



TRANSMISSION SYSTEM OPERATIONAL AND RELIABILITY BENEFITS TOOL (“SBT”)

SBT Workgroup “Kick-Off Workshop”
July 29, 2013



Let's turn the answers on.

Agenda

- SBT Team
- SBT Background
- SBT Overview
- Workgroup Approach
- Next Steps

SBT Team

- Executive Sponsor, Rick Vail – VP, Transmission
- Business Lead, Shay LaBray – Manager, Transmission Regulation, Strategy & Policy
- Technical Planning and Modeling Experts:
 - Dave Hagen, Manager, Transmission Area Planning
 - Eric Arzola, Senior Transmission Regulation Strategy & Policy Analyst
 - Robyn Kara, Senior Business Analyst
- Interface with IRP management and team as needed

SBT Background

- 2011 Integrated Resource Plan Commitment:
 - In the scenario definition phase of the IRP process, the Company will address with stakeholders the inclusion of any transmission projects on a case-by-case basis.
 - Develop an evaluation process and criteria for evaluating transmission additions
 - Review with stakeholders which transmission projects should be included and why

SBT Background



SBT analysis for the Sigurd – Red Butte transmission segment of PacifiCorp’s Energy Gateway project is included in the 2013 Integrated Resource Plan

See link to website:
<http://www.pacificorp.com/es/irp/SBT.html>

SBT Background

Estimated SBT Values for Sigurd-Red Butte (2015-2034)

• Operational cost savings.....	\$574 m
• Segment loss savings.....	\$70 m
• System reliability benefits.....	\$1 m
• Customer and regulatory benefits.....	\$0
• Avoided capital cost.....	\$0
• Improved generation dispatch.....	\$0
• <u>Wheeling revenue opportunity.....</u>	<u>\$57 m</u>

TOTAL BENEFITS (minus wheeling): \$645 m

SBT Background

- 2013 Integrated Resource Plan Commitment:
 - Action Item 9a:
 - Establish stakeholder group and schedule workshops to further review the SBT
 - For the 2013 IRP Update, complete additional analysis of the Energy Gateway West Segment D that evaluates staging implementation of Segment D by sub-segment
 - Complete internal sub-segment analysis – Winter 2014
 - Finalize 2013 IRP sub-segment analysis – by March 2014
 - In preparation for the 2015 IRP, continue to refine the SBT for Energy Gateway West Segment D and develop SBT analyses for additional Energy Gateway segments
 - Action Item 9b (related to benefits analysis):
 - Segment H Cascade Crossing, complete benefit analysis in 2013

SBT Overview

- IRP models identify the scenario with the lowest PVRR from an energy delivery view, but cannot capture a broader range of operational and reliability benefits provided by new transmission capacity
- The SBT is designed to capture incremental benefits
- No “off the shelf” or “one size fits all” tool is available, but methodologies used by various transmission planning groups are a helpful starting point

SBT Overview

- The SBT measures benefits that are incremental to those identified via IRP modeling
- Development of SBT metrics is an evolving effort that benefits from regulator and stakeholder input
- Near-term objective: Use SBT to build support for continued progress on transmission investments
- Long-term objective: Use SBT to complement IRP modeling for a more complete picture of costs and benefits of transmission investments

SBT Benefit Categories

- Seven benefit categories assessed by the SBT:
 - Operational cost savings (economic driven)
 - Segment loss savings (energy and capacity)
 - System reliability benefits
 - Customer and regulatory benefits
 - Avoided capital cost
 - Improved generation dispatch (reliability driven)
 - Wheeling revenue opportunity

Operational Cost Savings

- A production cost model, with detailed system topology and assumptions, may be used outside the IRP process to determine operational benefits attributable to new transmission
- These more granular benefits will only be included as part of the SBT to the extent they are incremental to those identified in the IRP modeling (*i.e. no duplication of benefits*)

Segment Loss Savings

Energy

- New transmission operated in parallel with an existing line reduces impedance, resulting in lower energy line losses
- Forward energy price curve used to monetize the value of line loss energy savings as an avoided market purchase

Capacity

- Lower line losses improves transfer capability and potentially offsets the need for new generation capacity
- Capacity savings (MW) calculated using historical power flow at the time of the PACE peak and valued by multiplying the incremental capacity line loss savings by the base capital cost of a combined cycle gas generating plant

System Reliability Benefits

- This metric quantifies the performance benefits to the existing system due to the addition of a new line
- Benefits may be derived from:
 1. Avoidance of transmission capacity reductions (“derates”)
 2. Reductions in forced generator outages
 3. Reduced exposure to loss of customer firm load
- The system performance criteria used by the Company is specified in the mandatory NERC and WECC basic Transmission System Planning Standards and Performance Criteria

Customer & Regulatory Benefits

- Transmission limitations increase the likelihood of a need to curtail load under abnormal conditions
- Such circumstances can result in economic impacts, including lost retail energy sales, lost sales for retail customers, equipment damage, lost product due to spoilage, and others
- May also include economic impacts of regulatory costs and associated mitigation
- Outage and curtailment risk is significantly reduced with new transmission capacity

Avoided Capital Cost

- If a transmission project avoids underlying upgrades for load service or reliability needs, the avoided cost of those projects are included as benefits
- The avoided cost of replaced or deferred investments is a commonly used metric in transmission benefit analysis
- The SBT factors in the one-time capital investment avoided costs for projects displaced by new transmission

Improved Generation Dispatch

- Transmission constraints prevent the Company from dispatching the most economic resources to meet customer needs
- The SBT calculates the value associated with generation that, with the addition of new transmission capacity, could be dispatched for reserves purposes
- Calculated as the difference between the minimum unit operating limit and the amount of increased transmission capacity provided by the new segment(s) up to the maximum output of each unit
- The resulting benefit value of this generation is based on the reduced need for incremental new generation at the cost of acquiring generation or market purchases, whichever is lower

Wheeling Revenue Opportunity

- The SBT reviews new incremental transmission capacity for each segment analyzed and identifies the value of this new capacity
- Incremental capacity created on paths is valued at PacifiCorp's current OATT long-term firm point-to-point rate
- Incremental system capacity is determined by comparing the initial path transfer capability with the improved path capacity

SBT Methodology Overview

Benefits

All results in year-end 2012\$, millions

Case C07

1	IRP PaR Analysis				\$	511.00	
2	Segment Losses Energy				\$	69.00	
		176,000 MWh per year not surrendered to line losses					
		Valued at PV market price September 2012 official price curve					
3	Segment Losses Capacity				\$	18.00	
	Segment 1:	Populus to Anticline				27.07 MW	
	Segment 2:	Anticline to Aeolus				2.75 MW	
	Segment 3:	Aeolus to Windstar				0.04 MW	
		Resource Assumed: CCCT Dry "F", Adv 2x1, with duct firing unit, per EG2_CO3 IRP calculation.					
	Resource replacement year			2019			
	Capacity replaced			29.85 MW			
4	Reliability				\$	112.00	
		Valued as generation margin of the power over the analysis period.					
		Bridger fuel costs subtracted from annual average September 2012 PV curve					
	<u>Transmission Path</u>	<u>Capacity (MW)</u>	<u>HLH Hours</u>	<u>LLH Hours</u>	<u>Benefit</u>		
	Bridger	1359	96	72	\$	67.14	
	Freezeout to Miners	125	19	14	\$	1.21	
	Miners to Platte	340	51	38	\$	8.88	
	Platte to Point of Rocks	265	140	105	\$	19.07	
	Rock Springs Monument	265	140	105	\$	7.47	
	DJ-Shirley Basin	172	96	72	\$	8.50	
5	Customer and Regulatory				\$	249.00	
		Regulatory and Customer expense savings due to more reliable transmission service.					
6	Avoided Capital				\$	151.00	
		Proposed White Horse – Mustang – Freezeout 230 kV line					
		Voltage Support - DJ 1-4 retirement					
7	Wheeling Opportunity				\$	16.00	
8	Improved Generation Dispatch				\$	39.00	
	Total				\$	1,165.00	
	Costs				\$	(934.00)	
	Net Benefit				\$	231.00	

Energy Gateway



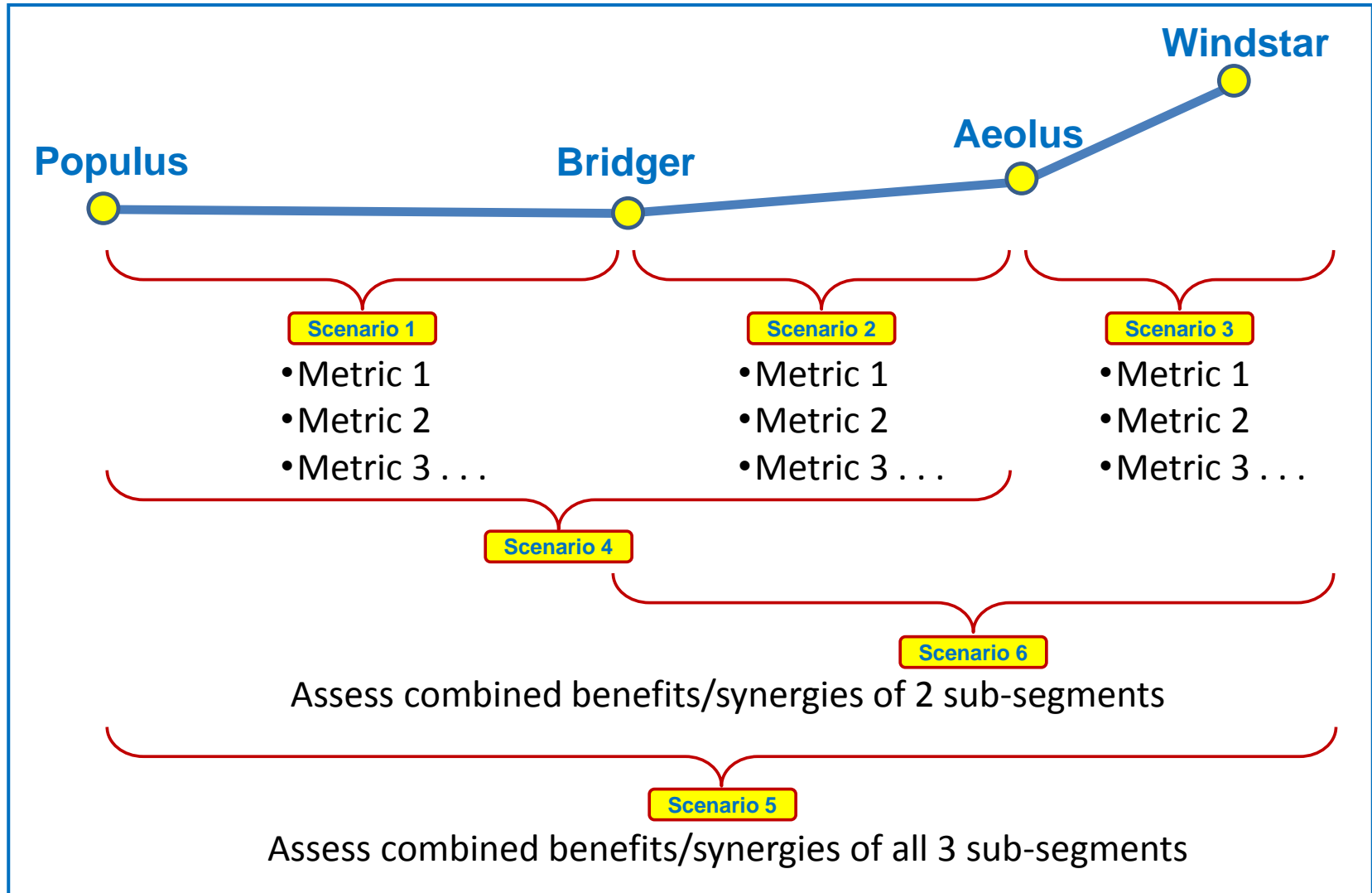
- Announced in May 2007
- Origins in multiple local and regional transmission planning efforts
- Approximately 2,000 new line miles; multi-year, multi-billion dollar investment
- Designed to ensure a reliable, adequate system capable of meeting current and future customer needs
- “Hub and spoke” design connects resource-rich areas and major load centers
- Projects continue to be vetted in multiple public forums at the local, regional and interconnection-wide levels

Gateway Segment D – Windstar to Populus



- Segment D
 - Estimated in-service date 2019-2021
 - Approximately 400 miles (230 kV and 500 kV)
 - Wyoming to SE Idaho 650 MW (Aeolus to Bridger/Anticline)
 - Wyoming to SE Idaho 1000 MW (Bridger/Anticline to Populus)
 - SE Idaho to Utah 550 MW

Windstar-Populus SBT Preview



SBT Workgroup Approach

- Formalize SBT workgroup
- Workgroup to meet once per month – August - October
- Participants provide feedback and written comments

Next Steps

- If interested in participating on the SBT workgroup:
 - Email: TransmissionSBT@PacifiCorp.com by August 2nd
- Doodle poll to be conducted for date of August meeting
- Please email suggestions for SBT workgroup areas of focus to the address above by August 5th