



CALIFORNIA ISO

California Independent  
System Operator

July 28, 2003

The Honorable Magalie Roman Salas  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

**Re: California Independent System Operator Corporation, ER02-922  
Status Report In Compliance With March 27, 2003 Order**

Dear Secretary Salas,

In accordance with the Federal Energy Regulatory Commission's March 27, 2002 Order in the referenced proceeding, the California Independent System Operator Corporation ("CAISO") hereby respectfully submits for filing an original and fourteen copies of a "Participating Intermittent Resources Program Status Report." Please return two file-stamped copies to the messenger.

Thank you for your assistance in this matter.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Anthony J. Ivancovich' with a stylized flourish at the end.

Anthony J. Ivancovich  
Senior Regulatory Counsel  
California Independent System  
Operator Corporation  
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Folsom, CA 95630  
(916) 608-7135

cc: All Parties

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

California Independent System Operator     )  
Corporation                                     )

Docket No. ER02-922-000

**CALIFORNIA INDEPENDENT SYSTEM OPERATOR  
PARTICIPATING INTERMITTENT RESOURCES PROGRAM  
STATUS REPORT**

On January 31, 2002, the California Independent System Operator (“CAISO”) filed Amendment No. 42 in Docket No. ER02-922-000 in which it propose numerous changes to its Open Access Transmission Tariff. Among the proposed changes were those necessary to implement the Participating Intermittent Resource Program (“PIRP”). The PIRP recognizes the special operating characteristics of intermittent resources, and provides a process for forecasting and scheduling Energy and settling deviations between scheduled and metered Energy by Eligible Intermittent Resources that elect to participate in the PIRP.

In its March 27, 2002 Order, 98 FERC ¶ 61,335 (2002), the Federal Energy Regulatory Commission accepted the CAISO’s proposed tariff changes to implement the PIRP, subject to certain conditions. This status report complies with the March 27 Order, which directed the CAISO to “to provide a report to the Commission detailing the performance of, and costs associated with, the proposed program, 16 months after the Commission's adoption of the program.”

Although the CAISO has been working diligently to implement the Participating Intermittent Resource Program, as described in greater detail below, no intermittent

resources are expected to begin scheduling in accordance with the PIRP until later this year. Thus, no data on the performance or settlement impacts of the program will be available for several months. Consequently, the discussion of PIRP costs provided herein is limited to actual expenses incurred to date to establish the program, and projected net expenses for the next three years of operation.

## **BACKGROUND**

In September 2001, the CAISO Board of Governors approved a consensus proposal that would establish new rules for scheduling and market integration of intermittent resources. The consensus proposal was developed in conjunction with the American and California Wind Energy Associations (AWEA and CalWEA), the California Energy Commission (CEC), representatives from the investor-owned utilities, governmental agencies, and wind power marketers. The working group developed a methodology that minimizes the risk of variation in charges for uninstructed deviations on wind energy suppliers in a way that also minimizes potential subsidies or cost shifting.

The CAISO's PIRP is also responsive to the Renewable Portfolio Standard ("RPS") that was adopted by the California Legislature in 2002. The RPS calls for 20% of California's energy consumption to be served by renewable energy sources by the year 2017. Intermittent resources, such as wind and solar generation, are expected to contribute a large portion of that requirement, and the PIRP will help the CAISO manage and predict the operational impacts of such additional intermittent resources.

The working group responsible for the consensus proposal that served as the basis for the program adopted through Amendment No. 42 continues to be involved in the

implementation of the PIRP. Four wind marketers have submitted Letters of Intent<sup>1</sup> to participate in the PIRP. These Letters of Intent represent 320 MW of wind generation in California. The CAISO is working closely with these generators to accomplish the necessary milestones needed to begin scheduling in accordance with the PIRP.

Additional information on PIRP implementation is posted on the CAISO Home Page at:

<http://www.caiso.com/docs/2003/01/29/2003012914230517586.html>

## **FORECASTING, SCHEDULING AND SETTLEMENT**

Participating Intermittent Resources must also sign all CAISO agreements, install production and meteorological meters, and operate an ISO Data Processing Gateway for real-time telemetry of metered parameters. Section 6 of the Eligible Intermittent Resources Protocol (“EIRP”) also specifies on-site meteorological recording requirements, including specific anemometer purchase and placement criteria. Updated weather data will be telemetered to the CAISO every four seconds.

The PIRP requires Participating Intermittent Resources to schedule energy in the Hour-Ahead Market in accordance with the hourly energy forecast provided by, or on behalf of, the ISO. Participating Intermittent Resources that comply with this scheduling obligation will not receive Imbalance Energy charges for deviations across each ten-minute Settlement Interval. Instead, the Energy deviations from a Participating Intermittent Resource will be netted across a calendar month and settled at a weighted-average price. State-of-the-art forecasting techniques will be used to provide unbiased hourly energy forecasts, resulting in an expected monthly net deviation close to zero.

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<sup>1</sup> Section 2 of the Eligible Intermittent Resources Protocol in the ISO Tariff requires that intermittent resources submit a Letter of Intent that commits a resource to the PIRP for a duration of no less than 1 year.

Deviations by participating projects will be excluded from consideration for the purpose of calculating charges owed by the responsible Scheduling Coordinators for Deviation Replacement Reserve and above-MCP costs, again with no expected subsidy or cost shifting, so long as forecasts are unbiased.

As a measure to help defray the cost of developing forecasts and accommodating intermittent resources, the Commission approved the CAISO's proposal to assess a Forecast Fee of up to \$0.10 per megawatt-hour to Participating Intermittent Resources. This charge will be billed on delivered energy on a monthly basis.

The CAISO is also implementing the Uninstructed Deviation Penalty with Phase 1b of MD02. Participating Intermittent Resources that schedule in compliance with the PIRP will be exempt from these penalties.

## **FORECAST VENDOR**

TrueWind Solutions, LLC ("TrueWind") has been selected as the forecast vendor that will supply Participating Intermittent Resources with state-of-the-art Day-Ahead and Hour-Ahead forecasts of wind generation energy. The CAISO evaluated four proposals that were submitted in response to the CAISO's solicitation. A total of 24 evaluation criteria were applied, including cost, proven ability, robustness and transparency of models, electronic security, viability of company, and forecast model accuracy. The CAISO also required respondents to submit sample energy forecasts based on CAISO-provided data representing several wind generation projects. The test results were evaluated in terms of accuracy and bias, and were used as an additional criterion in evaluating the vendors.

TrueWind Solutions is known globally for its successes and expertise in forecasting wind generation energy. TrueWind will be using a combination of powerful statistical methods to pursue the accuracy and bias requirements established by the CAISO. These include advanced weather forecasting and production models, statistical models, and artificial neural networks. TrueWind will be also implementing the modified Box-Jenkins Autoregressive Integrated Moving Average (“ARIMA”) model and bias compensation scheme previously developed by CAISO staff. TrueWind will also employ its ensemble forecasting strategy in which several forecasting methods work in parallel, and the most accurate forecasts are dynamically selected for each operating hour.

The CAISO will monitor the accuracy and the bias of forecasts provided by TrueWind for each Participating Intermittent Resource. During the initial stages, the forecast error and bias will be monitored only for the Hour-Ahead forecasts. The forecast error will be calculated for each operating hour as the difference between the forecasted average MW hourly production and the actual average MW production.

The accuracy requirement specified in the contract is a Percent Mean Absolute Error (MAE) determined for each Participating Intermittent Resource as a percentage of rated project capacity. The MAE is calculated each calendar month based on the error between the forecast submitted 2.75 hours before the actual operational hour begins and the actual energy generation. Unavailable or compromised evaluation periods will not be included in this calculation. The required bias accuracy is 0.6 % or better for Hour-Ahead forecasts. TrueWind will monitor the bias continuously in order to detect possible excess monthly violations early and will use special bias compensation algorithms, if needed.

The required forecast accuracy for each calendar month is 12% or better for the MAE, after a 60-day model-training period for each project.

Implementation of the PIRP methodology requires development of a forecasting information application, changes to several CAISO systems such as the Master File, Settlements and Billing, and the Scheduling Infrastructure (“SI”), and several new processes must be put in place to populate the new PIRP database with meteorological data, generation output from the plants, and de-rate information every 10 minutes. All data is compiled into a single data file and will be pushed hourly to the forecast vendor via the secure Energy Communications Network (“ECN”) connection. Daily and hourly forecasts will be then be submitted to the CAISO for the Day-Ahead and Hour-Ahead markets, respectively. In turn, the CAISO will provide the hourly energy forecast for each specific resource to the Participating Intermittent Resources’ Scheduling Coordinator through a new web service.

## **FORECASTING COSTS AND REVENUE OFFSETS**

The estimated CAISO costs and participant payments for the PIRP are provided below. In Year 1 (2003), capital costs included the cost of application and web server hardware and software licenses. Certain other project-related costs incurred by the CAISO are not included, and include the costs of modification of Settlement systems, on-going operational support, and redundant hardware costs.

## PROJECTED ANNUAL COSTS and PAYMENTS (YR 2003)<sup>2</sup>

| Resource                                              | Deliverables                                                                                                                                                               | Cost                                     | Revenue  |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------|
| Forecasting Service Fees<br>(PIRP Participants)       | • Participant Forecasting Revenues<br>(\$0.10 per MWh) <sup>3</sup>                                                                                                        |                                          | \$11,826 |
| Contractors                                           | • PIRP Application Development;<br>• Modifications to the forward market's Scheduling Application.                                                                         | (\$43,000)<br>(\$110,000)<br>(\$153,000) |          |
| Hardware, Software, & Licensing                       | • Application and Web Servers<br>• Software Licenses<br>• Networking Equipment & Licensing                                                                                 | (\$10,000)                               |          |
| Forecasting Vendor Fees<br>(TrueWind Solutions, Inc.) | • Initial setup of the CAISO service.<br>• PIRP Participant Forecasted MW<br>• Annual Maintenance Support (2-day seminar, 4 quarterly support meetings, technical support) | (\$10,000)<br>(\$78,180)<br>(\$88,180)   |          |
|                                                       |                                                                                                                                                                            | (\$251,180)                              | \$11,826 |
| <b>ESTIMATED NET 2003 EXPENSE</b>                     |                                                                                                                                                                            | <b>(\$239,354)</b>                       |          |

## PROJECTED ANNUAL COSTS and PAYMENTS (YR 2004)

| Resource                                              | Deliverables                                                                                                                      | Cost              | Revenue  |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|
| Forecasting Service Fees<br>(PIRP Participants)       | • Participant Forecasting Revenues                                                                                                |                   | \$70,518 |
| Forecasting Vendor Fees<br>(TrueWind Solutions, Inc.) | • PIRP Participant Forecasted MW<br>• Annual Maintenance Support (2-day seminar, 4 quarterly support meetings, technical support) | (\$150,260)       |          |
|                                                       |                                                                                                                                   | (\$150,260)       | \$70,518 |
| <b>ESTIMATED NET 2004 EXPENSE</b>                     |                                                                                                                                   | <b>(\$79,742)</b> |          |

## PROJECTED ANNUAL COSTS and PAYMENTS (YR 2005)

| Resource                                              | Deliverables                                                                                                                      | Cost               | Revenue   |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------|
| Forecasting Service Fees<br>(PIRP Participants)       | • Participant Forecasting Revenues                                                                                                |                    | \$109,500 |
| Forecasting Vendor Fees<br>(TrueWind Solutions, Inc.) | • PIRP Participant Forecasted MW<br>• Annual Maintenance Support (2-day seminar, 4 quarterly support meetings, technical support) | (\$302,300)        |           |
|                                                       |                                                                                                                                   | (\$302,300)        | \$109,500 |
| <b>ESTIMATED NET 2005 EXPENSE</b>                     |                                                                                                                                   | <b>(\$192,800)</b> |           |

<sup>2</sup> This reflects a partial year as the start-up of Forecasting Services begins September 1<sup>st</sup>.

<sup>3</sup> Based on a 25% capacity factor assumption and the expected level of participation based on Market Participant feedback on start-up dates.

Several uncertain factors, such as the number, location and size of new participants, make the estimated impact to the overall cost structure for forecasting services difficult to estimate. Under certain circumstances, such as the participation of 1000 MW of Southern California Edison intermittent resources in the San Geronio Pass/Tehachapi/Palm Springs area, the full cost of the program could be recovered beginning in 2005.

## **IMPLEMENTATION SCHEDULE**

The CAISO is working diligently on the changes and new applications necessary for the PIRP implementation. The CAISO's 2003 schedule for implementation of the PIRP follows:

| DATE                     | MILESTONE DESCRIPTION                                                                                                                                                                                                                                                                                    |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>July 9</b>            | <i>PIRP Program Initiation:</i> The CAISO will begin collecting meteorological and generation data from wind-energy projects that are qualified to begin the PIRP Certification Process                                                                                                                  |
| <b>Week of August 18</b> | <i>Market Simulation:</i> The CAISO will perform a simulation of the Day-Ahead/Hour-Ahead MW Forecast Schedule submittal processes from the CAISO to Participating Intermittent Resources' Scheduling Coordinators, and (if requested) the Schedule submission process from the SCs to the SI Workspace. |
| <b>September 9</b>       | <i>MW Forecast Schedule Initiation:</i> Day-Ahead and Hour-Ahead energy forecasts will be available to PIRP-certified resources. Scheduling and settlement according to the PIRP principles begins.                                                                                                      |
| <b>October 7</b>         | <i>PIRP-Express Initiation:</i> Wind-Energy Projects with 60-days worth of correlating meteorological and operating output data, and fulfillment of the contractual obligations may apply to bypass the 60-day Certification Period.                                                                     |

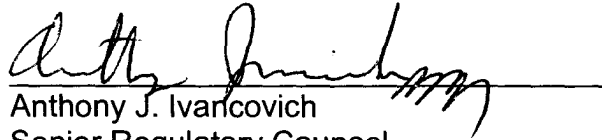
The CAISO is striving to standardize the on-site telemetry installations to allow new wind sites to be certified quickly. The forecasting vendor is confident that market simulation can be conducted in mid-August, with initiation of the hourly forecasting process by September 9, 2003.

Because the PIRP has not been implemented, there are no market impacts to report. The CAISO proposes to provide the Commission with another report on the progress of the program, including costs and benefits, 12 months from date of this report.

## **CERTIFICATE OF SERVICE**

I hereby certify that I have this day served the foregoing Participating Intermittent Resources Program Status Report upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Folsom, California, on this 28<sup>th</sup> day of July, 2003.

A handwritten signature in black ink, appearing to read "Anthony J. Ivarcovich", is written over a horizontal line.

Anthony J. Ivarcovich  
Senior Regulatory Counsel  
California Independent System Operator Corporation