

Energy Imbalance Market (EIM) Analysis Board Update

January 16, 2017

Note: for discussion; no action required

Background

- On November 21, 2016, EP&T made an Energy Imbalance Market (EIM) presentation to the Board
 - An EIM is an automated within hour market that dispatches in five minute segments
 - Previous analysis showed relatively small benefit relative to the estimated costs
 - EP&T to continue to monitor and analyze the EIM and changing landscape
- Engaged E3 to study EIM benefits and costs
- We are back to share recent EIM study results

EIM Analysis

- Purpose
 - The Western energy market is changing with the increasing footprint of the CAISO EIM
 - The District engaged E3 to provide an estimate of benefits associated with hydro
 - This slide deck summarizes the E3 revenue forecasts, estimates expenses, makes necessary revenue reductions, and examines various scenarios

E3 Revenue Forecasts (no reduction for expenses)

Sensitivity	EIM Market Access (MW)	Volatility (% of Historical)	Annual Revenue (\$ Million)		
			RT15	RT5	EIM Total
Base	150	100%	\$4.10	\$3.80	\$7.80
Low market access	100	100%	\$2.80	\$2.50	\$5.30
High market access	300	100%	\$7.70	\$7.30	\$15.00
Reduced price volatility	150	60%	\$2.50	\$2.30	\$4.70
Reduced price volatility & Low market access	100	60%	\$1.70	\$1.50	\$3.20
Reduced price volatility & High market access	300	60%	\$4.60	\$4.40	\$9.00
No HA market*	150	100%	\$8.60	\$4.50	\$13.10

Note: E3 modeled Chelan's entire Rocky Reach and Rock Island hydro projects (contracted and uncontracted). The results are extremely sensitive to assumptions.

EIM Cost Estimates (\$ millions)

	PAC	NV	PSE	APS	Idaho	PGE	SCL	SMUD/BANC	Average								
Initial	\$20.00	\$11.20	\$14.00	\$16.00	\$11.10	\$11.00	\$8.80	\$6.70	\$12.35								
Ongoing	\$3.00	\$2.60	\$3.75	\$4.00	\$1.60	\$2.30	\$2.80	\$2.60	\$2.83								
Source																	
PAC	http://www.puc.state.or.us/meetings/pmemos/2014/052814/SPM%20Presentation%20PacifiCorp%20EIM%20UM%201689%2005282014.pdf Slide 5																
NV	https://www.caiso.com/Documents/NV_Energy-ISO-EnergyImbalanceMarketEconomicAssessment.pdf Page 18																
PSE	https://www.rtoinsider.com/arizona-public-service-puget-sound-energy-eim-29915/																
APS	http://images.edocket.azcc.gov/docketpdf/0000161758.pdf Page 4																
Idaho	http://www.puc.idaho.gov/press/160920_IPCEIM.pdf Page 2																
PGE	http://edocs.puc.state.or.us/efdocs/HAA/haa151749.pdf Page 91/223																
SCL	https://www.rtoinsider.com/council-oks-seattle-city-light-explore-eim-33754/																
SMUD/BANC	https://www.smud.org/assets/documents/pdf/policy-10-19-2016-item4.pdf Slide 5																
<i>Note: SMUD/BANC initial cost is materially lower but they are already very active in the CAISO market</i>																	

Note: Many entities have stated that their actual implementation costs far exceeded their initial estimates.

Scenario Ranges

- Revenue: Examined three E3 revenue scenarios
 - Base: \$7.8 million; Lowest: \$3.2 million; Highest: \$15 million
 - Reduction of revenue because perfect foresight (hourly, 15 minute, and 5 minute) is not realistic
 - Reduction of revenue because of third party slice sales
 - District sells slices to reduce price volatility, operational and hydro risk
- Expenses: Examined eight EIM entity studies
 - Average expense of eight studies: \$12.4 million upfront and \$2.8 million annually
 - Examined a scenario that assumes only 75% of expense incurred, however many entities underestimated their actual implementation costs

Summary of District Net Benefits (revenue minus expenses)

Net Benefit (\$ millions)			
	Lowest	Base	Highest
Revenue Forecast	\$3.2	\$7.8	\$15.0
Net Benefit (lowest)	-\$3.3	-\$2.2	-\$0.1
Net Benefit (lower)	-\$2.8	-\$1.1	\$1.7
Net Benefit (mid)	-\$2.6	-\$0.5	\$2.7
Net Benefit (higher)	-\$2.4	\$0.0	\$3.6
Net Benefit (highest)	-\$1.2	\$1.4	\$5.6

EIM

- Risks

- Increased regulatory and compliance burden
- Increased level of complexity and staffing
- Revenues are uncertain
- Costs to join and participate are high and entities often underestimate the costs and complexity

- Opportunities

- Ability to further monetize within hour revenue
- Market is evolving and liquidity may change over time
- Ability to enable third party purchasers to access additional revenues of within hour market

Summary and Recommendation

- Given the low expected potential net benefit in the base case, it is not compelling to become an EIM Entity at this time.
 - Over time as the EIM market matures, additional transmission access and market liquidity could impact the overall economics (market access assumption of 150 MW base case is a key assumption)
 - A reduction in the number of bilateral trading parties in the real time market could change the market dynamics and cause us to reevaluate the EIM in the future.

Next Steps and Q&A

- Next Steps
 - As EIM market matures, monitor transmission access and bilateral market liquidity
 - Monitor items and assumptions that could impact overall economics for the District
 - Outreach
- Questions ?