

### **PIRP: Participating Intermittent Resource Program**

Topics of Discussion: •Brief Summary of the PIRP Program •Process Flow Terms of Participation •ISO Forecasting Performance Review Corrective Measures •Expected Error and Bias Outage-related Model Updates Project Implementation Schedule Market Simulation •Go Live •PIRP-Express Contact Information/Questions



### **PIRP: Brief Summary of PIRP Program**

Brief Summary:

•What is PIRP?

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•ISO Program which allows intermittent resources (e.g. wind turbines) to schedule energy in the Forward Market without incurring imbalance charges when the delivered energy differs from the scheduled amount.

•Benefits/Costs of the PIRP Program:

Risk management as hourly imbalance from Actual and Scheduled amounts are netted on a monthly basis and applied (as payment or charge) a weighted-average price.
Access to state-of-the-art Day-Ahead and Hour-Ahead MWh forecasts.

•Participants are charged a forecasting service fee of \$0.10 per delivered MWh.

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# **PIRP: Brief Summary of PIRP Program**

Brief Summary:

- Process Flow?
  - 1. Data process originates with real-time Meteorological (MET), Generation, and Outage (SLIC) information supplied from on-site to the ISO.
  - 2. This data is supplied to the Forecasting Service Provider and processed through several modeling techniques (the results of which is supplied to the ISO).
  - 3. The ISO provides the Scheduling Coordinators (SCs) the submitted Day-Ahead and Hour-Ahead MWh Forecast Schedules.
  - 4. The SCs then submit their DA/HA schedules based on the forecast via the SI Workspace.
  - 5. The ISO validates the HA schedule equals the forecast and nominates that hour's imbalance towards the "monthly netted" charge account. As the forecast bias should approach zero, the charge/payment is expected to be minimal.



# **PIRP: Brief Summary of PIRP Program**

#### **Brief Summary:**

• Process Flow (cont'd)?





# **PIRP: Brief Summary of PIRP Program**

**Brief Summary:** 

•Terms of Participation?

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•Must have 1 MW of rated capacity.

•Must have a single point of connection to the ISO-

**Controlled Grid.** 

•Submission of PGA and MSA agreements

•Signed Letter of Intent

On-site forecast modeling information

•(plant size, location, turbine height, etc)

•Install a Data Processing Gateway for MET data feeds.



Forecasting Performance Review:

**Corrective Measures?** 

- Performance review with vendor (TrueWind Solutions).
- Use of Alternative Models
- Augmented Data Inputs

**Expected Error and Bias?** 

- Moving Average Error = ± 12%
- Forecasting Bias =  $\pm 0.3\%$

#### How are turbine outages considered?

- SLIC updates are integrated with PIRP forecasts
  - If outages occur just after the top of the hour, the forecast will not include the derate for a maximum of 1 hour.



Milestone	Date
Market Simulation	September 15 <sup>th</sup>
Go Live Date for Market Implementation	October 1 <sup>st</sup>
PIRP-Express	October 14 <sup>th</sup>



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## Jim Blatchford: Account Manager for PIRP Tel: 916 – 608 – 7051 E-mail: jblatchford@caiso.com

### **ISO Web-Site (PIRP Resources)**

- 1. Go to <u>www.caiso.com</u>
- In the upper-menu bar, select Market Services → Participating Intermittent Resource Program (PIRP).
- 3. Select from a) Process of Participation;b) Stakeholder Activities; and
  - c) Background/Documentation resources.