

Alternative Operations Study Summary



Upper Great Plains Region

November 1, 2013

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Western Area Power Administration – Upper Great Plains Region (Western-UGP) markets Pick-Sloan Missouri Basin Program – Eastern Division (P-SMBP-ED) hydroelectric power and energy to preference entities in Montana east of the continental divide, North and South Dakota, western Minnesota and Iowa, and eastern Nebraska. In 1998, Western-UGP, Basin Electric Power Cooperative (Basin), and Heartland Consumers Power District (Heartland) implemented the Integrated Transmission System (IS). The IS includes approximately 9,848 miles of transmission lines owned by Basin, Heartland, and Western. Transmission service over the IS is provided under Western’s Open Access Transmission Tariff (OATT), with Western-UGP serving as tariff administrator for the IS.

Market to Non-Market Challenges

Approximately 50 percent of Western-UGP’s preference load is beyond the edge of the IS and delivered across third-party transmission systems in Midcontinent Independent System Operator (MISO) and Southwest Power Pool (SPP) predominately under arrangements made by those preference customers. This separation creates non-market to market seams between Western-UGP, MISO, and SPP and impacts both Western-UGP’s and other local utilities’ marketing of power across the seams. To address certain transmission congestion in the MISO and SPP footprints, the reliability coordinator cuts power schedules in and out of those Regional Transmission Organization (RTO)s under Transmission Loading Relief (TLR) protocols in addition to re-dispatching generation within its footprint. Western-UGP has experienced many TLR schedule cuts on short-term sales and purchases, as well as firm power schedules necessary to meet its obligations. Western-UGP has few options to avoid TLRs. These TLR impacts are directly related to Western-UGP and the IS owners’ unique footprint in relation to energy markets. In addition to the MISO and SPP seams on the east and south, Western-UGP is constrained by limited access to the Canadian markets to the north, as well as to western markets, due to limitations of available capacity for energy transfers through the AC-DC-AC interconnection ties. Historically, Western-UGP has had opportunities to sell and purchase short-term energy from many different entities in response to hydro-generation variability. However, with entities joining MISO and its organized energy market, Western-UGP has seen those opportunities decrease significantly. With the SPP Integrated Market Place planned to become operational in 2014, Western-UGP anticipates substantial reduction in bi-lateral short-term energy trading opportunities. Western-UGP recognizes the variability of the hydro-generation and the historic need Western-UGP has had for access to energy markets to realize the lowest cost energy purchases and optimized short-term energy sales. As a result, Western-UGP has performed an assessment of the costs, benefits, and risks of alternative operating models while continuing to reliably serve our firm power commitments.

The IS is composed of transmission facilities located on both the Eastern and Western electrical interconnected systems separated by the Miles City DC tie and the Fort Peck Power Plant. Western-UGP also operates two balancing authority areas, WAUW and WAUE, within the IS which are also separated by the Miles City DC Tie and the Fort Peck Power Plant.

The Alternative Operations Study (AOS)

For purposes of this assessment, Western is considering placing only the portion of the IS located in the eastern electrical interconnected system within an RTO market. The options for future operating models analyzed included a Stand Alone configuration, Join MISO, and Join SPP.

The Cost/Benefit Analysis (CBA) for this study measured and compared six criteria in each of the three options.

1. RTO Trade Benefit
2. Administrative Costs
3. Transmission Expansion
4. Capacity Benefits
5. IS Transmission Revenue - Cost Shifts
6. Drive-Out Impacts

There were significant monetary separations in the CBA results. The CBA results show the Join SPP option provides more benefits than the other two options.

The Brattle Group was hired to conduct a nodal study to analyze the RTO Trade Benefit criteria. Production cost calculations were performed for each of the three analyzed options, along with several sensitivities.

1. High Hydro
2. Low Hydro
3. High Gas
4. High Wind

Much of the overall benefit to SPP is derived from the ability to cost share upcoming IS transmission expansion projects, the planned West and East 345-kV loops in North Dakota. In the MISO and Stand Alone options, there is no opportunity for cost sharing on these projects. SPP has stated that transmission expansion cost sharing starts on Western-UGP's join date. IS facilities with "need by" dates which are after Western-UGP's join date would be eligible for cost sharing with SPP. Implementation into a Market can take up to two years; making the fall of 2015 the earliest expected date for joining. SPP recently performed a system adequacy study for the IS and that study has determined that the IS transmission system currently has adequate capacity and that the need by date for the West 345-kV Loop, with an estimated cost of 300 million dollars, is after the assumed integration date of October 2015. The need by date of the 250 million dollar East 345-kV Loop is after the need by date of the West 345-kV Loop. The ultimate configuration of the East 345-kV Loop will be determined by further planning studies

Table 1: Summary Table of IS Business Model Overall Cost/Benefit Analysis

Western – UGP Cost Benefit Summary	Stand Alone - \$m		Join MISO - \$m		Join SPP - \$m	
	First Yr	Out Yr	First Yr	Out Yr	First Yr	Out Yr
1. RTO Trade Benefits	3.9	23.6	0.6	13.6	4.8	26.9
2. Administrative Costs	(3.2)	(3.2)	(4.7)	(4.7)	(7.2)	(7.2)
3. Transmission Expansion – Base Case (Includes West 345-kV Loop)	(28.7)	(34.0)	(31.4)	(36.2)	(16.0)	(20.8)
4. Capacity Benefits	0.0	0.0	0.0	0.0	0.0	0.0
5. IS Transmission Revenue (Cost Shifts)	(55.6)	(51.6)	(61.5)	(56.0)	(53.4)	(49.5)
6. Drive-Out Impacts	0.0	0.0	(0.7)	(1.2)	(0.3)	(0.4)
Base Case Total Benefits (Costs) (Includes West 345-kV Loop)	(83.6)	(65.2)	(97.7)	(84.5)	(72.1)	(51.0)
Base Case - Join Options Relative to Stand Alone (Includes West 345-kV Loop)			(14.1)	(19.3)	11.5	14.2

Note 1: The above results are not indicative of Western-UGP's overall financial position.

Note 2: The CBA is a good comparative analysis tool to identify separations in the results. Many simplifying assumptions are made in the system model for model performance reasons. Therefore, the financial results should be interpreted as showing relative separation and not as actual financial outcomes.

Two additional factors could provide a positive benefit to Western-UGP in both Join options. Brattle used historical ancillary service prices to estimate that Western-UGP could get net revenue of about \$8 million per year by selling regulation service into the MISO or SPP markets. Also, if Western-UGP were to optimize its hourly hydro-generation pattern to maximize market revenue, Brattle estimates an additional benefit of approximately \$6 million per year within the markets. Western-UGP also anticipates a reduced Optimized Hydro Benefit in the Stand Alone case, since this benefit would be managed manually in this configuration. In addition, SPP has indicated that Western-UGP would be exempt from market congestion and loss charges on the IS. These anticipated benefits are reflected in the Anticipated Benefits Summary table below.

Table 2: Summary Table of Overall Cost/Benefit Analysis including Anticipated Benefits

Western – UGP Cost Benefit Summary w/Anticipated Benefits Join Options Relative to Stand Alone	Join MISO - \$m		Join SPP - \$m	
	First Yr	Out Yr	First Yr	Out Yr
Base Case - Join Options Relative to Stand Alone (Includes West 345-kV Loop)	(14.1)	(19.3)	11.5	14.2
Anticipated Ancillary Service Benefit	8.0	8.0	8.0	8.0
Anticipated Optimized Hydro Benefit	6.0	6.0	6.0	6.0
Anticipated Benefit from Congestion and Loss Exclusion from SPP			13.2	12.7
Base Case with Anticipated Benefits-Join Options Relative to Stand Alone (Includes West 345-kV Loop)	(0.1)	(5.3)	38.7	40.9

Also included in the Alternative Operations Study Recommendation paper is an evaluation of the qualitative risks for each of the options through the use of a Multi-Criteria Decision Analysis (MCDA) tool. The MCDA looked at two major criteria: Marketing Plan/Rate Stability and Agreements. Using multiple metrics for each criterion, a risk score was computed for each option. The risk score for the Join SPP option was the lowest and, therefore, the most favorable option from a qualitative risk standpoint.

Table 3: MCDA Results

(Higher Score is Higher Risk)	
Option	Score
Optimized Stand Alone	62.2
Join MISO	42.2
Join SPP	22.3

The MCDA risk analysis shows the least risk with the Join SPP option. Western-UGP's criteria and weighting and subsequent ranking resulted in a significant risk separation between each of the three options. The Join MISO option has a risk score of nearly double the Join SPP option, and the Optimized Stand Alone option risk score is nearly three times the Join SPP option.

Both the CRA study and the IS Business Model identify SPP as the most favorable option for Western-UGP and the IS. Much of this benefit to SPP is derived from the ability to cost share upcoming IS transmission expansion projects if the Join SPP option is realized by the fall of 2015, which is prior to those projects "need by" date. In the MISO and Stand Alone options there is no opportunity for cost sharing on these projects.

Based on the analysis, Western-UGP concludes that the potential benefits of the Join SPP option are significant enough for Western-UGP to solicit feedback from customers and other stakeholders concerning its recommendation to pursue formal negotiations with SPP regarding membership. Timing considerations are such that these actions should proceed quickly. The final decision on whether to join SPP would be made after the informal public process is completed and Western-UGP can assess the feedback gained from that process. If Western-UGP decides to join SPP, the membership agreement would be structured to ensure that the risks, benefits, and costs addressed in the evaluation are realized and that Western-UGP's statutory requirements as a power marketing administration of the Department of Energy are met.

Western has been explicitly authorized to participate in a transmission organization pursuant to Energy Policy Act of 2005 (EPAct 05). This statute gives Western explicit authority to transfer control and use of all or a portion of its transmission system to a transmission organization. It states that none of the existing statutory provisions that require or authorize Western to transmit power or to construct, operate or maintain a transmission system prohibit Western from transferring control and use of its transmission system to a transmission organization. The section does not give the Federal Energy Regulatory Commission (FERC) any jurisdiction over the electric generation assets, electric capacity or energy marketed by Western nor does it give FERC jurisdiction over the power sales activities Western engages in.

Western's Administrator has been designated as the appropriate Federal regulatory authority with respect to transmission facilities within the PSMBP-ED in accordance with Section 1232(a) (1) (A) of the Energy Policy Act of 2005.