



Building The Energy Markets of Tomorrow . . . Today

Market Participation by Wind Resources

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Current Market Rules for Intermittents

- **Imbalance Charges**

Intermittents existing as of 11/19/99 and 500 MW of new resources are paid for all energy produced regardless of their Day-Ahead schedule. Units selling into the LMP market and generating less than their Day-Ahead schedule are required to buy out at Real-Time LMPs

- ✓ *Units selling bilaterally may be able to transfer their balancing obligations to their loads*

- **Under-Generation Penalties**

Intermittents existing as of 11/19/99 and 500 MW of new resources are excused from paying penalties for generating at less than their basepoints.

- **Capacity**

Wind and solar resources are paid for their capacity in a valuation based on historic capacity factors, adjusted for maintenance

- ✓ *Capacity factor measures reliability of energy production over the course of a calendar year*

Rule Changes Ahead

- Adjust the manner in which intermittents are balanced against their Day-Ahead Schedules
 - ✓ *Including Real-Time Payments for Delivered Energy*
- Adjust the Method Used to Measure the Capacity Value of All Generation
 - ✓ *Including correlation of resource availability with system peak hours*
- Adjust the exemption from Regulation Penalties
- How will the 500 MW “Exemptions” be applied?

Wind Power Operational Issues

- Reactive power demands increase with increasing MW output (acts as an induction generator)
- Dynamic response to power system faults
- Potential regulation impact

Mitigation of Wind Power Operational Issues

Recommended features for new wind farms:

- Voltage regulation at the Point-of-Interconnection, with a guaranteed power factor range.
- Low voltage ride-through.
- A specified level of monitoring, metering, and event recording.
- Power curtailment capability.

Future desirable features:

- Ability to set power ramp rates
- Governor functions
- Reserve functions
- Zero-power voltage regulation