

A 2020 PERSPECTIVE ON RENEWABLES IN CALIFORNIA

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ABSTRACT

The California Energy Commission's Public Interest Energy Research Program assembled an industry team under the Intermittency Analysis Project (IAP) to tackle the challenges of integrating renewables into a future 2020 electricity transmission system. The IAP team conducted a series of scenario based studies to examine the statewide system impacts of higher levels of intermittent renewables on the California electricity and transmission infrastructure. Based on the analysis, technical and operational strategies and mitigation measures are recommended for consideration by California's utilities and system integrator. The analysis also provides a framework for system operators, utilities, and infrastructure planners to gauge the needs of the future 2020 system. Working with various agencies and

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California utilities to ensure coordination and to review results and findings, the IAP team also incorporated recent findings and input from a number of regional study groups in California, as well as lessons learned from the international perspective. Results include providing a detailed technical analysis of existing and future infrastructure needs, addressing potential operational strategies, developing a set of utility “best practices,” and tools for integrating intermittent renewables, and as problems were encountered, assessing potential mitigation options to ensure sustainable operation.

This paper focuses on the assessment methodology, scenarios and highlights some of the findings presented in the IAP interim and final reports. All reports and presentations are available on the Energy Commission website (www.energy.ca.gov).

1 INTRODUCTION

California has one of the most diverse electricity supply systems in the U.S. with a large potential to generate electricity from renewable sources, such as wind, geothermal, biomass, hydroelectric and solar. With progressive renewable policies (Renewable Portfolio Standard (RPS) and state Energy Action Plan [1]), the challenge facing the state will be how best to integrate and manage renewable energy resources with traditional generation while ensuring a reliable electricity system.

1.1 Challenges

The California RPS requires investor owned utilities to procure 20% of its generation from renewable energy by 2010. In addition, the State Energy Action Plan has set a state goal of 33 % renewable energy by 2020. A few challenges facing the state in trying to achieve these targets include:

- Building sufficient transmission infrastructure to support and sustain the development envisioned for 2020.
- Balancing the need to integrate increasing levels of renewable energy while minimizing adverse impacts on the surrounding environment.
- Developing tools with the industry to properly integrate variable renewable resources including wind and solar.

1.2 Background

The IAP was organized to

1. Consider the impacts on the electricity grid of higher levels of intermittent renewables on a scenario basis;
2. Trace the historical evolution of wind technologies in California and their changing impact on the grid;
3. Determine how other international regions have integrated intermittent renewables generation.