

Memorandum

To: Board of Governors
From: Armie Perez, Vice President, Planning and Infrastructure Development
Clyde Loutan, Sr. Operation Coordination Engineer
Date: October 9, 2007
Re: **Briefing on Draft Integration of Renewable Resources Report**

This is a briefing only and does not require Board action.

Summary

California is a leader in promoting environmentally friendly generating resources and the CAISO is establishing a leadership role in integrating renewables into the grid. Two of CAISO's Long Term Strategic Plan Key Initiatives address renewable resource integration. CAISO has provided regional and national leadership in renewables integration through the Participating Intermittent Resources Program (PIRP), and led ground-breaking regulatory work with FERC on transmission to connect location constrained resources, to move renewable energy from remote locations to load centers. In support of California's 20% Renewable Portfolio Standard, the CAISO undertook a major engineering study in 2007 to identify challenges and solutions to successfully integrate the growing renewables portfolio into the grid.

The study focused on the transmission planning and operational issues associated with the intermittency of some renewable resources, especially wind generation. The initial findings of the analysis are positive; despite the intermittent nature of renewables, the CAISO anticipates being able to integrate the renewable resources supporting the 20% RPS requirement, subject to the recommendations cited in the report.

Published in draft form on September 21, 2007, the Integration of Renewables Resources Report focuses on the ramping, load following capacity, forecasting, regulation capacity and over generation issues that need to be managed in order to accommodate new renewable resources. On September 26, 2007, the CAISO hosted a public meeting to review with stakeholders the assumptions, methodology and initial findings of the engineering study. Over 50 stakeholders attended and were asked to provide written comments on the study by October 3, 2007. Any clarifications will be included in the final study report, which is anticipated to be published in early November, 2007.

The study focuses on wind generation because of its intermittent characteristics and because wind is expected to add the largest volume of new renewable generation in the next few years. The CAISO anticipates that the largest increase

in renewable energy resources will come from new wind generation in the Tehachapi Wind Resource area. The engineering study examined the unique characteristics of renewable resources utilizing the Tehachapi transmission system to model and forecast transmission plans and operational requirements for renewable resources. The study first analyzes the transmission system and planning assumptions, and then analyzes the operational/forecasting issues of wind integration. Initial findings and conclusions are presented in each area.

As part of the concluding recommendations, Statewide and Regional cooperation are identified as key to successful renewable integration. Implementing the 20% RPS requires a coordinated effort, both within existing CAISO programs, and between the CAISO and other regional entities. Some of the recommendations include determining:

- (1) The impact of wind generation on system operation, both by steady-state and transient stability analysis.
- (2) The need to significantly improve wind forecasting methodologies to incorporate into scheduling processes and integrate with unit commitment and dispatch applications.
- (3) The need to change existing operational processes to improve utilization of existing hydro-electric generation, and possibly increase reliance on existing fast-ramping fossil generation.
- (4) The need to deal with larger ramps, larger reserve requirements, and fast starts generation.
- (5) The need to increase the supplemental energy stack to meet intra-hour load following needs.

Additional work will be required to turn the recommendations from the study into operational reality. That work will be started soon. The draft report is published on the CAISO Web Page at <http://www.aiso.com/1c60/1c609a081e8a0.pdf>. The CAISO will publish the final Report in early November, 2007.