BEFORE THE
PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Investigation into Implementation of Assembly Bill 970 Regarding the Identification of Electric Transmission and Distribution Constraints, Actions to Resolve Those Constraints, and Related Matters Affecting the Reliability of Electric Supply.	)	I.00-11-001

COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION ON THE REPORT OF THE TEHACHAPI COLLABORATIVE STUDY GROUP

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The California Independent System Operator Corporation ("CAISO") actively participated in the subgroup that led the Tehachapi Collaborative Study Group process, performed and reviewed power flow and production cost analyses of the transmission alternatives, determined the technical criteria underlying the recommendations, and drafted the Report. As such, the CAISO supports the Report, which, in large part, fully incorporates the opinions and conclusions of CAISO staff and therefore reduces the present need for substantial opening comments. The CAISO anticipates addressing in reply comments any concerns with the Report raised by other entities. Nevertheless, the CAISO believes several points warrant emphasis.

1. The Commission Must Consider and Provide for the Further Study of Operational Issues Associated with Connecting Intermittent Wind Resources to the Grid

The Commission must remain cognizant of the uncertainties and operational challenges associated with integrating the large quantity of intermittent wind power anticipated at the Tehachapi area with the electrical grid. Chapter 4 of the Report details several of the key operational issues:

- Regulation – Regulating resources are those quickly adjustable generating units used to meet the system's need for a second by second matching of load and generation. As the

potential variation in the output of wind generation increases with increased development of wind resources, the need for regulation is also likely to increase. Many thermal units are unable to adjust their output quickly enough to provide regulation. Accordingly, the effect of increased wind generation on the sufficiency of regulation resources and the CAISO's ability to maintain NERC and WECC control standards must be considered and studied. At the present time, the California Energy Commission is evaluating regulation related issues.

- Ramp Rates – Generally, load come on very quickly in the morning and decreases very quickly in the evening, creating steep system ramps. Resources need to be dispatched in near real-time to match these ramps. To the extent that wind generation increases these ramps, or creates new ramps within an hour, this could lead to increases in the amount of generation needed to be dispatched in real-time to accommodate the ramps.
- Load Following in Real-Time – To correct for the inevitable mismatch between forecasted load and generation, dispatchable resources must be available. The present uncertainties with intermittent generation output may increase the need for load-following resources.
- Frequency Response Issues – When a generator trips on the system, the other generators on the system will see a drop in frequency and automatically initiate changes in their output to correct the mismatch between generation and load to maintain system frequency. Wind resources are generally not effective in providing system frequency control. An area with a large amount of generation that cannot provide frequency response creates operational risks and, for the case of additional wind generation in southern California, may reduce the transmission system's ability to import power into California from areas such as the Pacific northwest.
- Accommodating the Daily Load Pattern – Tehachapi wind generation will generally operate at high levels only during off-peak times, while operating at low levels during peak periods. This will decrease the need for base load generation, which can lead to the need

> to cycle the base load thermal units more frequently than intended or designed. As such, it will be necessary to study the need to couple energy storage technologies, such as pumped hydro generation, with plans for additional wind generation. Using storage technologies to store the off-peak generation for later use during peak load periods will likely be necessary to integrate large quantities of wind generation in southern California. This Commission and other State policy-makers must consider this need before deciding on California's future portfolio of resources.

The CAISO is committed to formulating effective solutions to the foregoing operational concerns in order to meet the State's stated goal of increasing renewable resources and particularly wind generation. As noted in the Report, the CAISO and CEC are currently engaged in efforts to study the effects of Tehachapi wind generation on operational and integration issues. However, the Commission should recognize that the tendency of these efforts and the uncertainty of their outcomes may, and should, ultimately effect the scope and timing of wind development in the Tehachapi area. Indeed, Chapter 4 of the Report prudently highlights that transmission availability does not represent the sole challenge to wind generation in the Tehachapi area and that additional operational analyses must be completed as a precondition to the realization of the full vision of the Tehachapi wind resource region.

2. The Report is a First Step in an Ongoing Study Process

Consistent with the foregoing, the Report constitutes a preliminary, conceptual plan for the export of Tehachapi wind power. Chapter 7 of the Report outlines the need for additional technical studies prior to adoption of a definitive plan. For instance, the Report notes that the identified alternatives to providing Tehachapi resources with access to statewide markets need more analysis, that additional production cost simulations must be run on the potential alternatives, and that additional transmission planning studies, including dynamic stability, voltage support, and short-circuit, are necessary inputs to a definitive plan. Again, the CAISO emphasizes that the outcome of these studies and the issues upon which they are founded are likely to affect the viability of wind development in the Tehachapi area by impacting, among other things, the scope of the facilities, the phasing of the facilities, and their cost.

3. The Commission Must Ensure that Adequate Resources Are Dedicated to Further Study the Tehachapi Area as Well as Other Potential Renewable Resource Regions

As noted in Chapter 8 of the Report regarding "lessons learned," D.04-06-010 established that each party in the study group would pay its own costs. Indeed, the Report notes that future studies could benefit from conducting production simulation studies using the CAISO's Transmission Economic Analysis Methodology (TEAM), or similar methodology, to provide least-cost best-fit information for the investor owned utilities procurement process. However, the CAISO has a limited modeling budget and staff and the Commission should recognize there may be a need for supplemental funding for the hiring of consultants to complete such future modeling efforts.

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Respectfully Submitted:

By:_____
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