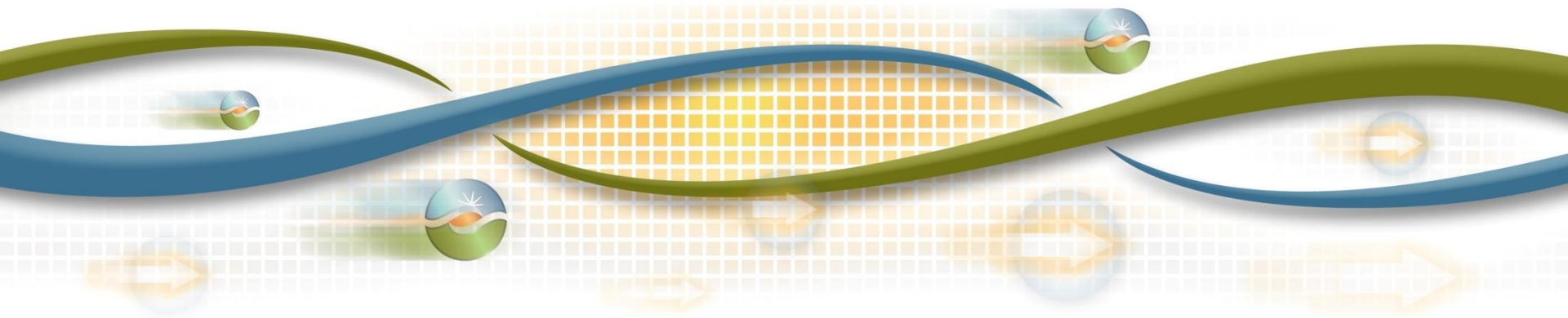




Western Energy Imbalance Market update

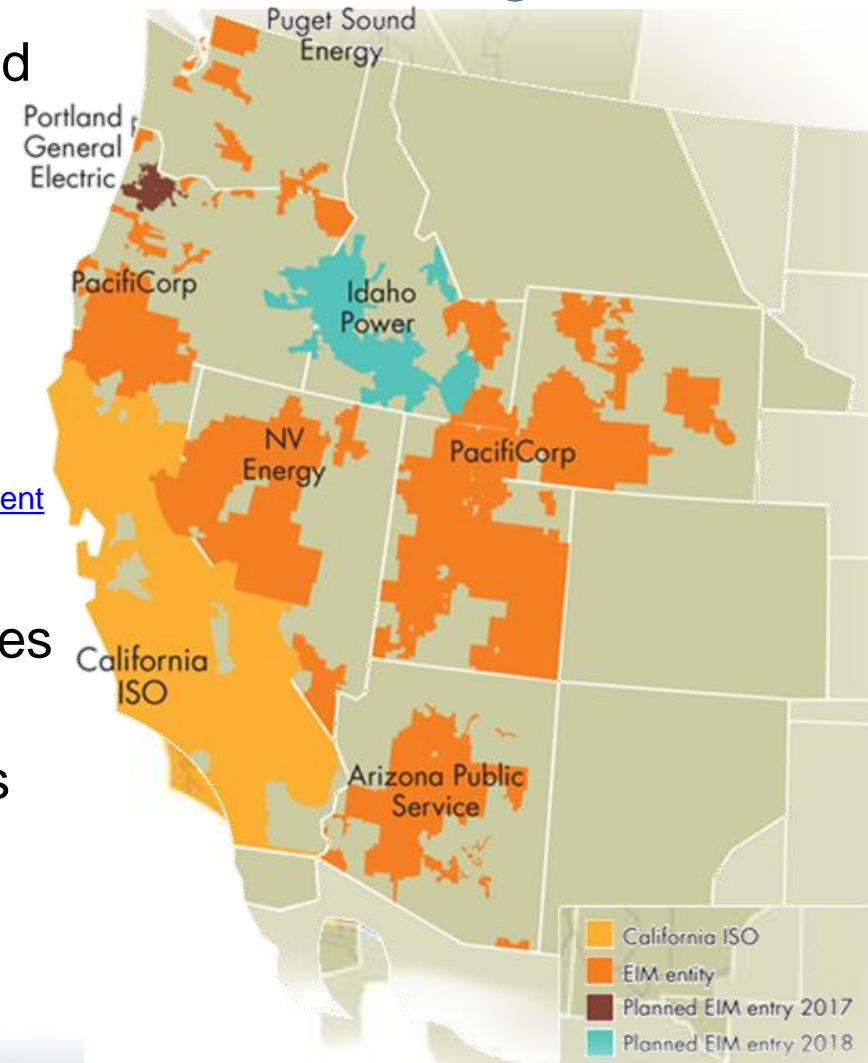
National Association of State Energy Officials

Don Fuller, Director Strategic Alliances
November 10, 2016



EIM adds to flexibility as 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>
- No critical mass required. No exit fees
- Easily scalable, low-cost, low risk, voluntary option for new participants
- Preserves BAA autonomy, including compliance, balancing, and reserve obligations



Power industry transformation



Wind

- Unpredictable Output
- 4769 MW Peak – April 12, 2014



Solar Thermal / Photo Voltaic

- Semi – Predictable Output
- ~~• 8030 MW Peak – July 12, 2016~~
- ~~• 8352 MW Peak – August 7, 2016~~
- 8545 MW Peak – September 14, 2016

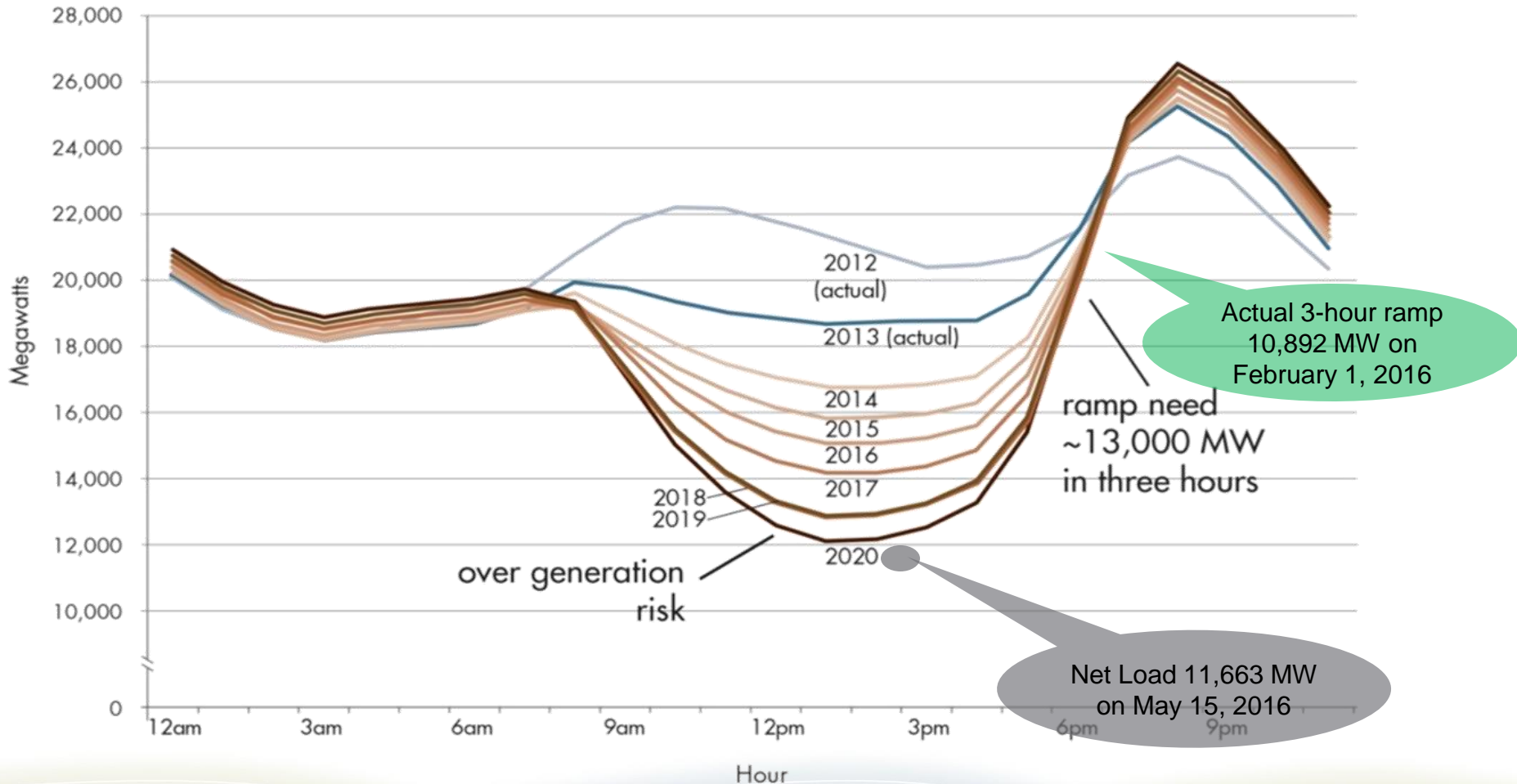


Roof Top Solar

- Semi – Predictable Output
- Behind the meter – Residential
- 3500 MW Estimated Capacity

Original estimate of net-load as more renewables are integrated into the grid

Typical Spring Day



Gross economic benefits since start of EIM = \$114.36M

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	Total
CAISO	1.24	1.44	2.46	3.48	5.28	6.35	7.89	5.44	33.58
NVE	-	-	-	-	0.84	1.70	5.20	5.60	13.34
PAC	4.73	3.82	7.72	8.52	6.17	10.85	10.51	15.12	67.44
Total	5.97	5.26	10.18	12.00	12.29	18.90	23.60	26.16	114.36

BAA	July	August	September	Q3 – 2016 Total
CAISO	2.24	1.38	1.82	5.44
NVE	1.88	2.16	1.55	5.60
PAC	6.09	4.92	4.12	15.12
Total	10.21	8.46	7.49	26.16

Avoided curtailment of 335,930Mwh of renewables, displacing an estimated 143,695 metric tons of CO2.

Reduced Renewable Curtailment	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	Total To-Date
Mwh curtailment avoided	8,860	3,629	828	17,765	112,948	158,806	33,094	335,930
Estimated metric tons of CO2 displaced	3,792	1,553	354	7,521	48,342	67,969	14,164	143,695

EIM Transitional Committee governance proposal approved and implementation underway

EIM Governing Body seated June 28, 2016

- Carl Linvill, Principal, The Regulatory Assistance Project
- Doug Howe, Consultant, Vanry & Associates
- John Prescott, (Retired) President and Chief Executive Officer, Pacific Northwest Generating Cooperative
- Kristine Schmidt, President, Swan Consulting Services
- Valerie Fong, (Retired) Director of Utilities, City of Palo Alto

Body of state regulators – to advise EIM Governing Body and ISO Board on matters of interest, representing 8 states

Regional Issues Forum – public vehicle for discussion of EIM-related issues, including impacts to neighboring balancing authority areas, next meeting scheduled for November 29 in Phoenix, AZ

Body of State Regulators

State	Commissioner
Arizona	Doug Little
California	Michael Picker
Idaho	Kristine Raper
Nevada	Paul Thomsen
Oregon	John Savage
Utah	Thad LeVar
Washington	Ann Rendahl
Wyoming	Bill Russell

- Provide voting member to Nominating Committee
- Hold periodic meetings to provide information to members about EIM
- Provide forum for discussion
- Develop process where it may express common position in ISO processes or to EIM Governing Body
- Post items on a webpage
- Body is not committee of the ISO

Implications for Nevada

- \$12.5 million in economic savings for NVEnergy in first 3 quarters 2016
 - Compared to \$6-10 million range of annual benefits noted in 2014 cost/benefit study
- Increased participation brings additional transmission interconnections and with it access to a broader range of resources