

Nevada New Energy Industry Task Force Subcommittee on Transmission

Energy Imbalance Market Concepts

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Outline of Presentation

- Issues and Current Practices in the West
 - Variability
 - Balancing Authorities
 - Unused Transmission Capacity
- What is an EIM and how does it work?
- Where are we now?
 - PUC EIM Group
 - Costs and Benefits
 - Next Steps



Issues & Practices in the West

Variability on the Grid

Balancing Authorities

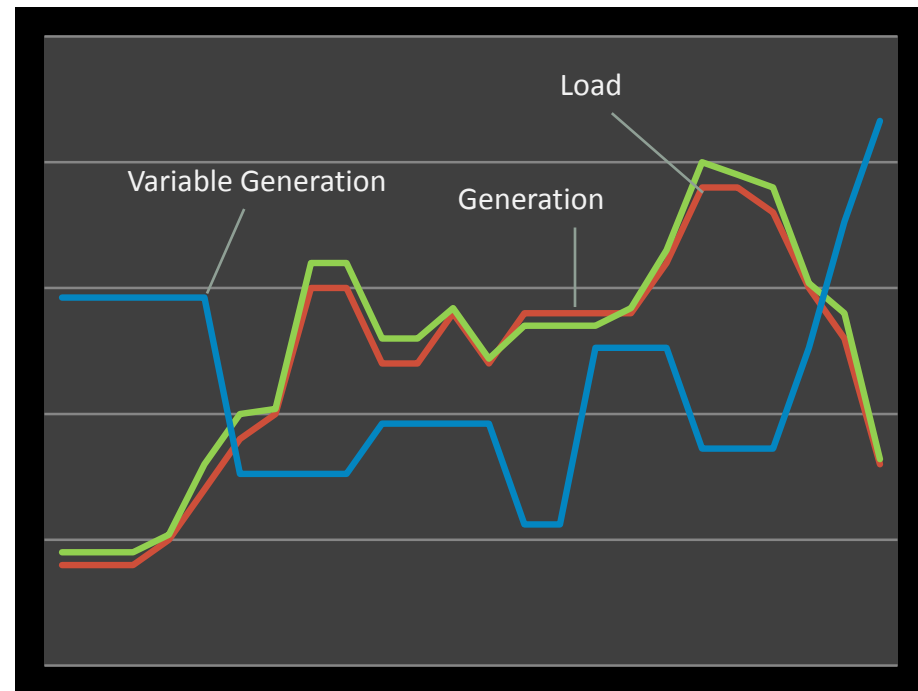
Unused Transmission Capacity



Issues & Practices in the West

Variability on the Grid

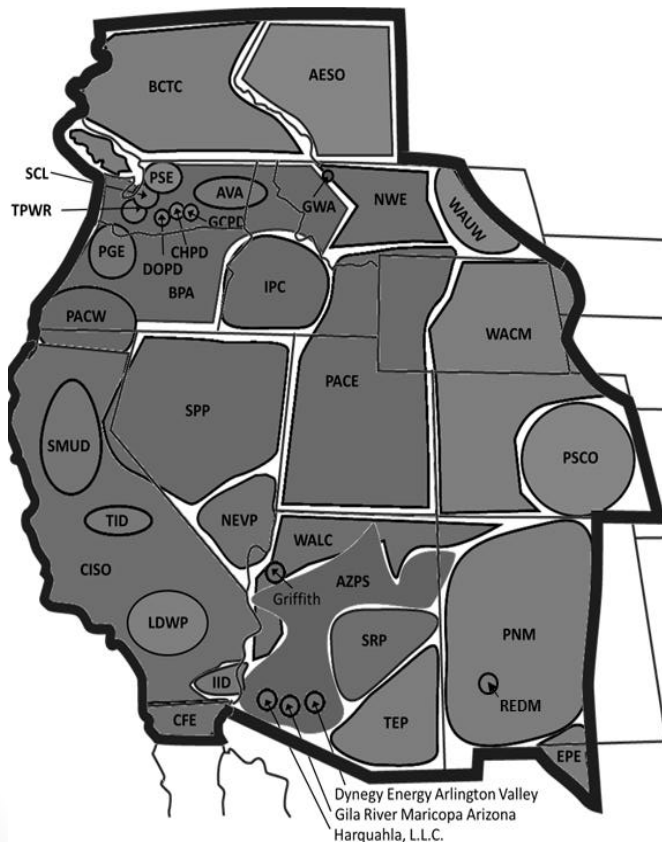
- Variability – changes in electricity production and use
 - Historically, variability has come from load and is relatively easy to manage
 - Variability from variable energy resources—wind and solar—is more difficult to manage because it is less predictable





Issues & Practices in the West

Balancing Authorities

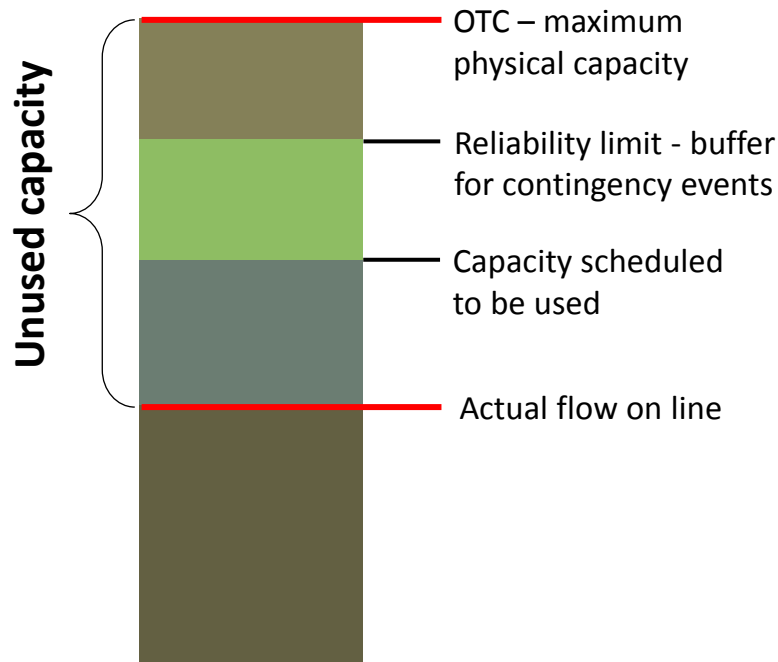


- 37 Balancing Authorities (BAs) that balance within their footprints
- Energy imbalance is handled according to Schedules 4 & 9 of the OATT
- Variability can have greater impact in smaller footprints
- We don't share variability across the interconnection-- each BA is on its own when balancing, which could lead to utilization of higher-cost resources



Issues & Practices in the West

Unused Transmission Capacity



- Because we cannot see the grid in enough detail in real-time, we create large buffers in line capacity to guard against contingencies.
- This practice leaves capacity on the table that might otherwise be used in the real-time horizon.



What is an EIM and How Does it Work?

High-Level Overview
Myths and misconceptions



What is an EIM?

Definition

- An Energy Imbalance Market is a tool that dispatches lowest cost resources to address energy imbalances, while maintaining reliability.

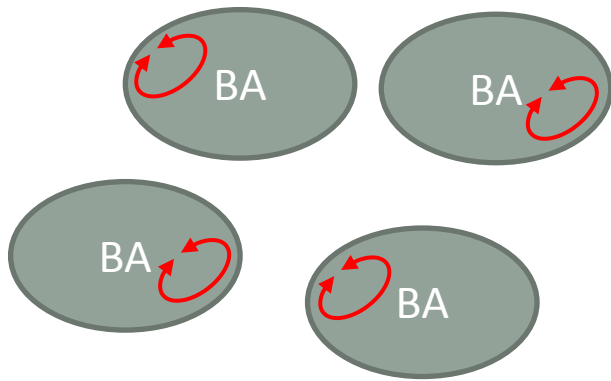


What is an EIM?

Breaking it down

Today:

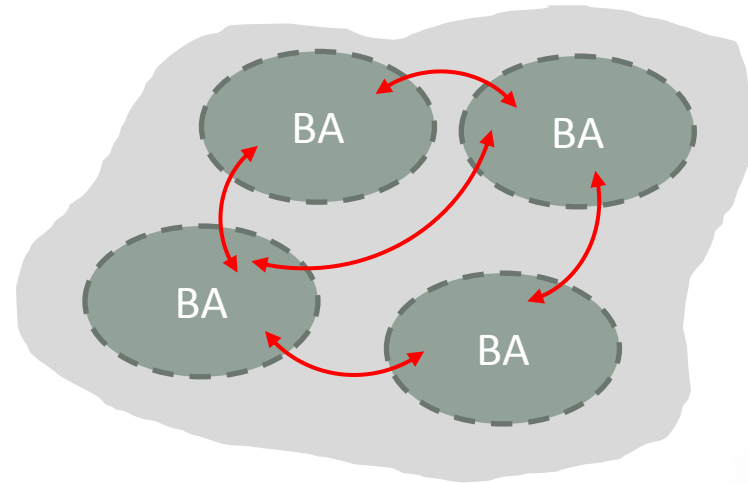
Each BA must balance loads and resources **w/in its borders.**



- 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

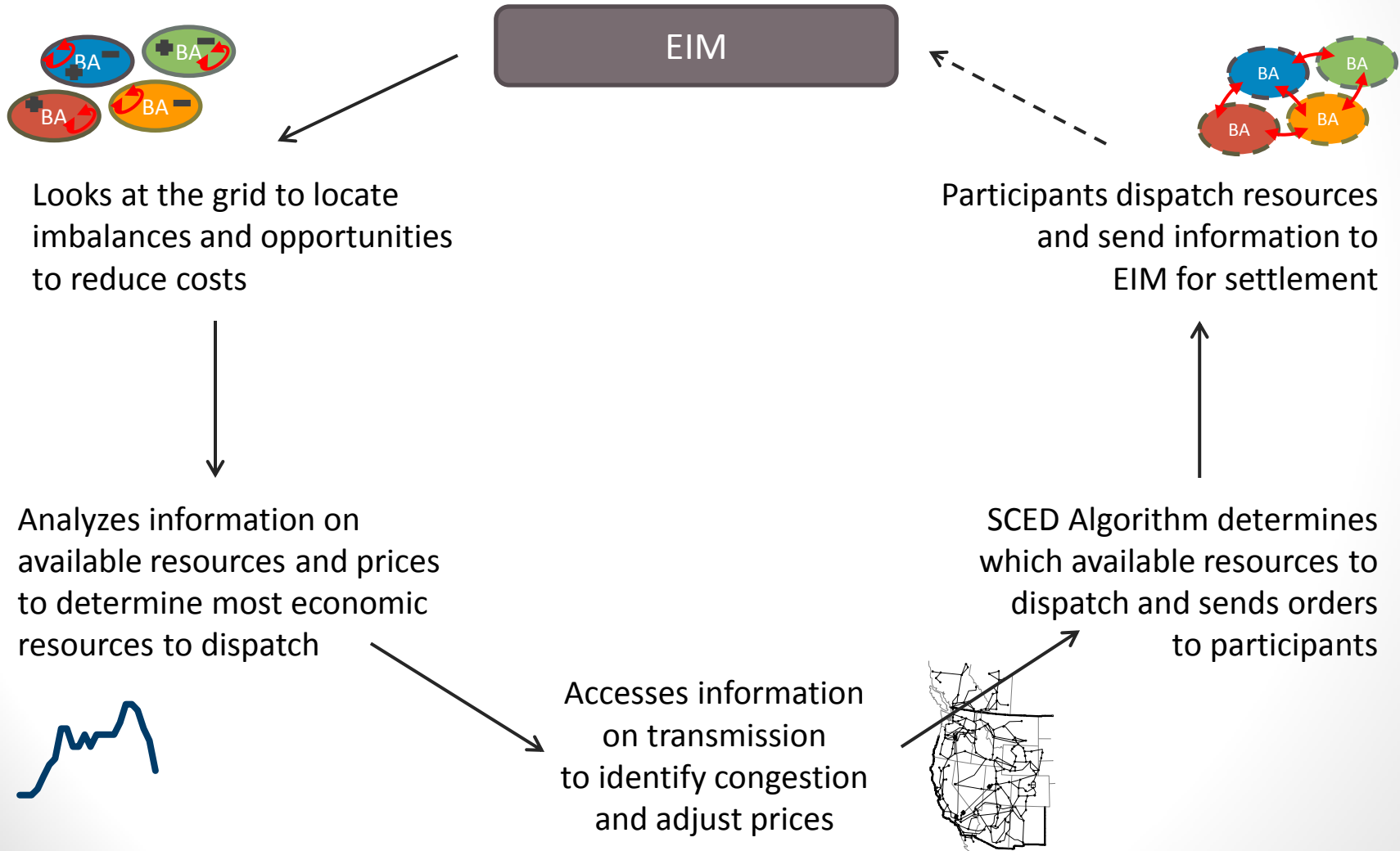


- Diversity of balancing resources
- Increased flexibility
- Decreased levels of reserves
- More economically efficient
- Decreased integration costs



How does an EIM work?

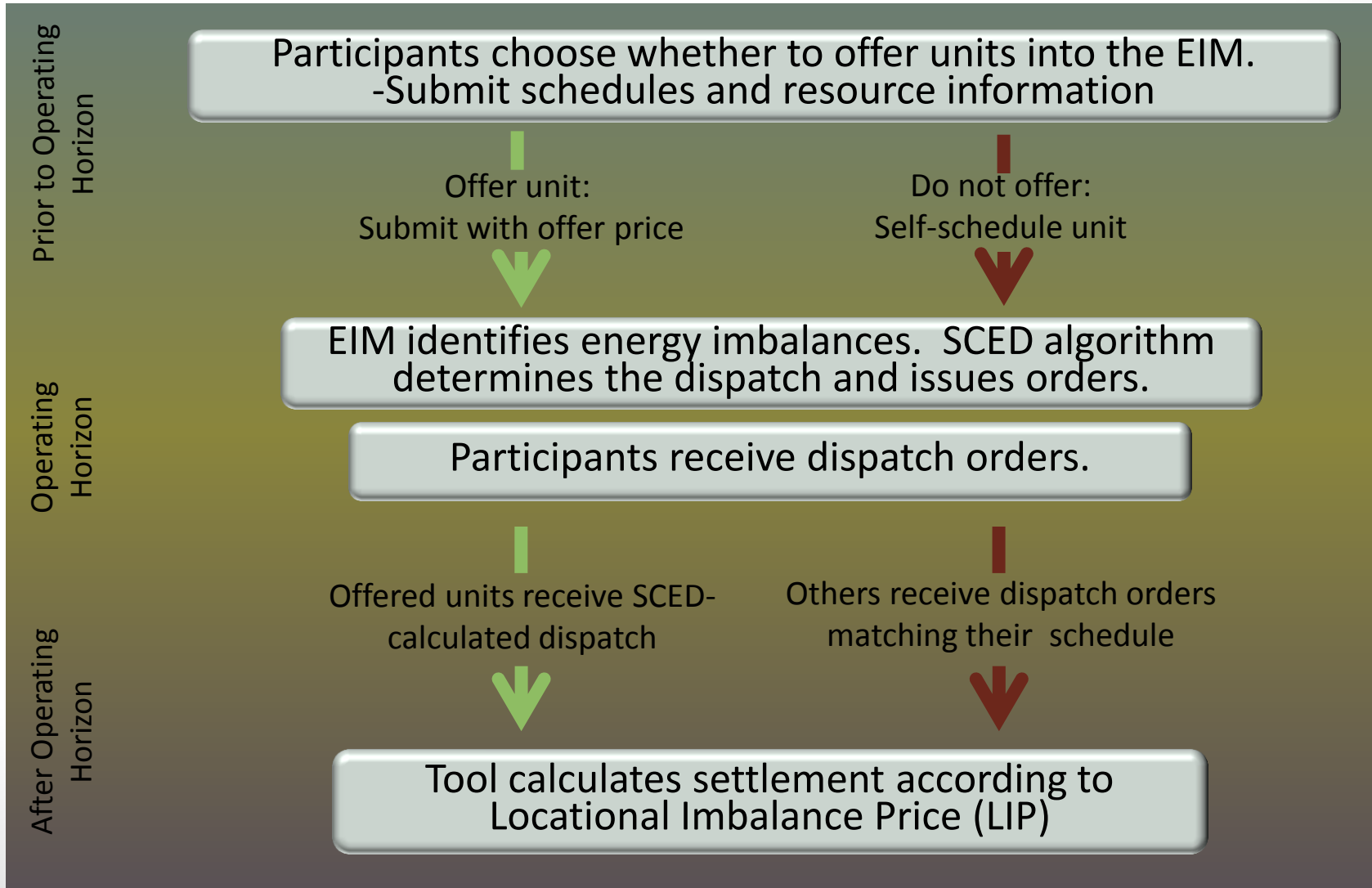
Dispatching balancing energy





How does the EIM work?

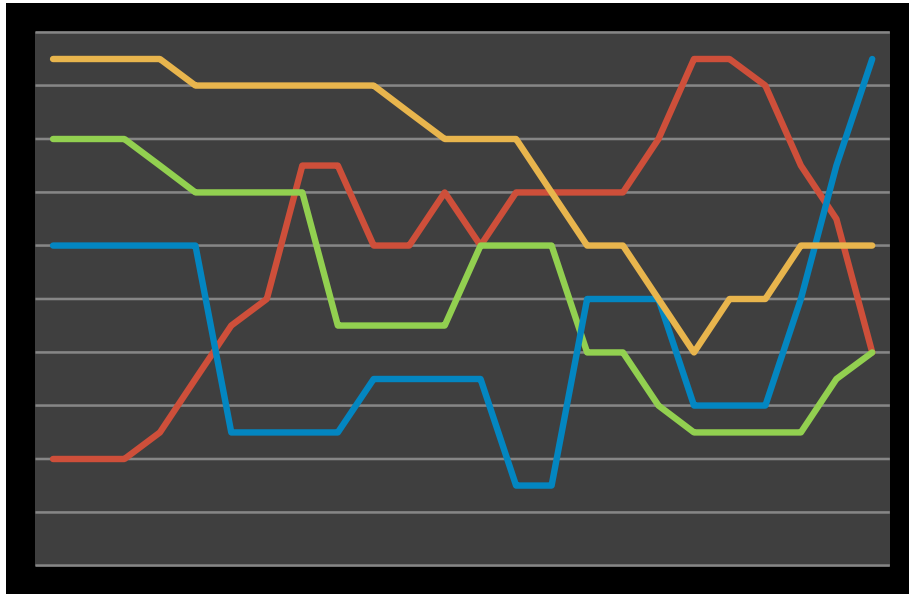
Participant actions





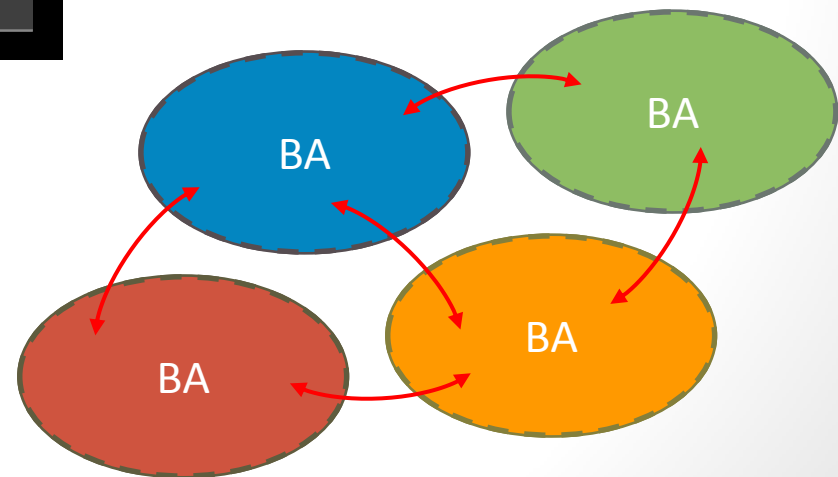
What does an EIM do?

Reducing Variability across BAs



Through the EIM, variability in aggregated across participating BAs, which effectively reduces the overall variability across the footprint.

At the same time, the pool of resources available to manage variability expands, increasing flexibility.





What does an EIM do?

Reliability

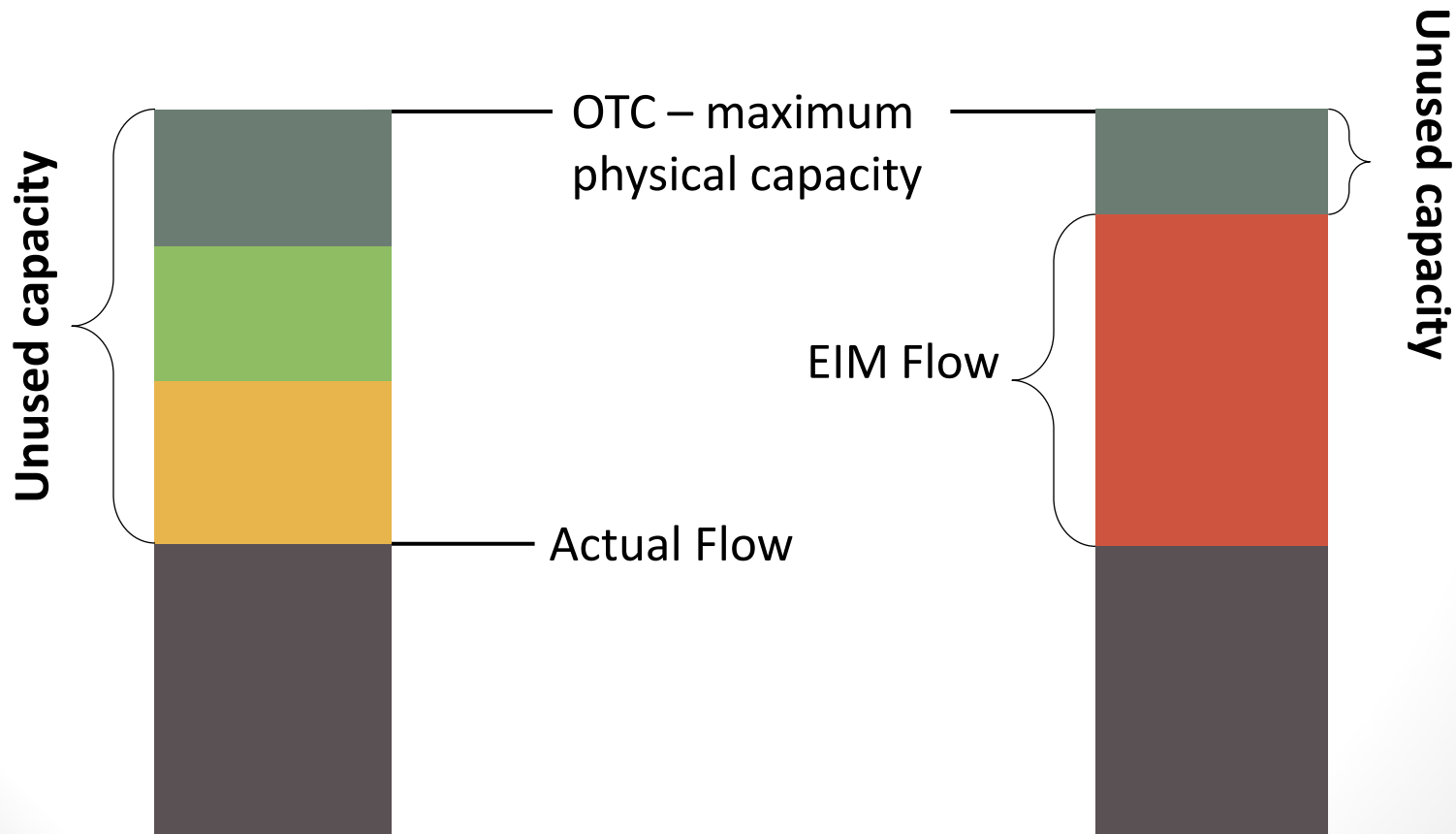
- Situational awareness:
 - The EIM requires modernization of existing tools to monitor the grid in real time
- Tools to address imbalance:
 - Sub-hourly monitoring of the grid and 5-minute dispatch allows market operator to follow variability more accurately
- Flexibility:
 - Increased communication across BAs creates more flexibility to deal with balancing



What does an EIM do?

Use of transmission capacity

- The EIM must use capacity that would not otherwise be used





What is an EIM?

Myths and Misconceptions

The EIM is

- A market for balancing energy
- Centralized unit dispatch for balancing energy
- Voluntary*

The EIM is NOT

- An RTO (with planning, day-ahead markets, etc.)
- Centralized Unit Commitment
- Capacity market
- A replacement for current bilateral contractual business structure



Where are we now?

PUC EIM Group
Costs and Benefits
Next Steps



Where are we now?

PUC EIM Group

- Purpose:
 - Investigate issues surrounding an EIM and the potential costs and benefits to ratepayers, and
 - Foster a conversation between regulators and industry in a multi-state cooperative setting.
- Meeting Sept. 13-14 in Tempe, AZ

State commissioners:

- AZ – Paul Newman
- CA – Timothy Alan Simon
- CO – Jim Tarpey
- ID – Paul Kjellander
- MT – Travis Kavulla
- NV – Rebecca Wagner
- NM – Jason Marks (Chair)
- OR – John Savage
- SD – Brian Rounds*
- TX – Rolando Pablos
- UT – Ric Campbell
- WA – Jeff Goltz
- WY – Steve Oxley

* Commission Staff



PUC EIM Group

Prerequisites to a meeting

3 key pieces of information:

- Analysis of intra-hour and individual BA benefits
- Strawman detailed market design
- Cost estimate for a market operator from SPP and CAISO
 - SPP and CAISO agreed to prepare estimate based on the strawman market design.

Additional information:

- WSPP document on EIM Governance and FERC jurisdictional issues
- Transmission in the EIM



Cost Estimates

	Start-Up Costs	Ongoing Operational Costs
WECC	\$42.2 - \$114 million	\$50 - \$95.7 million
SPP	\$64.4 million	\$28.5 million (first year) \$28 million (years 2+)
CAISO	\$.03 per MWh of total annual energy usage - ~\$16 million at 2009 net energy for load	Variable <ul style="list-style-type: none"> • \$.19 per MWh in the EIM or ~ \$10 million assuming 10% of annual energy usage • \$1,000 per month per scheduling coordinator



Annual Benefits

	Full EIM	Reduced Footprint	Alternate BAU*	Low gas price (\$4.50/MMBtu)	High gas price (\$10/MMBtu)	CO ₂ Price (\$36/ton CO ₂)
WECC/E3	\$141 million	\$54 million	n/a	\$227 million	\$157 million	\$233 million
NREL Alignment	\$180 million	\$113 million	n/a	n/a	n/a	n/a
NREL Intra-Hour	\$167 million	\$142 million	\$1.47 <u>b</u> illion	\$1.2 <u>b</u> illion	n/a	n/a

* Assumes 60 minute schedules with 40 minute lockdown (WECC/E3 and NREL alignment cases assumed 60 minute schedule with 10-min lockdown)



Other Costs and Benefits

- FERC is signaling that an EIM may supplant the new requirement for 15 minute scheduling
 - What is the cost/benefit comparison between 15-min scheduling and an EIM?
- What role would an EIM play in improving reliability and lowering outage costs to companies and consumers?
- How do benefits change depending on participation levels?
- Individual company costs need to be compared to individual potential benefits



Next Steps

- PUC EIM Meeting Sept. 13-14 in Tempe, AZ
 - Discussion of results and next phase of work through end of the year
- NWPP conducting analysis of costs and benefits of an EIM and other initiatives -- working with PUC EIM
 - Deadline for work is end of 2012
- Get more clarity and possibly refinement of the individual BA benefits numbers
- Conduct additional benefits analyses (e.g., carbon price)
- If costs outweigh benefits...participating BAs need to come together and begin working out governance and market design details

Questions?



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PUC EIM Group website:

<http://www.westgov.org/PUCeim/index.htm>