GRID TRANSFORMATION WORKSHOP

Bonneville Power Administration
Rates Hearing Room
911 NE 11th Ave, Portland, OR

March 20, 2013
8:30AM – 4:30PM

Objective

Develop the means of substantially and reliably increasing the capability of the transmission system without significant expansion of transmission circuits and the commensurate capital investment

Background

Transmission planning is an essential function that makes decisions on capital investments in the electric power grid. These investments must provide reliable and economical power delivery to the customers.

The transmission planning process includes many uncertainties such as load growth, addition or shutdown of large industrial loads, generation additions and retirements, regulatory requirements and government policies. The rate at which things change has also been increasing. In the last 12 years at BPA, we had an energy crisis, interconnected almost 4,000 MWs of gas-fired combined cycle generation, saw the massive loads of the aluminum industry exiting the region, and reliably integrated 5,000 MW of wind generation. The diversity of generation patterns has also increased. Wind generation is a major factor, but not the only one. There have been several very dry water years in the Pacific Northwest followed by above average water years. Wide swings in natural gas prices have also had a major effect on economic dispatch of thermal generators. Responding to customers demands, Bonneville has reinforced its transmission backbone by energizing three major 500-kV lines in the region and upgrading capacity on California – Oregon Intertie.

Business Challenge

Traditional planning analysis tests a small number of load and dispatch patterns against a set of deterministic performance criteria. However, transmission utilization is becoming more unpredictable due to a combination of drivers. Addition of variable energy resources has driven the need for shorter scheduling intervals and flexibility to follow schedule ramps. Emissions regulations and fuel price shifts are resulting in more evlauations of the retirement of large coal units and new dispatch patterns. Traditional transmission line solutions have become more costly and difficult to implement due to environmental impacts and siting issues. It often takes more

than 10 years to permit and construct a large transmission line project, if it can be built at all. Demand side "Non – Wires" solutions are becoming an increasingly viable alternative.

More flexible risk-informed approaches are needed to handle the additional uncertainty and variability in both the planning and operating horizons. However, transmission utilities must still meet regulatory requirements, which are likely to become more stringent due to the outage that occurred on September 8, 2011 between Arizona and Southern California.

Technology Drivers

We have identified risk-based planning and the ability to control power flows as essential elements in the future. Bonneville intends to evaluate steps to include risk-based scenario planning into the transmission planning process.

Fundamental assumptions need to be reviewed including the meaning of "firm transmission," the greater use of probabilistic components in outage-performance standards, and use of forecasted path load-duration information in transmission planning. Production cost simulations are used to estimate optimal economic dispatch scenarios and to provide a high-level assessment of power system congestion. Tools are needed to factor these optimal dispatch scenarios into the reliability assessment studies.

An open loop system is a broken system. Transmission Planning needs to have methods and tools to include operational feedback and to assess the effectiveness of investments made on the grid. Development of state estimator models and their mapping to planning models and scenarios is needed to learn from operational conditions. BPA has invested over $30M into synchrophasor technology, providing an unprecedented synchronized view of the dynamic state of the power system. The baseline power system dynamic performance is ultimately expected to inform decisions on capital investment.

Risk-based planning will require greater resources in terms of staff, data management systems and computational capabilities. Therefore, we need to stage the effort so we have a clear understanding of the capabilities and resources needed to achieve them.

Draft Agenda

Time	Panel	Presenter		
8:00	**Security Clearance**			
8:30	**Welcome**	**Bill Drummond**	**BPA Administrator**	
8:40	**Keynote**	**Hardev Juj**	**BPA VP System Planning and Asset Management**	
8:50	**Panel 1A: Industry experience with risk-based planning**			
		Chuck Matthews	Moderator, WECC RS Chair, BPA	
		Chuck Matthews	What does "risk-based planning" mean? Moving outages from one category to another based on performance? Estimating unserved energy? Quantifying risk as a function of generation pattern / load levels / transfers? Other? What is your experience with risk-based planning? What value was realized? What resources were needed? What is your risk tolerance and who sets it?	5
		Milorad Papic, Idaho Power	Probabilistic planning in WECC	10
		Bill Mittelstadt	Probabilistic planning in BPA	10
		Bill Harm, PJM	PJM experience with risk-based planning	10
		Anatoly Meklin, Quanta Tech	previous PG&E and CISO experiences	10
		Q&A, Discussion		15
		Break		**15**
10:00	**Panel 1B: Industry experience with risk-based planning**			
		Hari Singh, Xcel	Xcel Energy risk metrics	10
		Gordon Dobson Mack, Powerex	Planning for operational flexibility	15
		Steve Kerns	BPA Power approach to risk based planning	10
		Discussion		15

10:45	**Panel 1C: Research in the area of risk-based planning**			
		Joe Eto.	DOE-CERTS	
		Jim McCully	Iowa State University	10
		Ben Hobbs	John Hopkins University	10
		Q&A		15
11:30	**Open Discussion**			
		Tom Burgess, NERC	NERC Perspective on risk-based planning	10
		Discussion		20
12:00	**Lunch**			
1:00	**Panel 2: Dealing with Modeling Uncertainty and Defense in Depth**			
		Dmitry Kosterev	BPA	
		John Undrill	Expert	
		Bernard Lesieutre	University of Wisconsin	
		Alison Silverstein	NERC NASPI Manager	
		Damir Novosel	Qunata Technology	
		Bob Cummings	NERC	
		Discussion		
2:15		**Break**		
2:30	**Panel 3: Planning for Grid Flexibility**			
		Eric Heredia	Moderator	
3:15		**Break**		
3:30	**Round Table Discussion and Next Steps**			
		All	What we've heard, what is most interesting, what are the next steps	
4:30	**Adjourn**			