



## **Staff Workshop**

# **Solar Thermal Energy Storage and Solar Cogeneration**

California Energy Commission

Sacramento, CA

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# **Introduction and Workshop Goals**

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**Commissioner Carla Peterman**



# **Solar Thermal Energy Storage and Solar Cogeneration workshop**

- Discuss the role of solar thermal storage and cogeneration in achieving the 33 percent renewables portfolio standard goal.
- Review the value of these technologies in increasing intermittent resource penetration, offsetting peak demand and providing ancillary services.



# **Solar Thermal Energy Storage and Solar Cogeneration workshop**

Present a mid-term update of the work being performed by KEMA, Inc. entitled “Evaluation and optimization of Concentrated Solar Power Coupled with Thermal Energy Storage.”



# Workshop Purpose

The purpose of this workshop is to seek input from experts, stakeholders, and the general public to determine the value of solar thermal storage and solar cogeneration to increase renewable penetration.



# Opening Comments

**Frank (Tex) Wilkins**  
Executive Director, CSP Alliance



## Overview of KEMA's Work Plan and Parameters

**Warren Katzenstein**  
KEMA, Principal Consultant

**John Warmerdam,**  
KEMA, Principal Consultant



Questions or comments ?



## **Panel 1 (Industry) Validity of KEMA's Approach, Parameter Selection and Deliverables**

- Provide feedback on the approach employed by KEMA to meet project goals under their PIER funded contract.
- Serve as a check-in on progress and methods, and will allow industry an opportunity to provide input for any mid-project adjustments for the technical work plan.
- Provide industry an opportunity to discuss the latest developments in the concentrated solar power coupled with thermal energy storage and outline which questions they think KEMA's work will be most beneficial in answering.



## **Panel 1 (Industry): Validity of KEMA's Approach, Parameter Selection and Deliverables**

Moderator: Prab Sethi, Energy Commission

Panelists:

- Udi Helman, Director of Economic and Pricing Analysis, BrightSource Energy
- Adam Green, Senior Development Manager, SolarReserve
- Paul Denholm, Senior Analyst, National Renewable Energy Laboratory
- Andrew Mills, Senior Research Associate, Lawrence Berkeley National Lab



## **Panel 1 (Industry): Validity of KEMA's Approach, Parameter Selection and Deliverables**

### Questions:

1. Did KEMA develop and present the proper metrics for this effort? If not, what other metrics should be developed?
2. What are most promising thermal energy storage (TES) technologies for near term applications?
3. What response characteristics are desired for different systems (reliability, cost, size, etc)?
4. How should storage be valued and how should incentives be structured? Are there areas of value the energy storage provides that are not currently being valued and if so, what are they and how should they be valued? What ultimate results should the incentives attempt to accomplish?
5. What additional Concentrated Solar Power Coupled with Thermal Energy Storage (CSP-TES) information can be provided to ISO, CEC, CPUC, and FERC that would reduce the risk and uncertainty for renewable integration applications?



## **Panel 2 (Utilities and Regulators) Current and Future Role of CSP-TES in California**

- Discuss how KEMA under the PIER contract view the roll-out of CSP-TES in California.
- Outline the aspects of CSP/TES that demonstrate the most value, and how current regulations do or do not recognize that value.
- Discuss the most desirable response characteristics for renewables, and outline what aspects of KEMA's work they feel will be the most beneficial.



## **Panel 2 (Utilities and Regulators): Current and Future Role of CSP-TES in California**

Moderator: Mike Gravely, Energy Commission

Panelists:

- Mark Rothleder, Project Manager, Cal ISO
- Shucheng Liu, Principal, Market Development, Cal ISO
- Daidipya Patwa, Principal, Integrated Resource Planning, PG&E
- Rahim Amerkhail, FERC, Office of Energy Policy and Innovation
- Gerry Braun, Director, Cal-IRES



## **Panel 2 (Utilities and Regulators): Current and Future Role of CSP-TES in California**

### Questions:

1. What are the impacts of Concentrated Solar Power Coupled with Thermal Energy Storage (CSP-TES) on renewable energy integration? Should future CSP renewable projects receive special consideration, incentives or other added value if they contain TES?
2. What barriers need to be addressed to incorporate solar thermal storage?
3. What response characteristics of TES are desired for different systems (reliability, cost, size, etc)?
4. How should TES be valued and how should incentives be structured? Are there areas of value the energy storage provides that are not currently being valued and if so, what are they and how should they be valued? What ultimate results should the incentives attempt to accomplish?
5. What is your near term plan for adopting solar thermal storage?
6. What additional CSP-TES info can be provided to ISO, CEC, CPUC, and FERC that would be most useful for integration?



# Public Comments



# Lunch

Workshop will resume  
at 1:15 p.m.



## **Panel 3: (KEMA) Extracting Value from our Current Study**

- Respond to issues raised by the previous panels and explain how the current study will or will not resolve each issue.
- Discuss potential modifications, if any, to the work plan to provide solutions that best meet Energy Commission's objectives.



## **Panel 3: (KEMA) – Extracting Value from our Current Study**

Moderator: Prab Sethi, Energy Commission

Panelist:

- Anoop Mathur, Chief Technology Officer, Terrafore
- Alexander Mitsos, Professor, RWTH Aachen
- Ralph Masiello, Senior Vice President, KEMA
- Warren Katzenstein, Principal Consultant, KEMA
- John Warmerdam, Principal Consultant, KEMA
- Alicia Abrams, Senior Energy Analyst, KEMA



## **Panel 3: (KEMA) – Extracting Value from our Current Study**

Questions:

1. What major issues were raised this morning?
2. Does the current study provide solutions to the issues raised?
3. Must we modify the scope to better answer these issues?



# Summary of Points Learned from Panel Discussions

Ralph Masiello, KEMA



**Please send written comments by  
August 30, 2012 to:**

Prab Sethi

[Prab.sethi@energy.ca.gov](mailto:Prab.sethi@energy.ca.gov)



# **Introduction to Solar Cogeneration Session**

Rizaldo Aldas, Energy Commission,  
Energy Commission Specialist III



## **Panel 4: Solar Cogeneration**

This panel will discuss the solar cogeneration technologies and potential applications in California that support implementation of the renewable portfolio standard (33 percent renewable by 2020), focus on the integration of new technologies, and provide clear ratepayer benefits. This panel will discuss the current state of solar cogeneration, their various components, reliability, shortcomings, and future research needs.



## **Panel 4: Solar Cogeneration**

Moderator: Pablo S. Gutierrez, Energy Commission

Panelists:

- Mani Thothadri, Senior Director, Marketing and Product Management, Cogenera Solar
- Samuel Sami, President, TransPacific Energy
- Frank Shubert, CEO, Combined Solar Technologies
- Russel Teall III, President and Founder, Biodico, Inc.



## **Panel 4: Solar Cogeneration**

### Questions:

1. What is the value of solar cogeneration in the California renewable energy market?
2. How can solar cogeneration most effectively affect peak load shifting, dispatchability and reliability of a distributed generation system and the grid?
3. What are the most significant factors that contribute to the decision of a private or public developer to invest in solar cogeneration?
4. What are the economic and/or regulatory challenges that may lead to delays or failure of solar cogeneration?
5. How can the Energy Commission support the development of an active market for solar cogeneration?



# Public Comments



**Please send written comments by  
August 30, 2012 to:**

Prab Sethi

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