



Western energy imbalance market update

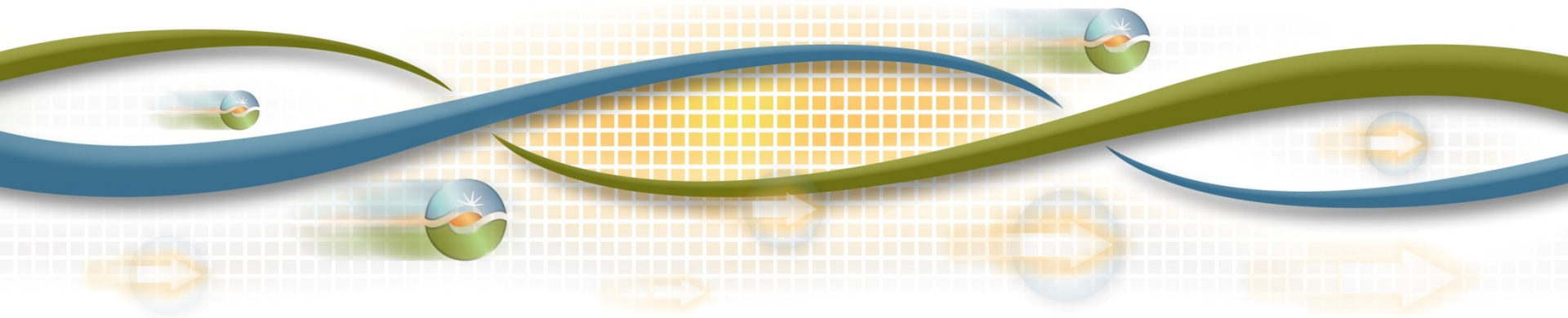
Mark Rothleder

Vice President, Market Quality & Renewable Integration

Board of Governors Meeting

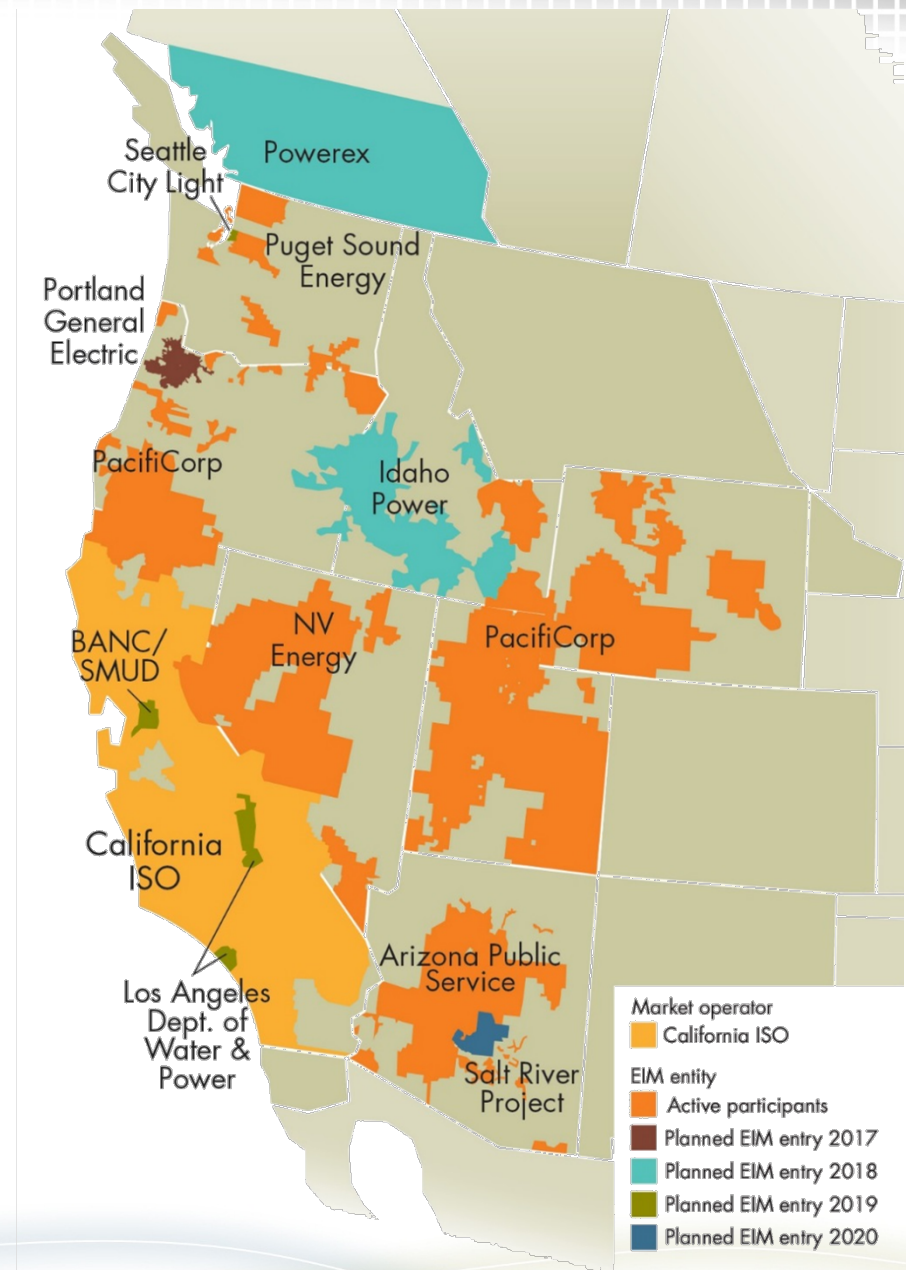
General Session

September 19-20, 2017



Implementation update

- Portland General's readiness criteria has been filed with FERC. PGE implementation is ready for October 1st.
- Idaho and Powerex begin market simulation in December.



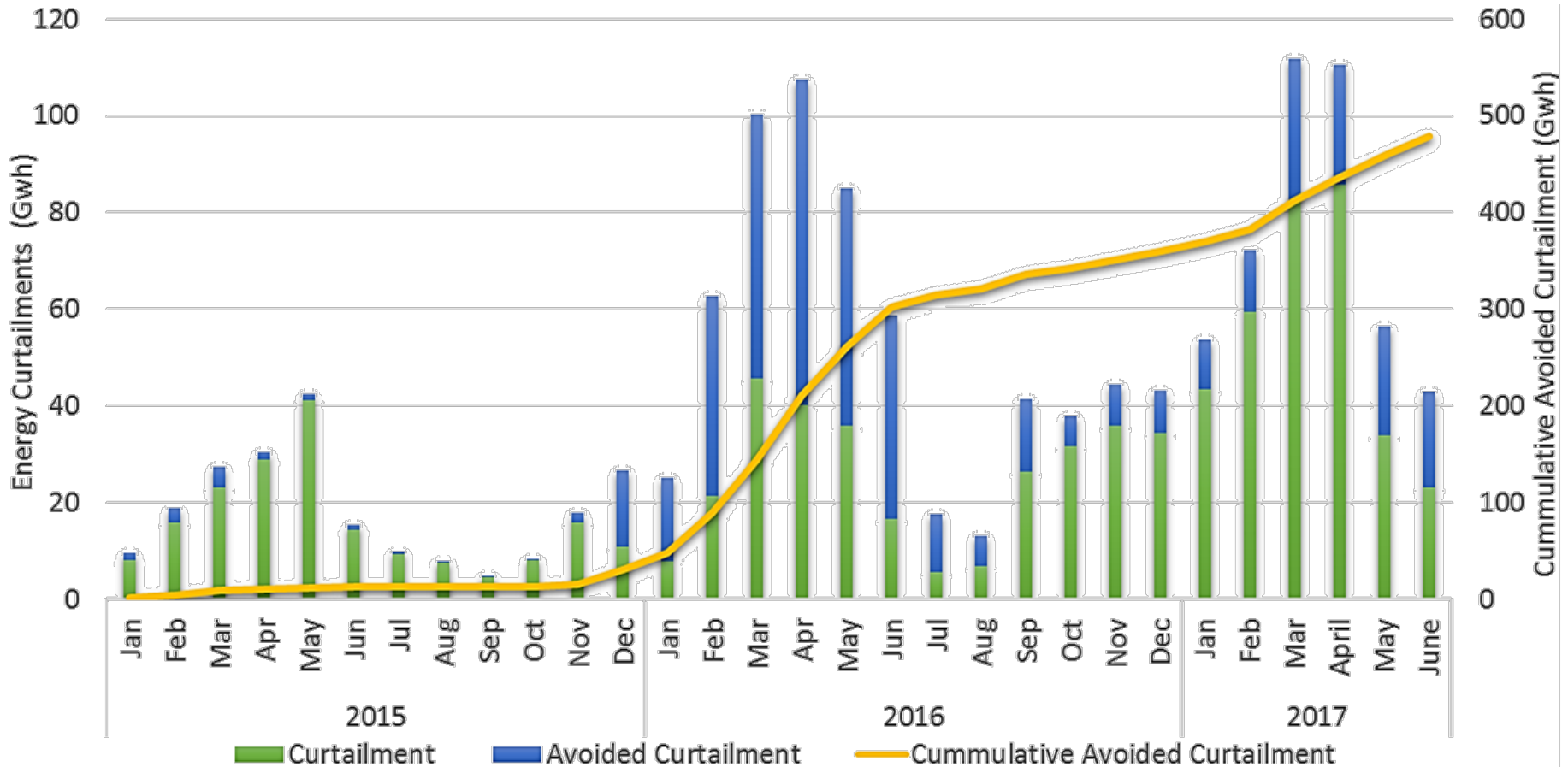
Gross economic benefits since start of EIM = \$213.24M

BAA	2014	2015	1st Qtr 2016	2nd Qtr 2016	3rd Qtr 2016	4th Qtr 2016	1st Qtr 2017	2nd Qtr 2017	Total
APS						5.98	5.23	8.13	19.34
CAISO	1.23	12.66	6.35	7.89	5.44	8.67	9.5	15.49	67.23
NVE		0.84	1.7	5.2	5.6	3.07	3.5	4.62	24.53
PAC	4.73	26.23	10.85	10.51	15.12	8.99	11.47	8.81	96.71
PSE						1.56	1.4	2.47	5.43
Total	5.96	39.73	18.9	23.6	26.16	28.27	31.1	39.52	213.24

BAA	April	May	June	Q2 – 2017 Total
APS	2.87	2.54	2.72	8.13
CAISO	3.42	5.23	6.84	15.49
NVE	2.37	2.25	*	4.62
PAC	3.94	2.97	1.90	8.81
PSE	1.13	0.72	0.62	2.47
Total	13.73	13.71	12.08	39.52

*Due to special circumstances, the benefits for NV Energy for June are not included at this time, pending further data verification.

Energy imbalance market helps avoid curtailment



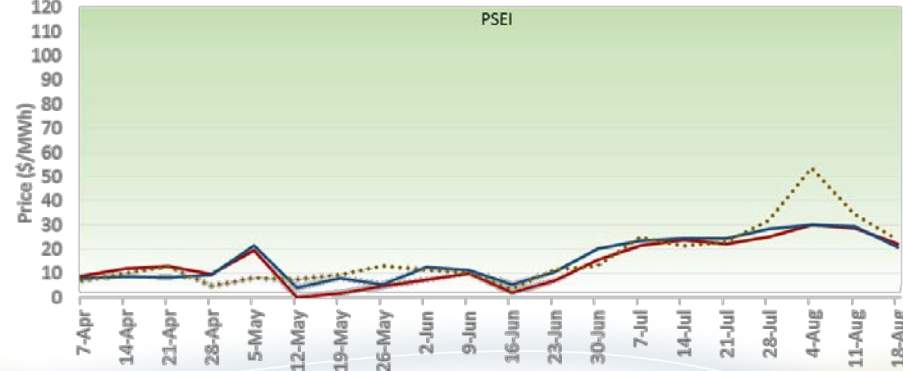
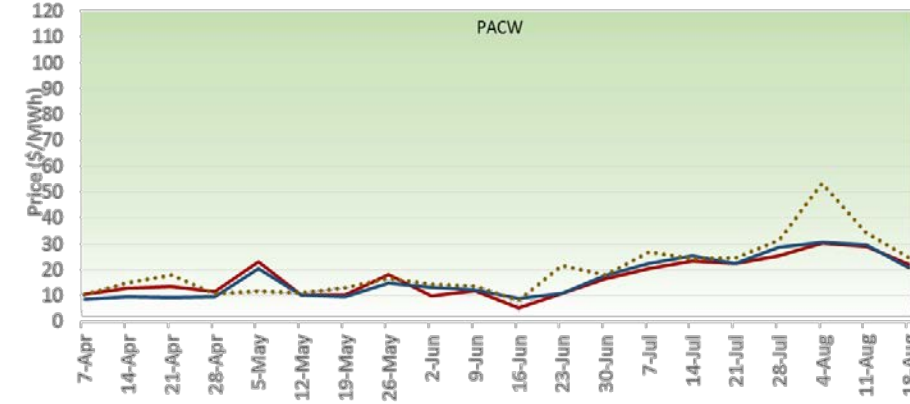
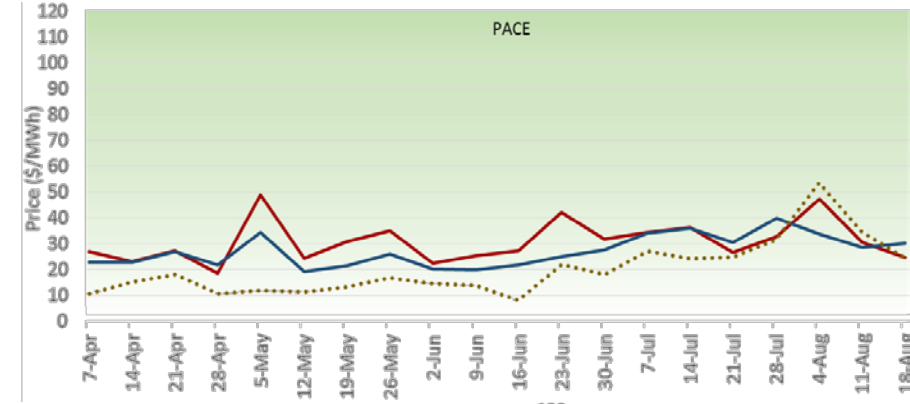
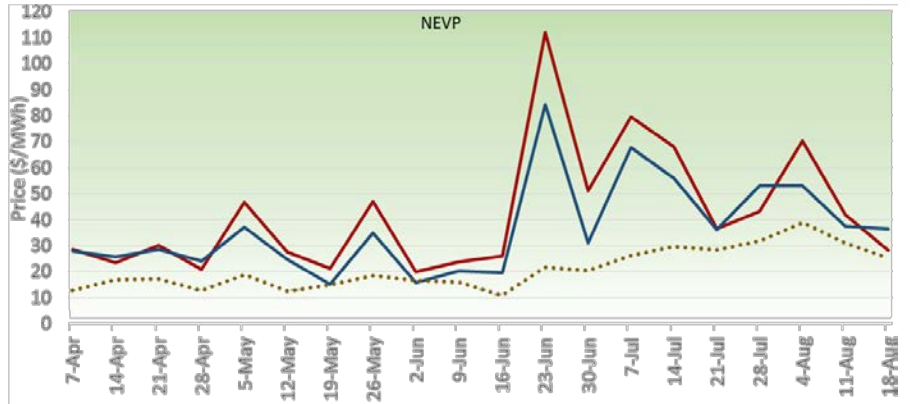
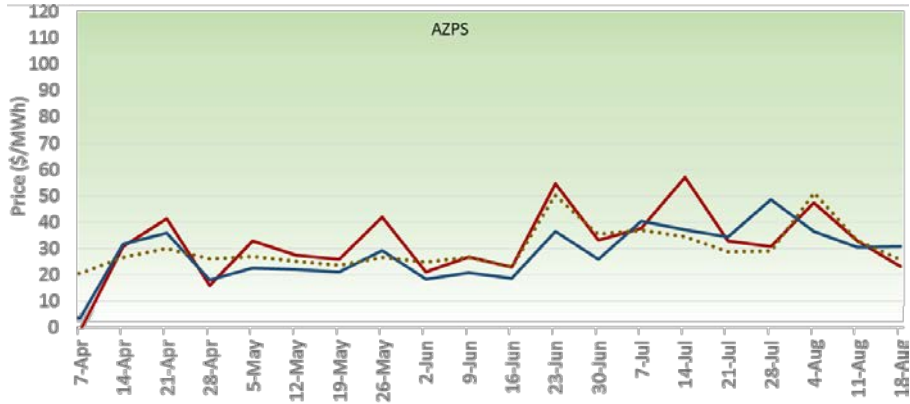
Year-to-date estimated metric tons of CO2 displaced = 52,235

Flexible ramping procurement diversity savings for 2nd quarter, 2017

	April		May		June	
Direction	Up	Down	Up	Down	Up	Down
Average MW saving	426	509	469	521	482	504
Sum of BAA requirements	1,210	1,303	1,242	1,319	1,245	1,275
Diversity Benefit	35%	39%	38%	39%	39%	39%

The percentage of savings is the average MW savings divided by the sum of the four individual BAA requirements.

Weekly average prices in EIM areas



- FMM ELAP
- RTD ELAP
- ⋯ Estimated Proxy

Robust energy transfers observed in 3rd quarter

