

Western Energy Imbalance Market

Montana Wind & Transmission
Working Group

March 23, 2017

**Travis Kavulla,
Vice Chairman**

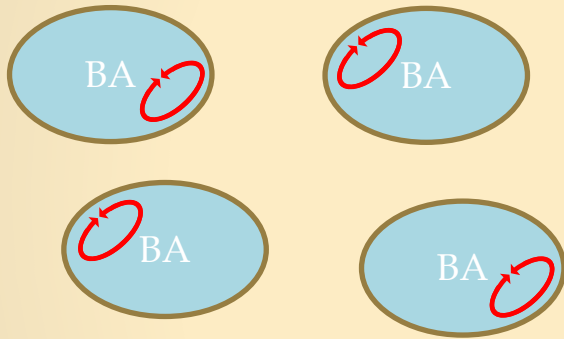
Montana Public Service Commission



EIM enhances integration of VERs by dispatching every five minutes

Today:

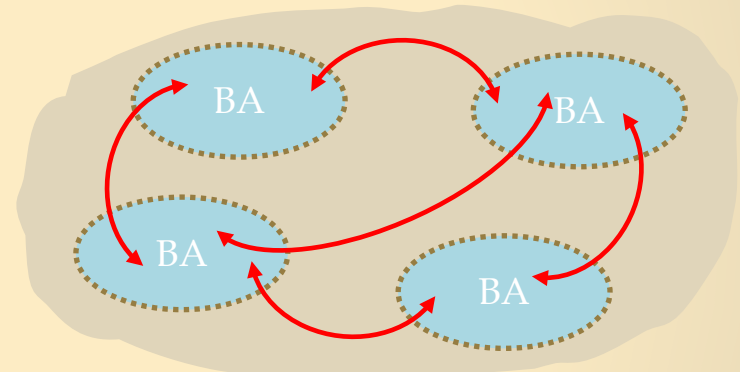
Each BA must balance loads and resources w/in its borders.



- Limited pool of balancing resources
- Inflexibility
- High levels of reserves
- Economic inefficiencies
- Increased costs to integrate wind/solar

In an EIM:

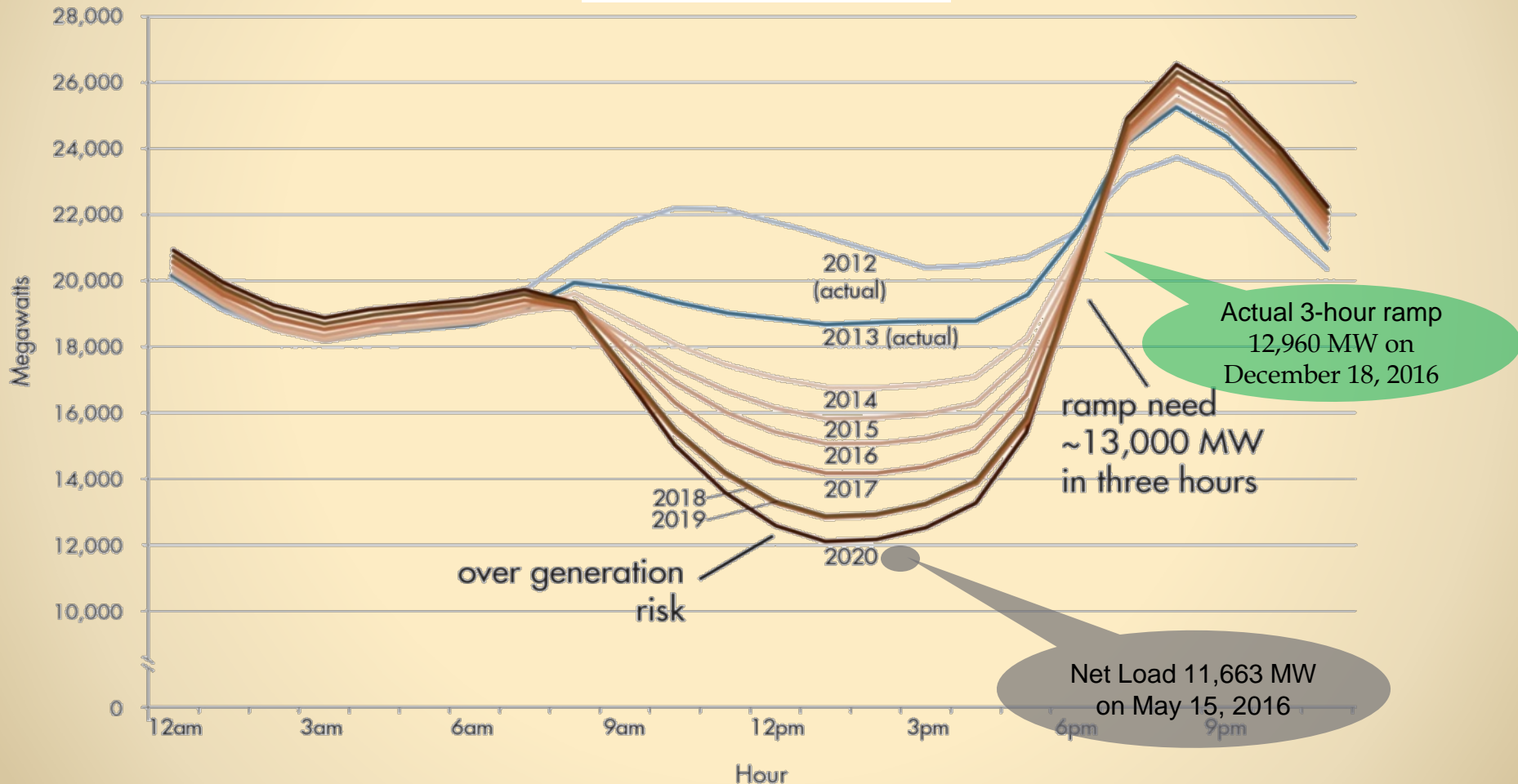
The market dispatches resources across BAs to balance energy



- Diversity of balancing resources
- Increased flexibility
- Decreased flexible reserves
- More economically efficient
- Decreased integration costs
- Easily scalable

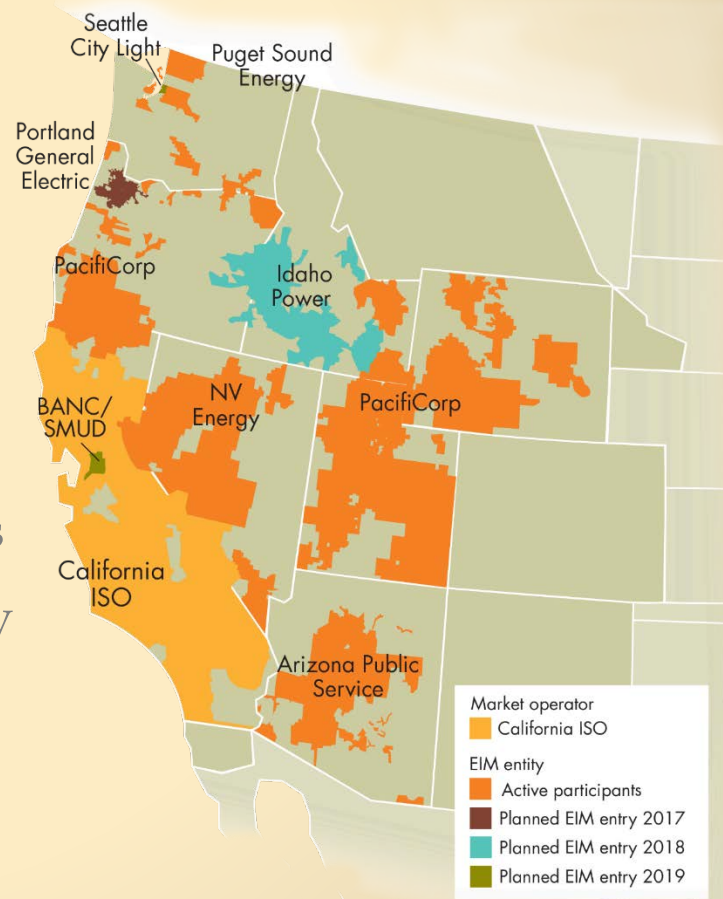
Quickly approaching the 2020 scenario of low net load and afternoon ramping needs

Typical Spring Day



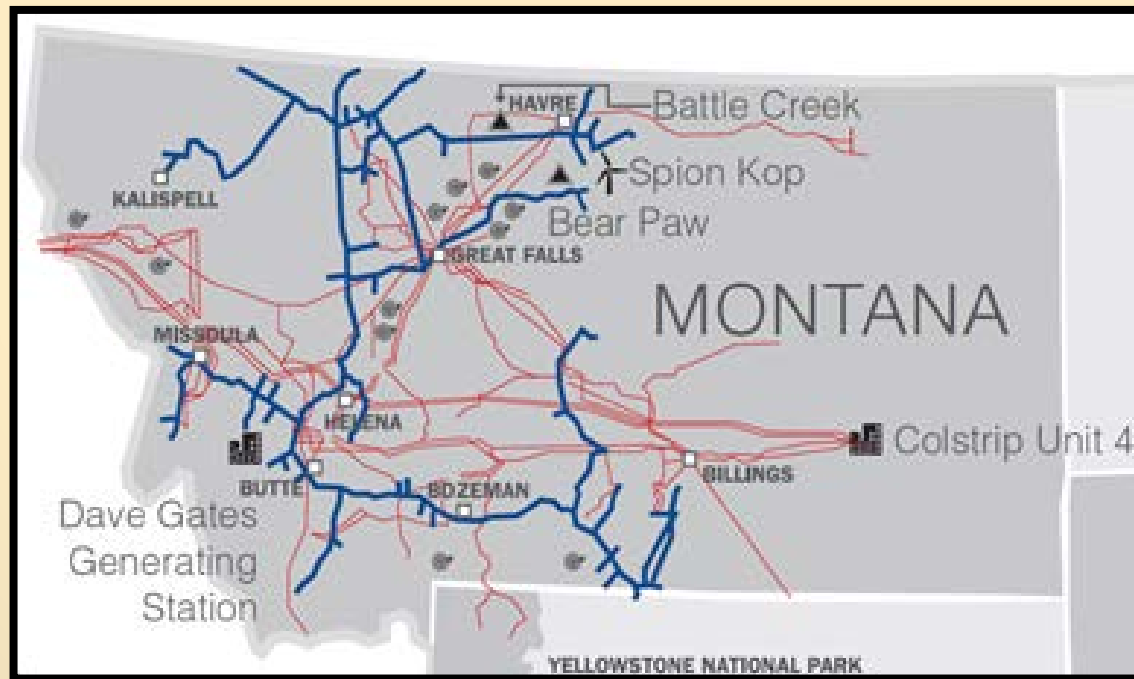
EIM provides an easily scalable extension of real-time market to broader region

- Builds on existing market: automated dispatch minimizes cost, facilitates renewables, resolves imbalance & avoids congestion
- Situational awareness enhances reliability
 - FERC staff paper documented EIM benefits:
<http://www.caiso.com/Documents/QualitativeAssessment-PotentialReliabilityBenefits-WesternEnergyImbalanceMarket.pdf>
- Easily scalable, low-cost, low risk, no exit fees, voluntary option for new participants
- Utilizes reciprocal transmission availability
- Preserves BAA autonomy, including compliance, balancing, and reserve obligations



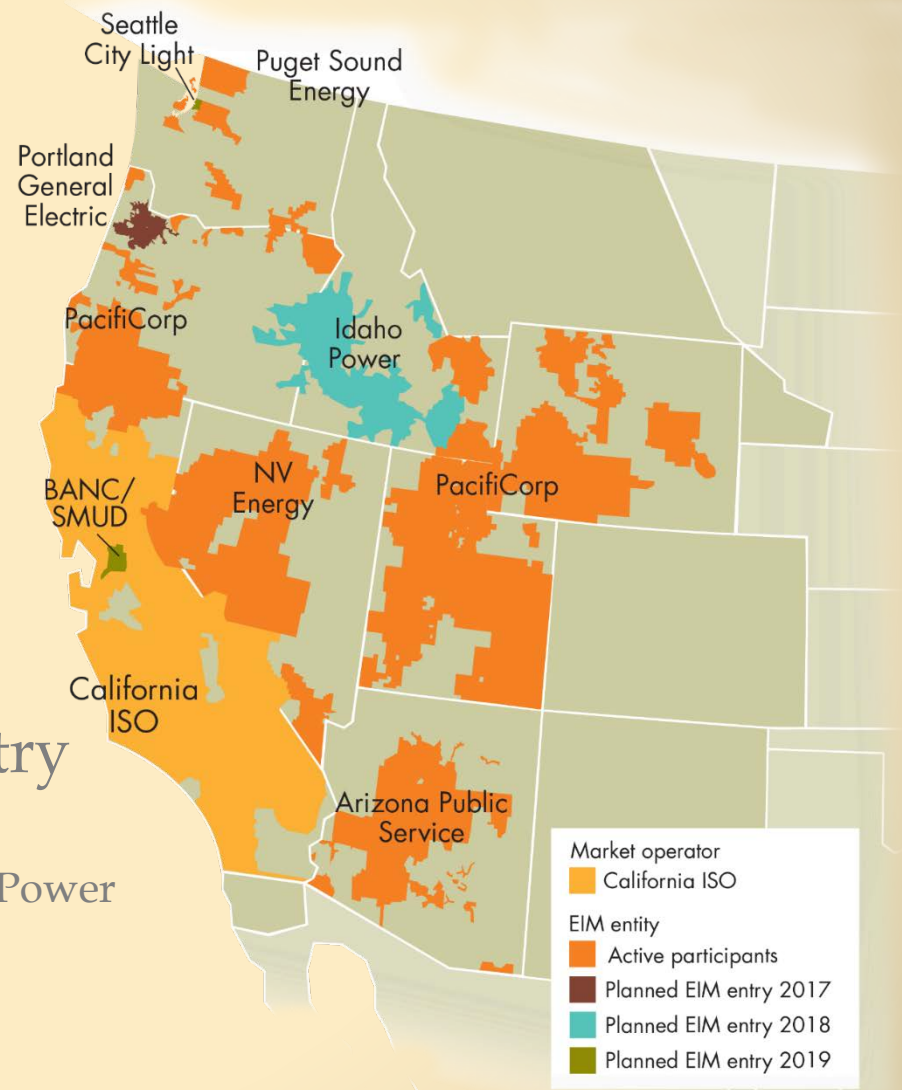
EIM preserves Northwestern Energy autonomy

- NWE maintains control over all transmission and generation assets
- NWE maintains all compliance obligations and obligations to procure and maintain operating reserves and for balancing.



EIM Entity Update

- Arizona and Puget Sound
 - Operational October 1st
- Implementation Phase
 - Portland General - Fall 2017
 - Idaho Power - Spring 2018
 - Seattle City Light - Spring 2019
 - BANC/SMUD - Spring 2019
- Entities exploring future entry
 - CENACE, Baja CA
 - Los Angeles Department of Water & Power
 - Salt River Project
 - Northwestern Energy

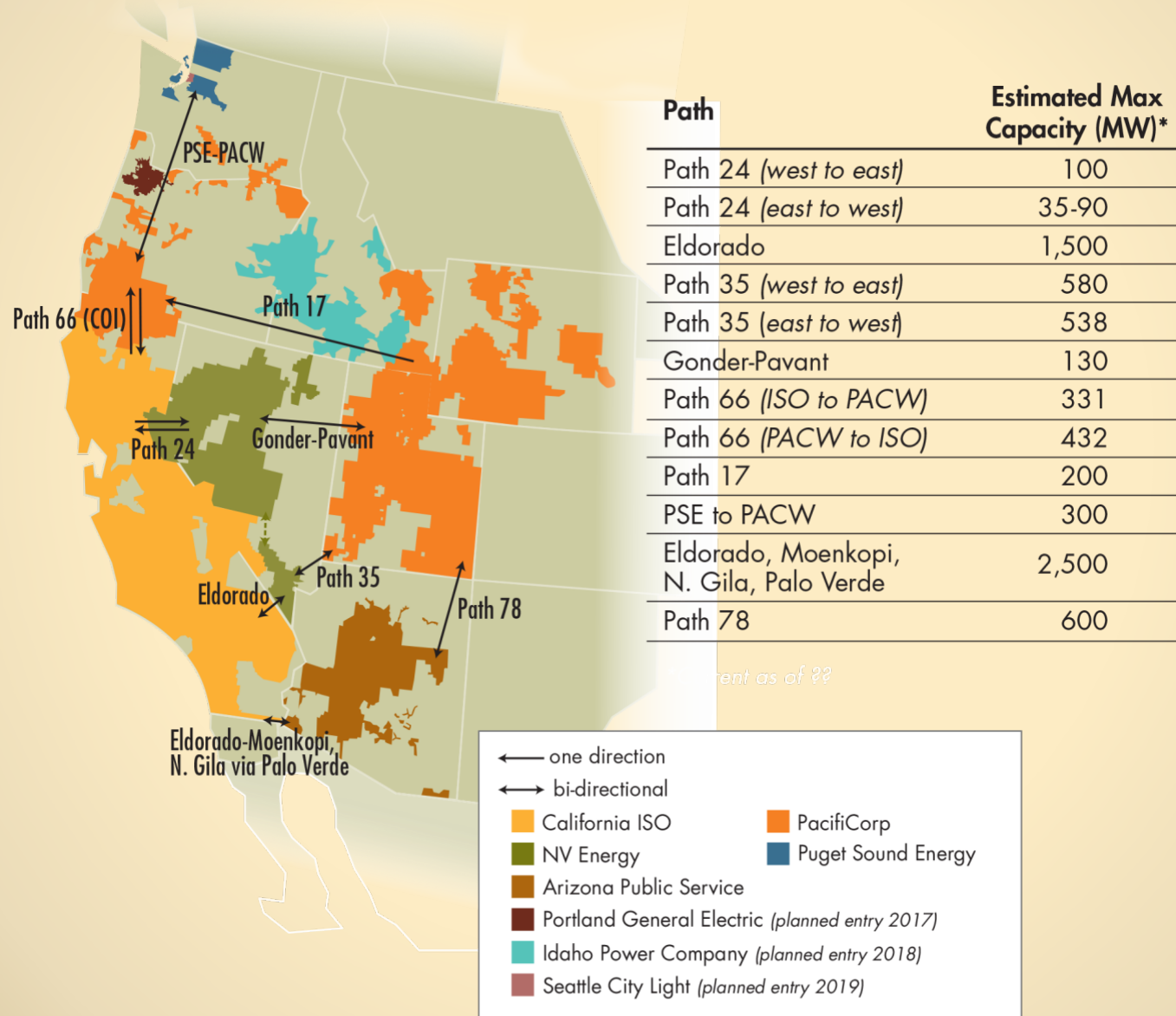


Gross economic benefits since start of EIM = \$142.62M

BAA	4 th Qtr 2014	1 st Qtr 2015	2 nd Qtr 2015	3 rd Qtr 2015	4 th Qtr 2015	1 st Qtr 2016	2 nd Qtr 2016	3 rd Qtr 2016	4 th Qtr 2016	Total
APS									5.98	5.98
CAISO	1.24	1.44	2.46	3.48	5.28	6.35	7.89	5.44	8.67	42.25
NVE	-	-	-	-	0.84	1.70	5.20	5.60	3.07	16.41
PAC	4.73	3.82	7.72	8.52	6.17	10.85	10.51	15.12	8.99	76.43
PSE									1.56	1.56
Total	5.97	5.26	10.18	12.00	12.29	18.90	23.60	26.16	28.27	142.62

BAA	October	November	December	Q4 - 2016 Total
APS	2.81	1.68	1.49	5.98
CAISO	1.62	3.10	3.95	8.67
NVE	1.00	1.47	0.60	3.07
PAC	3.24	1.89	3.86	8.99
PSE	0.25	0.66	0.65	1.56
Total	8.92	8.8	10.55	28.27

Energy transfer capability in 4th quarter, 2016



Thank You

- Questions?

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