

Benefits of Integrating State Climate Program Design With Regional Energy Markets

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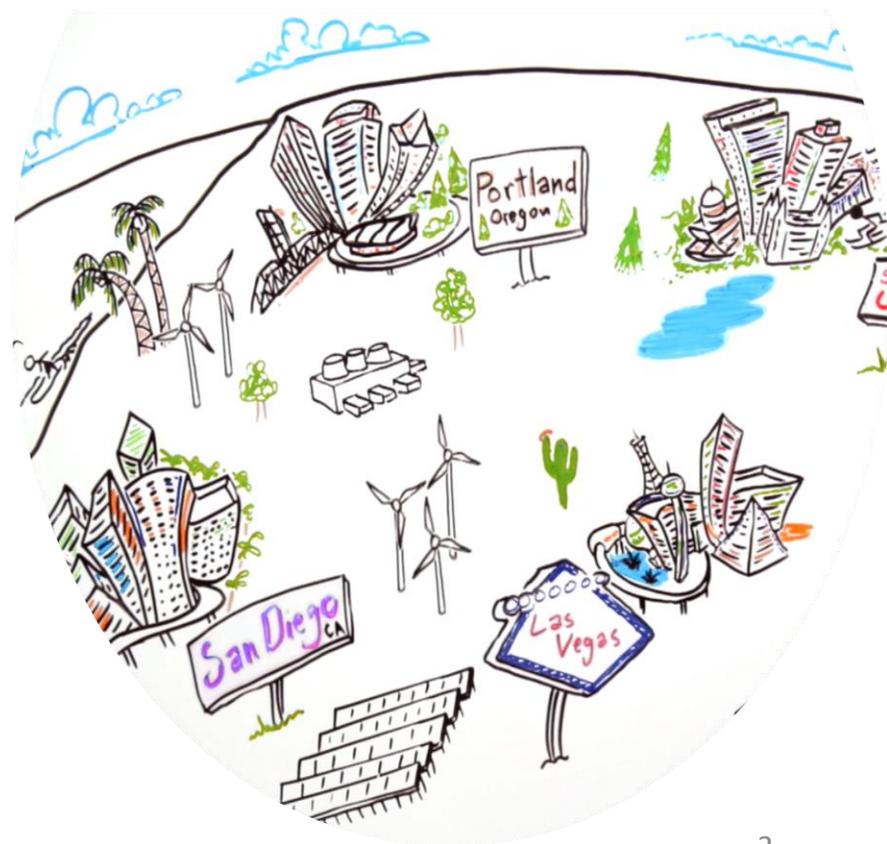
Significant growth in renewables has created a grid management challenge.

- Evening Ramp
- Curtailment of low marginal cost renewable generation



The Energy Imbalance Market helps to address this challenge.

- More efficient dispatch
- Less curtailment
- Reduced electricity costs



Good News! The Benefits of The EIM Are Significant



Environmental – 10,026 tons reduced CO₂ emissions due to avoided curtailment**



Operational – 46% average reduction in flexibility reserves**



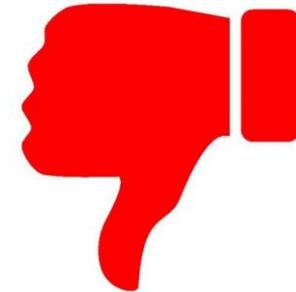
Economic - \$62.57 million cost savings realized due to more efficient dispatch**

**Western EIM Benefits Report, Fourth Quarter 2018.

Bad News -- EIM Optimization Can Conflict With State Climate Rules



Finding the most efficient resource dispatch



Including avoided GHG costs in decisions for California bound electricity



So,,, What is resource shuffling?

Complication -- Tracking GHG Emissions From Source to Sink is Not Easy



- Typical E-Tags can trace the transactions from resource to load
- But EIM transfers are done via a single BA to BA tag
- And BAs often cover multiple states

Suggestion – Recognize That a Portfolio Approach Will Optimize Social Welfare

State level climate policies improve social welfare

The EIM facilitates more efficient dispatch and enables a greater volume of renewable energy

State level climate policies challenge EIM optimization

States can best support climate change solutions by designing regulations to work with broad energy markets

