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RECD JUNE 8 2012

California Energy Commission
IEPR Lead Commissioner Workshop
Strategies to Minimize Renewable Integration Costs and Requirements
and Improve Integration Technologies
June 11, 2012 – 9:00 a.m.
Hearing Room A
AGENDA

Introduction

Suzanne Korosec

Opening Remarks

Commissioner Carla Peterman, Lead Commissioner

Chair Robert B. Weisenmiller

Commissioner Timothy Simon, California Public Utilities Commission

Summary of Grid and Distribution Level Integration Issues Identified in *Renewable Power in California: Status and Issues Report*

Suzanne Korosec

Panel 1: Integration Issues Associated with Increased Renewable Penetration

This panel will include presentations and discussion on the types and levels of ancillary services needed to integrate large amounts of renewable energy at the transmission and/or distribution level. What are the key uncertainties in this assessment?

Moderator: **Melissa Jones**, Energy Commission staff

Panelists:

Mark Rothleder, Executive Director, Market Analysis and Development, California ISO

Lori Bird, Senior Analyst, National Renewable Energy Laboratory

Ben Kroposki, Ph.D., P.E., Director-Energy Systems Integration, National Renewable Energy Laboratory

Questions:

1. What integration challenges are currently being experienced at the transmission and/or distribution level at this time? How are these challenges expected to change over time?

2. How do the uncertainty and variability of loads and intermittent resources interact to determine the precise mix of necessary ancillary services?
3. What specific ancillary services are needed to integrate different central-station renewables, how much, in what location, and in what time frame?
 - a) Will the composition of the state's renewable resource portfolio affect the need for various ancillary services?
 - b) Will these needs change over time?
4. What are the specific characteristics necessary to address these integration challenges in terms of response time, ramp rates, reliability, location, etc.?
5. How are renewable integration challenges at the distribution level different or similar than those posed by large-scale, transmission-delivered renewable energy? How are solutions different?

Panel 2: Operational Characteristics of Natural Gas Plants Needed to Support Renewable Integration

This panel will cover integration services that natural gas-fired plants can provide and discuss barriers to providing those services.

Moderator: **David Vidaver**, Energy Commission staff

Panelists:

Mark Rothleder, Executive Director, Market Analysis and Development California ISO

Dr. Bonnie D. Marini, Director, Gas Turbine Design Engineering, Siemens

John Kistle, Director of Engineering, AES Southland

Tom Pierson, Founder and Chief Technology Officer, Turbine Air Systems

Mark J. Smith, Vice President, Market Design, Calpine

Questions:

1. Which specific operating characteristics does/should natural gas-fired generation have in order to provide the ancillary services needed to integrate variable energy resources in terms of response time, ramp rate, reliability, incremental costs?
2. What efforts are underway to increase the amount of ancillary services provided, e.g. changing market structures, dispatch protocols, etc.?

3. The recent CAISO Market Monitoring Issues and Performance report¹ concluded that existing gas-fired generation cannot recover its costs from the existing energy and ancillary services markets. What are the implications of this finding? What are the solutions?
4. Gas-fired resources not only provide the incremental ancillary services needed to integrate variable energy resources, but also system and local capacity. What other services/functions does natural-gas fired generation provide (such as inertia, voltage control)? Which of these services could not be provided by demand response (DR) or storage? What engineering improvements have been made to increase the flexibility of gas-fired generation resources during the past decade?
5. From an engineering and/or cost perspective, what are the tradeoffs involved in providing operating characteristics that represent “flexibility” rather than simply providing energy?

Public Comment

LUNCH (approximately 12:15 p.m.)

Panel 3: Assessing Demand Response Potential to Provide Renewable Integration Services

This panel will discuss which DR programs are best suited to integrate renewable given the necessary response time, what activities are currently ongoing in this area of DR, and what needs to be done in the future.

Moderator: **Mike Gravely**, Energy Commission staff

Presentation: **Scott Baker**, Business Solutions Analyst, PJM

Panelists:

Scott Baker, Business Solutions Analyst, PJM

Andy Satchwell, Scientific Engineer Associate, Lawrence Berkeley National Laboratory

John Hernandez, Sr. Product Manager, Customer Energy Solutions Emerging Market, PG&E

Anthony MacDonald, Demand Management Team Lead, Target

Ron Dizey, President and CEO, Enbala

Rick Counihan, Vice President Government Affairs, EnerNOC

Stephen Keehn, Smart Grid Technologies and Strategy, California ISO

¹2011 Report on Market Issues & Performance, Department of Market Monitoring, California ISO, April 2012, page 14, <http://www.caiso.com/Documents/2011AnnualReport-MarketIssues-Performance.pdf>

Questions:

1. DR has traditionally provided a variety of services through a variety of programs. What will be needed in a DR program to provide fast-response ancillary services to support renewable, and which of these ancillary services can DR provide?
2. What are the biggest obstacles to implementing DR as a service to support renewable integration?
3. Assuming Automated DR (Open ADR) will be necessary for DR to assist in the integration of renewables in California, what are the technical challenges to open ADR?
4. What are the telemetry, control or performance reporting needs for DR for it to be used by the CAISO or utilities to integrate renewables?
5. As part of the Summer of 2012 efforts by the CEC, CPUC, and CAISO, it was determined that while there was hundreds of MWs of DR potential in the required locations, only a small portion of DR programs could respond within 15 minutes. How do we increase the amount of fast-response DR to thousands of MWs within the next 5 and 10 years?

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Panel 4: The Role of Energy Storage in Supporting Renewable Integration

This panel will discuss the potential for energy storage to provide integration services and the cost, technology status, whether services are short-term or long-term options, response times, and barriers associated with energy storage.

Moderator: **Pramod Kulkarni**, Energy Commission staff

Panelists:

Todd Strauss, Senior Director, Energy Policy, Planning, and Analysis, PG&E

Jim Eyer, Advisor, California Energy Storage Alliance

Dr. Ali Nourai, P.E., KEMA

Dr. Charlie Vartanian, P.E., A123

Arthur O'Donnell, Senior Regulatory Analyst, CPUC

Dr. Udi Helman, Director of Economic and Pricing Analysis, BrightSource

Questions:

1. Are there specific transmission or distribution level renewable integration issues that current energy storage technologies can effectively mitigate? What are their respective competitive advantages over other options?
2. What is the current status of storage technologies (quantity, response rate, ramp rate, duration and costs) that could serve transmission and/or distribution level renewable integration needs? What characteristics are necessary for storage to play a meaningful role

in renewable integration? How do we deploy thousands of MWs of energy storage within the next 5 and 10 years respectively?

3. Are there recent examples of energy storage systems that have successfully addressed the small-scale or large-scale photovoltaic (PV) integration and/or wind resource integration issues?
4. Given the current regulatory structure, what business models exist for deploying energy storage to facilitate renewable integration? Do you have any suggestions?
5. How can storage complement demand response and natural gas to help integrate intermittent renewable resources at the transmission and/or distribution level? Are there portfolios of these three technologies that can provide the best value and/or lowest costs?

Public Comments

Adjourn (approximately 5:00 p.m.)