, storage devices and large batteries. Demand response strategies have also been important in creating cost effective delivery of power to meet system peaks and balance wind power. Mr. Silverstein commented that he was not aware of a utility that has yet deferred a bulk electric facility using non-wires solutions. [NOTE: subsequent to the meeting we found a report which stated that demand response procured by the PJM Interconnection contributed to delaying the need for the proposed 765-kV Potomac-Appalachian Highline by “at least one year.”]

BPA has not convened the round table more recently due to the lack of active transmission expansion projects. In the interim, BPA has reviewed technical requirements and policy issues with the intent of reconvening the round table as additional projects were initiated. The region needs to continue to look at non-wires solutions, as transmission development remains a significant challenge. The round table will continue to work with the agency on alternatives to building lines and other facilities where transmission system improvements are needed and help TS determine whether non-wires solutions can be employed as viable alternatives to transmission expansion. Non-wires solutions may include pricing strategies, demand side management, re-dispatch of existing generation, strategic placement of new generators and other strategies.

Mr. Silverstein reviewed several objectives for the current Round Table process:

- Understand current industry practices and experience
- Review and advise BPA on project-specific studies on non-wires solutions
- Review the screening process
- Review technology choices

Mike Weedall added that EE works closely with TS to conduct the non-wires evaluation process and EE staff has the expertise to perform the technical planning and analyses for these studies. EE also wants to expand on these approaches and ensure that BPA is looking at all transmission alternatives. There has not traditionally been a capacity issue in the Pacific Northwest because of the nature of the BPA system and public customers. As these capacity conditions change, the degree to which BPA can understand the region and makeup of challenges, the better they will be at matching tools to the needs of the region. Mr. Weedall mentioned that one area where BPA is growing its capabilities is in demand response load management. After just two years pursuing this program, BPA was recently recognized by the Peak Load Management Association with a national award for innovative projects.

Mr. Silverstein commented that demand response strategies offer a business proposition across the value chain associated with generation, transmission and distribution. These investments can be leveraged and capture multiple value streams, but this so far has been a challenge. Wind generation and the need to balance this power is now a driver for demand response and storage technologies. Proposed transmission investments will influence the conversation around non-wires in the coming years. Demand response is contributing to the reliability and cost-effective operation of the grid, but it is a challenge to incorporate these measures in order to defer transmission.

Remarks from Distinguished Members of the Early Round Table

Members of the earlier round table efforts shared their perspectives on the value of this previous experience as well as that of continued round table work.

Ralph Cavanagh, National Resources Defense Council, commented on the influence of the round table's previous work. At that time, he said, environmental interests were skeptical of transmission proposals as potentially misguided solutions that also were tied to fossil fuel generation. The non-wires approach marked an important shift by including measures that can accommodate multiple benefits including generation, transmission and distribution. Mr. Cavanagh offered his belief that BPA is earnestly looking for alternatives to large transmission projects and is well qualified in this work. He commented that there are abundant non-wires measures yielding benefits in multiple dimensions (i.e., value delivered as measured in generation, transmission and distribution system benefits, with energy efficiency leading the way). The problem is finding ways to provide appropriate compensation incorporating all these value streams, and he hopes we will redouble our collective efforts there.

Ken Canon, Canon and Hutton, added that BPA has long been an innovator in engineering and that non-wires is an extension of this innovation. His experience in evaluating several Puget Sound Reliability Plan for non-wires potential was a great learning opportunity. Reliability of the system will need to be ensured as the world becomes increasingly digital and industry processes move towards greater use of electricity. Non-wires solutions provide many opportunities for customers to participate in improving this reliability through energy efficiency, load controls and demand management, generation re-

dispatch and voltage optimization on distribution lines. Mr. Canon commented that new transmission development, by contrast, will remain difficult. It will be critical for the round table to assist BPA with developing smart and comprehensive solutions that are well rounded and well configured as well as to support BPA throughout the process.

Robert Kahn, Northwest Independent Power Producers Coalition, offered his respect for the commitments that BPA has made to non-wires solutions. The power of the non-wires work is the evaluative process that is a tool for a go/no-go decision on bulk transmission projects, including clustering of projects and use of a long-range planning horizon. Non-wires analyses help to understand alternatives or delay transmission. Mr. Kahn commented that non-wires method also supports the wired solutions, as well, as its evaluations provide a justification to move forward when needed.

Tom Foley, independent consultant commented that he is pleased that the round table has been reconvened. He participated on pilot projects for the Olympic Peninsula and in Ashland and sees benefits of these early projects that will serve as a foundation for future non-wires candidates. Mr. Foley said that improved implementation of non-wires solutions will emerge as additional tools become available.

Transmission Planning Process and Update

Planning Process

Hardev Juj, Vice President of Planning and Asset Management (Planning), presented an overview of the transmission planning study process. He explained that Administrator Steve Wright has established several objectives, or filters, that are used to evaluate all projects: encouraging renewable and energy efficiency, reliability, regional benefits and avoiding cost shifts.

Mr. Juj referred to a diagram displaying the transmission planning study process. Transmission projects enter planning from several sources early on in the process, including Load Growth, Transmission Service Requests (through the Network Open Season process), Generation Interconnection Requests, Line/Load Interconnection Requests and Operational/Maintenance Problems. Projects are then forwarded to separate processes for Generation Interconnection Planning or Network Open Season (NOS) Cluster studies.

Planning Services has a template that is used to identify system problems and potential solutions, including non-wires alternatives. EE leads the Non-Wires Preliminary Assessment and Planning staff works closely with EE to evaluate alternatives to identify non-wires candidate projects. Non-wires candidates are then evaluated further in a detailed feasibility study. If a project is found to be feasible after this first phase of evaluation, they are advanced to a process to select a Preferred Plan of Service Based on Electrical Performance and undergo a Cost and Risk Assessment before the environmental process.

Brian Silverstein added that some of these planning processes are occurring simultaneously. For example, the I-5 Corridor Reinforcement project that has recently undergone the first phase of non-wires evaluation has also completed the scoping phase of its environmental process and is now preparing its Draft Environmental Impact Statement (EIS). One of the lessons that BPA has learned through the process is that it is ideal to conduct non-wires evaluations as early as possible in the National Environmental Policy Act (NEPA) environmental process to identify potential solutions.

Mr. Juj provided additional detail on the NOS process. The prior method of transmission service queue management BPA employed was not working. The NOS was introduced in 2008 as a new process that integrates planning to meet load growth and renewable portfolio requirements. It has been successful in clarifying the transmission reinforcement that is needed across the region. In the NOS process, customers agree to buy long-term firm transmission service through a Precedent Transmission Service Agreement (PTSA) and provide a deposit to secure their commitment. In return, BPA agrees to conduct a Cluster Study to identify new reinforcements necessary to serve these long-term commitments. The Cluster Study looks at congestion and interdependencies across the region to understand how reinforcements in one area can affect others. BPA also conducts a Commercial Infrastructure Financial Analysis (CIFA) on new reinforcements, conducts a NEPA review, finances and builds the infrastructure .In addition, BPA offers Conditional Firm Products to bridge service until new facilities are built.

Brian Silverstein added that long customer queues were an issue that the previous round table discussed. Under the traditional transmission queue system BPA would receive a request, conduct studies, come to a business agreement and then move on to the next request. The agency found that there are significant interactions between the requests that create efficiencies. In addition, some customers in the queue were inactive and effectively blocking access for other customers. BPA borrowed from a model used by the gas pipeline industry to develop the NOS process. With this new approach, the queue has been unclogged. In 2008, BPA was able to offer approximately 1500 MW of service out of existing inventory without building new service. Mr. Kahn, speaking on behalf of utilities he represented in the NOS process, agreed that NOS is an equitable approach that is a good example of a public-private partnership.

Mr. Silverstein referred to the Conditional Firm product as another item the previous round table had discussed. He explained that the grid is not frequently congested. Conditional Firm is a product described by the Federal Energy Regulatory Commission (FERC) that says you can offer service “most of the time.” BPA has offered approximately 1000 MW of Conditional Firm service, more than the rest of the country combined.

Mr. Juj provided a summary of NOS offers and participation. In 2008, NOS started with 14,464 MW of requests for service, of which 6,410 MW (57 percent of which was wind) committed to service through PTSAs. In 2009, the NOS process resulted in participation from 42 percent of offered PTSAs at 1,553 MW (of which 59 percent was wind). BPA is currently evaluating their 2010 NOS data..

2008 NOS resulted in four 500kV projects: McNary-John Day, Big Eddy-Knight, Central Ferry-Lower Monumental and I-5 Corridor Reinforcement. As mentioned, no additional reinforcement was required in 2009 to fulfill service requests.. The 2010 NOS included 1522 MW of 2008 NOS projects as well as the Colstrip Upgrade (522 MW), Garrison Ashe 500kV (544MW) and Northern Intertie Reinforcement (1100 MW, upgrading existing 230kV lines).

Colstrip Upgrade is projected to cost $115M to support enhanced wind generation. Six owners and BPA agreed to conduct a study and look for on-ramp/off-ramp types of solutions. It is expected this will be a permanent deferral solution. Garrison-Ashe, by contrast, is a new line that is projected to cost over $1B and is not likely to proceed. Northern Intertie is an upgrade of existing lines with larger conductors and/or tightening wires, not new towers.

Discussion
Several members asked about the role of the NOS queue. Mr. Juj and Mr. Silverstein responded that all customers in the queue who signed an agreement are included in the Cluster Study. Those highest in the queue based on date/time stamps receive service first if service can be offered immediately. If requests in a cluster can be served by a proposed reinforcement, they are essentially treated equally. For example, in 2009, service was provided to approximately 1400 MW from the projects proposed in the 2008 NOS.

Transmission Project Update
Larry Bekkedahl, VP of Engineering and Technical Services, presented on the status of four 2008 NOS projects resulting from the Cluster Studies. He commented that in general, transmission projects in the United States are behind their counterparts in China and India, due to their great need to build new transmission lines, by taking advantage the latest available technology and application of engineering expertise. Mr. Bekkedahl also remarked on the fact that in some cases the U.S. no longer has integrated utilities, which requires cooperation between those that are serving load directly and generators. There is a real challenge to work on integration of transmission and generation with distribution. Additional controls may yield transmission and distribution efficiencies from the system that serve a need for capacity.

With respect to power losses in the transmission system, BPA's losses are relatively low, approximately 1.5%.This reflects previous decisions to evaluate investments in efficient power transformers and larger wires against the cost of acquiring energy. Typical transmission losses are 4 to 6 percent, while distribution losses average between 6 and 9 percent.

McNary-John Day
The McNary-Day project is 79 miles of new 500kV transmission line and two sub bay additions with a total project cost of $170M. In February 2009, BPA concluded they would move forward. Environmental process was originally conducted in the 2000/2001 timeframe to serve gas-powered generation planned for this area, but these generation projects did not advance amidst the energy crisis. Today, wind generation is a new driver. BPA was able to move quickly on this project and it is on-track to energize in early 2012 because of the previous environmental work. The project is a year ahead of schedule and a third less cost than estimated, with the cost difference primarily due to lower prices for steel and construction contracts.

Lower Monumental
Lower Monumental includes 40 miles of new 500 kV transmission line and two sub bay additions at a total project cost of $90M. Substations are being funded by wind developers and will be finished in October at a cost of an additional $80M. The Record of Decision (ROD) was completed for this project three weeks ago and construction is expected to begin in summer 2011 to take advantage of steel contracts secured through August 1. BPA is currently purchasing land and finishing negotiations on easements, with access roads to begin construction within a few weeks. Project construction will be complete in 2013.

Big Eddy-Knight
Big Eddy-Knight is 28 miles of new 500 kV transmission line as well as a sub bay addition and new Knight substation at a total project cost of $115 M. The Final EIS was released and a ROD is expected by September 1. Construction outages of the power system can only occur in certain timeframes. This is a critical issue because a whole year could be lost if the opportunity to start construction is missed. This

project provides additional value to McNary-John Day. Land acquisition on this project will not begin until the ROD is received. The far easterly route has been identified as the preferred route. Project construction is hoped to be complete by spring 2013 to take advantage of McNary-John Day project. The primary cost difference between this project and McNary-John Day is the need to build a new substation.

I-5 Corridor Reinforcement

The I-5 Corridor Reinforcement project involves 70 miles of new 500 kV transmission and two new substations at a total project cost of approximately $342M. Project costs are currently undergoing evaluation. The project began in February 2009 with scoping and is expected to have a Draft EIS later this year, a Final EIS in 2012 and ROD in January 2013. Energization is expected in October 2015.

The project provides reinforcement for the area between Longview, WA and Troutdale, OR which experiences summer peaks and increasing winter loads, with 2016 identified as a year of concern for operations. There is just one 500kV line in the Portland area and four 230 kV lines; the last major transmission developed in this area was in the 1960s. More recently BPA has had to move significant power to balance this portion of the system, creating issues with shutting down generation. The capacity issue is primarily due to load growth in the area and the maxing-out of allowable dropped generation through Remedial Action Schemes (RAS). This project is the subject of detailed non-wires studies that will be presented to the round table later in the session.

Many possible segments and routes have been identified for this project, including the existing 230 kV right-of-way from Longview to Vancouver and Troutdale. This route impacts more people, so other routes being considered. The I-5 project has created a lot of community dialogue because it is in an urban area with many residents.

Review of Screening Process and Evaluation

Ottie Nabors, BPA EE, presented an overview of the non-wires screening process. The process has changed slightly since the last round of evaluation of non-wires candidate projects. The purpose of the non-wires process remains to ensure BPA is pursuing the least cost solution to transmission issues from an engineering, economic and environmental standpoint. The non-wires process includes a Transmission Planning Study and integrates to the NOS Cluster Study process. BPA seeks to use the non-wires process as a framework to broaden the agency resources brought to bear on the evaluation of transmission projects. Several projects have previously undergone non-wires evaluation including Kangley-Echo Lake, Olympic Peninsula, Southern Oregon Coast and Lower Valley.

The non-wires screening process includes criteria related to power generation. Projects cost must be greater than $5M and planners work to determine the project's drivers to ensure they are related to load growth versus construction to support merchant activities. Another major consideration is that projects be far enough out in the planning timeframe, ideally 8-10 years, so the project can be effectively mitigated through non-wires solutions.

The Transmission Planning Study process begins with an initial screening to determine candidacy for non-wires screening. There is a two-part process in the non-wires evaluation. A high level screen is applied to determine whether there are sufficient measures available to mitigate a project. A more detailed feasibility study is initiated once it is determined that a project has the resources and time available to apply non-wires solutions. The recommendations from the in-depth study then undergo additional senior management review before moving forward.

The initial non-wires screen (also referred to as "phase one") reviews problems identified in the base case and whether they are related to system reliability, thermal limits, voltage stability or safety. Safety is a key issue that may be a "non-starter" for application of non-wires. The initial screen also looks at drivers of the proposed transmission construction including load service, new generation and transfers, as well as seeks to understand the time critical contingency to problem occurrence. Once problems are understood, the initial screen reviews possible solutions through load reduction or generation and compares potential costs to the avoided cost of the transmission project, including accounting for sunk and non-deferrable costs and other critical factors such as anticipated load growth, the need date and construction decision dates.

Mr. Nabors provided an overview of the non-wires model analysis framework. A transmission project characterization feeds into the avoided costs calculation that measures the costs and benefits of transmission and the costs, benefits and technical potential of energy efficiency, demand response, distributed generation and re-dispatch of existing thermal generation. These analyses feed into the measure of the benefits themselves, the total resource cost screen and cost-effective energy efficiency measures. Mr. Nabors noted the 10 percent benefit requirement for conservation versus other resources dictated by the 1980 Northwest Power Act. Additional energy efficiency measures are evaluated to determine whether they are sufficient to meet the deferral needs. Once the total resource stack is determined and expressed as a supply curve over time, measures are added together and compared against a benchmark load reduction that would need to occur over time to defer the line upgrade.

The high level screening study is intended to provide a quick analysis that identifies the adequacy level of resources to defer the project by the need date. The benchmark benefit-cost test measure has been based on the 6th Regional Power Plan assumptions to provide a consistent means for initial evaluation. These assumptions include technical inputs such as fuel costs, residential and commercial profiles, projected load growths and technical potential. The first phase of the non-wires screening process determines whether there is potential to support an in-depth study. "Cost-effective" is a comparison of the payments over time of non-wires solutions versus the costs and benefits of deferring the transmission project. This is looked at in a total resource cost sense, a holistic view that considers a wide range of offsetting costs and benefits across transmission, generation, distribution and conservation. The energy efficiency models consider maximum achievable potential and include both utility costs and a customer's out of pocket costs.

The in-depth study (also referred to as "phase two") verifies the cost-effectiveness and feasibility of measures identified in the initial screen. Detailed non-wires supply curves are developed to consider additional benefits that can be derived from putting non-wires measures into place, such as those related to generation and distribution. The result of the more detailed analysis is used to make the business case along with detailed implementation plans.

Discussion

Paul Cartwright, Montana Department of Environmental Quality, commented that load shifting opportunities should be considered in terms of locating large consumers closer to power supplies. Robert Kahn added that assumptions need to be made about electric vehicles and other shifts in technology.

Booga Gilbertson, Puget Sound Energy, asked about the top factors in making non-wires solutions successful. Snuller Price suggested that the top three are the timing of the study relative to transmission

needs to ensure it is meeting reliability needs, trickle-up growth conditions where the deferral of a large transmission project makes sense and the energy value of conservation and savings used to free-up system capacity.

Hardev Juj asked whether potential impacts related to energy efficiency are considered. He provided an example of a utility that sells less power because of conservation measures and needs to raise its rates. Mr. Price responded that the total resource cost analysis eliminates the need to consider cost transfer. Costs, payments, transfers, etc. will be considered in the second phase non-wires screen.

Ralph Cavanagh asked about limits on the potential for energy efficiency to create cost-effective deferral of transmission. Mike Weedall responded that this depends on the achievable market penetration. Unless there is a large package of measures that can be implemented, energy efficiency will likely serve as a complement to rather than the basis of non-wires solutions.

Nancy Hirsh, NW Energy Efficiency Coalition, confirmed that the non-wires process is iterative and BPA should continue to consider non-transmission fixes, like technologies applied at the Southern Oregon Coast, to think about engineering solutions to defer transmission. Larry Bekkedahl added that an important question is to determine where in the screening process it makes sense to apply these technologies and said the challenge is to apply them sooner in the process.

Paul Cartwright asked about whether non-wires solutions provide another tool to hedge against peak temperatures changing faster than are assumed by the regional models. Ottie Nabors responded that non-wires could be considered as another way of formulating a total integrated resource plan. It may be that the strategies used to pursue cost-effective deferral of transmission are also cost-effective to meet another need. Brian Silverstein added that additional summer peak forecasting work is needed west of the Cascades to help address issues related to temperature and load forecasts.

Steve Weiss asked about traditional generation and offered the scenario of a peaking power plant. Without location-based pricing, there is not a market mechanism to recognize this problem. Mike Weedall agreed and noted that some of the early pilot projects in non-wires involved generation on the Olympic Peninsula.

Review and discussion of I-5 Reinforcement Screening Report

Jack Moore, Energy + Environmental Economics (E3), provided an overview of the I-5 Reinforcement non-wires initial screen. The need for the project is to avoid the risk of overloads on two critical north-south paths along the I-5 corridor during the summer peak. The first of these concerns is voltage stability on the South of Napavine path, located between Centralia and Longview. Voltage issues and overloads are caused by losses of Paul-Allston and 500 kV lines (N-2) that require load to be shed. The second risk is thermal overload on the South of Allston path between Longview and Vancouver where the loss of the 500 kV Allston-Keeler line (N-1) causes overloads on lower voltage parallel facilities. Voltage limit overload on South of Napavine are forecast by 2018 and thermal overload on South of Allston is expected by 2015/2016.

The I-5 Corridor Reinforcement project proposes 70 miles of new 500 kV line connecting new substations in Castle Rock, WA and Troutdale, OR with proposed energization in summer 2015. Exact routes are still under consideration and costs are estimated at approximately $342M, including $128M in land cost. Land costs were subtracted from the deferred project cost for the purposes of the screening study, as they were determined to be unwise to defer.

The screening study process for non-wires alternatives includes five primary steps. The base case proxy of the problem is first developed using path limits from BPAs base flow data and using interpolation determine what dates summer peak flows on those paths would exceed their capacity. Time of day and time of week are also reviewed to determine when reductions through non-wires measures would be needed. The next step is updating the local area demand forecast, which is an important step as it is used to forecast future expected flows. Metrics are then developed for determining cost-effectiveness, both in terms of deferral of transmission revenue requirement as well as other benefits related to generation capacity deferral and energy savings. The cost-effective potential of non-wires solutions is then evaluated before a portfolio of non-wires alternatives are compared to the overall need of the situation.

The load forecast for the I-5 screening study was an important aspect, given the recent economic climate and other factors. E3 spoke with utilities about their load forecasts and found them to be lower than what was originally studied by BPA. This is due in part to economic conditions, as well as climate conditions. 2009 was the second-warmest summer in recorded history, while 2010 was more moderate. The 1-in-2 summer peak and 1-in 10 summer peak were both reviewed. There is not necessarily a standard method for selecting a summer peak metric so this is an evolving issue. An update to the load growth forecast is expected for the in-depth second phase analysis.

Sensitivity analyses were applied to develop load forecast scenarios for use in the non-wires alternatives evaluation. “Case 1” was based on Portland General Electric’s updated 1-in-10 load forecast and set the 2009 actual peak as the floor. The Economic Sensitivity Case adjusts this forecast upward to add back the drop in flows between 2009 actual and the 2011 forecasts. The Economic Sensitivity Case assumes negligible long-term economic growth change compared to the forecast created before the 2008 recession. Similar assumptions were used to update the Clark PUD load forecast.

Load flow distribution factors are a metric that estimates the impact of changing load and generation on flows for a transmission path. Load flow factors incorporated assumptions of the system related to customer delivery points and pathways and generator dispatch. These factors were then multiplied by incremental loads to estimate incremental flows on each of the I-5 corridor pathways and forecast overloads. Critical peak periods were also identified as occurring in the afternoon to evening timeframe and used to refine the analysis of potential non-wires measures.

The non-wires alternative screening tool framework uses measure data from the 6th Regional Power Plan to determine which measures could be cost-effective. As was described earlier in the day’s discussion, the framework results in supply curves over time that are used to evaluate the potential for non-wires solutions to provide cost-effective transmission deferral. The high-level non-wires screen used the differential revenue requirement method. The results of this analysis compared energization in 2015 versus an investment in 2020 and found a $17.8M savings in deferring the line in 2015, with additional savings from deferring the line over time, if non-wires could be used. Prices per kW based on flow factors for these local paths were calculated to estimate the value of other generation or re-dispatch in these timeframes.

The screen identified a portfolio of cost-effective resources, including energy efficiency, demand response and distributed generation. Cost-effective energy efficiency measures included a peak reduction of 143MW (at meter), with the residential sector making up the bulk of these savings. Demand response savings were estimated at 54MW and distributed generation savings estimated at

60MW. These 257MW of savings resulted in a 1.94 benefit-cost ratio, which is relatively good and could be a component of a broad set of measures.

Generator re-dispatch potential was also reviewed for the I-5 project. It is possible that flow could be decreased on these paths if generation is decreased somewhere to the north of the I-5 path and generation is ramped-up to the south. However, decreasing generation also affects other pathways. The study recommends investigating the feasibility of re-dispatch potential, which could provide a sizable reduction to the flows on critical I-5 paths. The screening study explored this potential using load flow distribution factors and assuming generation re-dispatch of 500-1500MW.

The non-wires screening study for the I-5 corridor drew several conclusions.

- BPA should continue to pursue environmental analysis for the I-5 project on its current schedule while investigating the feasibility of deferral using non-wires measures identified in the screening study.
- Energy efficiency, demand response and distributed generation alone are insufficient to defer the I-5 project need, but could be an important component of a broader plan that includes generator re-dispatch.
- Key feasibility issues include areas load growth forecasting, the effect and treatment of new transmission service requests and the feasibility/economics of generator re-dispatch.
- There is a need to explore implementation feasibility in depth.

Discussion

Ralph Cavanagh asked about the potential of smart grid and demand response technologies over the next decade and how this was accounted for in the screen. Mr. Nabors responded that the maturity of smart grid in the region is beginning to demonstrate opportunities for increased implementation and these technologies will be accounted for in more detail in the second phase of non-wires screening. Mike Weedall added that at this early stage of smart grid development it is difficult to achieve a similar level of granularity as other measures and that the accounting will need to be conservative. BPA is currently working with a strategy group to determine what role it should be playing in demand response. Mr. Cavanagh added that as BPA becomes more involved in smart grid, they will have more influence on the design of future systems that are being engineered today.

Ken Canon asked whether the outcomes to reduce generation from north to south in the I-5 corridor could be achieved through an increase in loads from local generation. He gave an example of industrial generation capacity in Longview. Larry Bekkedahl commented that this may not yield significant relief because these loads are mostly industrial and constant in nature.

Nancy Hirsh asked about lead times in planning for non-wires solutions and whether the 8-10 year horizon that is ideal for these analyses is factored into ramp rates for the I-5 screening. Mr. Moore responded that this has been accounted for and results in lowered potential. Brian Silverstein added that some measures have a shorter timeline, such as deploying generation redispatch where timeframes are generally six-months to one year.

Ms. Hirsh asked about the differentiation in measures at the meter versus the impact on the path and whether this difference was due to power flows. Jack Moore replied that this difference depends on the locations of generation and of load relief.

Ms. Hirsh asked about the effects of the planned phase-out of the Boardman coal plant and potential phasing-out of thermal generation in Centralia. Melvin Rodrigues responded that if generation in Centralia were shut down that depending on the N-1 and N-2 contingencies, the entire path may need to be opened. In the case of South of Napavine the target date for overloads is already at 2018. Snuller Price reiterated that one of the options is to decrease generation in Centralia and increase generation to the south to reduce this overload, however this may cause overloads in other locations.

Mark Smith suggested that additional scenario planning would be helpful for the I-5 non-wires screening process. This is distinct from a sensitivity analysis, which he sees as a toggle of an assumption versus a set of complete scenarios. He offered assistance in this effort to develop boundaries, including discussion of what new resources might be built for generation re-dispatch.

Ken Canon asked about potential load reductions in the summer peaks and targeted solutions to this problem. Mike Weedall asked if cooling savings are reflected in demand response. Jack Moore responded that cooling may be shared in the evaluation of demand response and that this is an area that should be looked at in more detail. Mr. Weedall and Mr. Nabors added that the 6th Power Plan is more focused on winter peaks and that summer peaks will be more of a focus in the 7th Power Plan. Also, the Power Plan is done on a regional basis and not for specific territories.

Tom Foley asked about the conservation shaping used in the screen. Jack Moore and Snuller Price responded that the 6th Power Plan was used in addition to estimates of similar measures in California, including load shape direction specific to these paths.

Ralph Cavanagh asked about savings from traditional conservation measures in peak times. These savings are disproportionate in the peak, but may have been averaged. Mike Weedall responded that this is an area of the analysis that should be checked.

Carl Linvill, Western Grid Group, asked about the creation of energy imbalance markets and their potential to affect re-dispatch. Jack Moore responded that greater market visibility would likely help some in this area, but additional targeted marketing would be needed. Snuller Price added that these actions need to be contracted far in advance in order to have reliability. Mr. Linville commented that a shared planning reserve may be a more appropriate strategy.

Round table members talked about the relationships between future system loads and economic, environmental and technical factors. Hardev Juj commented that economic recovery to previous levels will have a step function effect on loads, especially from industrial sources. Larry Bekkedahl added that temperature variation during the recession is another complex factor that should be considered. For example the reduced peaks in 2010 were related to lower summer temperatures, not the effects of the recession. Booga Gilbertson commented that the use of consumer energy may flatten out or decrease in ways not yet anticipated. For example, spot solar sales and spot local distribution and generation may be a factor in the next 20 years.

Diane Adams suggested that a work group may be formed to advise the second phase of non-wires analysis for the I-5 corridor project. She summarized areas for additional work based on the group discussion:

- Development of scenarios using internally consistent assumptions, including boundaries on potential generation to the south.

- Improvements to load forecasts and layers of data related to energy efficiency and temperatures.
- Consideration of technologies and accounting for energy efficiency and demand response.
- Assigning value to smart grid.

Review and discussion of Hooper Springs Screening Report

Amber Mahone, E3, presented an overview of the non-wires alternative screening study completed for the Hopper Springs project. The project is located in eastern portion of the region and includes the service areas of Lower Valley Energy (LVE) and Fall River Rural Electric Cooperative (FREC) in Teton County, Idaho, Jackson City, Wyoming and West Yellowstone, Montana. The problem identified in this area is the potential to violate the N-1 single contingency critical during the winter critical peak demand hours along the Swan Valley 161/115 kV or Goshen-Swan Valley 161 kV paths. Winter peak demand including losses, are required to stay below 253MW to avoid system voltage collapse. This estimate assumes that the Palisades hydro plant is generating at 10MW, which is consistent with its historic availability. This is a cold region, with Jackson being above 6000 ft. in elevation. The 1-in-2 planning temperature for the winter season peak is -27 F, so the risk of failure is considered an issue of safety.

The proposed project includes a new 32-mile single-circuit 115kV transmission line connecting PacifiCorp lines to the Lower Valley Energy system, as well as a new substation at Hooper Springs. The line is proposed to be constructed and energized in 2013 at an estimated total cost of $47.8M. The net deferrable cost of the line for the purposes of the analysis is calculated at $24.1M, after sunk costs and equipment are subtracted. The short timeframes for construction and critical reliability and safety issues are a significant challenge for the non-wires approach for this project.

Peak demand forecasts in this area generally align, with some open questions about the contributions of mining or industrial loads. A combined forecast using FREC and LVE data shows that this area is already in a serious risk situation. Load growth is projected at 6MW per year, with the need to defer over 65MW by 2020. The number of hours per year these flows exceed operating limits total 9 hours in 2012 and 35 hours in 2014. The risk of outages remains, as well as the challenge of bringing loads back on-line in extreme weather conditions. The highest peaking hours are found to be in the morning and afternoons, which help to determine which EE measures will be most effective.

Non-wires solutions were looked at in the areas of energy efficiency, fuel switching, generation re-dispatch, demand response and distributed generation. Power Council data was used to identify measures that align with this territory which are then screened for conservation potential and cost-effectiveness. The bulk of savings were found to be in the residential sector, but there may be additional potential in commercial measures.

A natural gas pipeline serves limited areas of the LVE territory, serving only 10 percent of customers. The non-wires analysis considered natural gas fuel switching as an opportunity for additional savings. Approximately 13 percent of LVE and FREC residential customers and 28 percent of commercial customers have access to gas, but currently only use electricity. This analysis only considers residential fuel switching options and additional analysis is needed to understand natural gas supply constraints and fuel switching options. Expansion of the natural gas pipeline to serve new areas is a possibility, but is estimated to take three to four years to complete based on permitting requirements.

Several demand response measures were included in the screen, yielding some cost-effective measures. The potential is fairly small. Total energy efficiency and demand response are estimated at less than 40MW, with an estimated 65 MW needed by 2020.

Generator re-dispatch is another non-wires option for Hooper Springs. Two generating units at the Palisades hydro-plant are non-operational in the winter with the remaining two units running at low flows. Generating more power at this Bureau of Reclamation facility in the winter is a challenge due to ice and potential for flooding.

Distributed generation potential was also reviewed in this screen. Gas generation, including use of a "peaker" facility was analyzed, considering the existing low pressure and limitations on the quantity of gas generation the system could support. 20-30MW of generation potential was identified, but more detailed engineering studies will be needed to determine whether the existing gas pipeline system can support new generation and fuel switching.

The combined portfolio of non-wires measures in energy efficiency and demand response (at 40MW) and gas generation (at 30MW) shows the potential for deferring the Hooper-Springs line until 2020 with a total resource benefit-cost ratio of 1.4. Considering the cost of deferral is only $24M to begin with, the savings of deferral is relatively small, about $9M. A waterfall diagram was used to communicate the 30-year lifecycle costs of non-wires alternative costs and benefits for energy efficiency, demand response and distributed generation. When applied to the supply curves, 20MW of new gas generation along with energy efficiency and demand response measures could result in cost-effective deferral of the line in 2016; an additional 10MW of gas generation could create a case for deferral through 2020. The results of the first phase screen suggest that Hooper-Springs continue to move along its current schedule as any additional exploration of non-wires alternatives is conducted.

Discussion

Jim West, LVE, provided additional detail and observations on several aspects of the project. A transmission line in the area was planned in 2004 and was near construction when it ran into difficulties related to a Superfund site within the right-of-way, which is partly why this area faces the current risk. The natural gas pipeline brought into the area did not anticipate the potential for generation and while fuel switching is one of LVE's strategies, they are finding some difficulty in encouraging switching while electricity rates remain low. The primary concern for the area is reliability and safety. If the non-wires process were initiated earlier, it may have seen additional potential. At this point, a non-wires approach may be too risky.

Nancy Hirsh suggested that water heater load control be considered within the demand response area, using 15 minute cycles.

Steve Hawke, Portland General Electric, suggested that the analysis consider diesel backup generators. Mr. Hawke also suggested that cost estimates for the transmission line include the potential for undergrounding portions of the line, especially in pristine areas.

Paul Cartwright asked if generation in Fall River would have helped this situation. Jim Webb responded that most of the generation at the Palisades facility is in the spring/summer, so there is a seasonal mismatch. Ms. Mahone added that in terms of fixing the transmission problem, the further away generation is the less effective it is in addressing these issues.

Larry Bekkedahl commented that the non-wires alternative opportunity for this project now is related to the new Hooper-Springs line being longer and more expensive. Ottie Nabors added that a critical path for the phase two non-wires screen would be focused on the gas system, fuel switching potential siting for distributed generation. Work on the second phase of screening would be done in the August/September 2011 timeframe.

Public Comments

Richard van Dijk and Terry Constance, Another Way BPA, observed the round table meeting and provided comments on the I-5 Corridor Reinforcement Project. Mr. van Dijk said their group agrees with the non-wires and conservation approach, however they believe the project has not been clear about the potential results of the non-wires analysis. Many in the community now believe based on information distributed in the last project newsletter, that the project will not be built. He requested that the non-wires analysis be clarified in future information. The project began with the 2008 NOS, where 150MW were identified as part of the I-5 system but the other three NOS projects contributed over 1000MW. The actual driver of this project is the need to send more power to California, not meet the needs of Clark and Cowlitz Counties. Their group disagrees with the stated purpose and feels that ten thousand families are "on hold" and potentially affected until the ROD. He asked on behalf of the group that the non-wires option not delay the project and that the project be built outside of populated areas.

Terry Constance added that many of the proposed segments for the project are in populated areas. The community has proposed unpopulated routes they would like to be considered that they believe are on less expensive real estate with fewer impacts to people and the environment. The group would like to show BPA their ideas in a presentation. Mr. Constance said that people are willing to pay 100 percent of the project costs and that a two or three percent addition to electricity rates is not worth destroying homes and families. Cost should be the last factor considered when putting a line through a major metro area.

Brian Silverstein and Larry Bekkedahl thanked Mr. van Dijk and Mr. Constance for presenting their perspectives and responded that many of these issues are part of the environmental process. BPA does need to clarify what the non-wires analysis means for the NEPA process. They agreed that the environmental process should stay on-schedule and said is not expected that the non-wires work will delay the timing of the EIS. It is possible that when the ROD is completed the project could be delayed.

Round Table Next Steps

Diane Adams reported on future Round Table activities. A conference call may be held in June to continue these discussions along with another face-to-face meeting in September.

Brian Silverstein asked for Round Table members to provide additional thoughts about the in-depth non-wires studies to feed into these approaches. A note will be sent to members to solicit this feedback.

Supplementary Comments from Members – Post meeting

Tom Foley:

General Comments:

I would argue that costs used to evaluate conservation should be utility costs rather than societal costs. Here's why. If a utility pays for 50% of the costs, the ratepayer is manifesting by his/her choice to pay 50% that the benefits to him are at least as great as the cost. Thus, that part of the cost is cancelled out with societal benefits to the participant. This change would allow more conservation to be purchased at the threshold price per kWe.

The question of whether costs of the land purchase should be considered as sunk is an interesting one. If the line is deferred and never built, the land can be sold (perhaps at a profit). In this case the land purchase should not be considered as a sunk cost. If the line is simply deferred, the land can be "sold" to the new project. Or the new project (or even the current project may have a revised route) may have a different route, in which case the previous land would be sold, and the costs of new land would have to be included in the next evaluation cycle.. I think that on balance, the land costs should not be considered as sunk.

Comments on the I5 Project:

Fundamentally, as presented, this is a $342M project to supply cooling for a relatively few hours (140 hours in August above 2000 MWe in the graphs on Page 12 of the presentation) per year in Portland and Vancouver. Is this a good use of resources? Perhaps, but it's the essential question; I am glad that we are asking it.

It looks from the Chart on page 12 that the base August 2010 load is in the 2000 MWe range, which implies that cooling load in August 2010, was about 1500 MWe. In 2009, the cooling load may have been much larger.
Can pre-cooling help, or is the cooling period too long?

How many degrees adjustment in interior temperatures would be needed to achieve significant reductions? Can we afford to buy the adjustments from ratepayers?

Are there storage opportunities that are less costly than the I5 line? Ice storage, for example?

We don't only have to go after cooling loads. Storing power in hot water heaters by raising water temperatures to 170 F is being tested in the region. These water heaters can float through an entire day, lowering the whole curve on peak. They also are important as a solution to the high-water, high-wind problems. Thus, all of the costs would not have to be allocated against the I5 project. All of these and other opportunities may make the tail of Bill Pascoe's dog thicker.

Lower Valley's Hooper Springs Line:

After stating in the meeting that I thought Phase II of the study should be scrapped, I was convinced by the following conversation that it is worth pursuing Phase II

In my earlier comments I argued that utility costs should be used for conservation measures rather than societal costs. However, as I think about it, I wonder why we do not use near zero costs for the conservation. Why? All of the conservation that will be used to test deferral is already cost-effective versus generation and delivery costs. If transmission were not a part of the discussion, we would buy this conservation because it is cheaper than getting power from generation. If we buy it for transmission deferral, the only costs that should be included against the deferral are those costs that may occur

because we are buying it early, or that occur because we are trying to do a lot at once. The latter effect could go either way.

Bottom line: Conservation does not have to be cost-effective against generation, and then separately against transmission deferral. If it is cost-effective against one or the other it is free to one or the other.