# The Future of Electricity Storage in California

EUCI Conference

***Electricity Storage: Business and Policy Drivers***

Houston, TX

January 25, 2011


Laurence G. Chaset

Attorney at Law and Founder

***SUSTAINABLE ENERGY FUTURES***

# Overview of Presentation

- Why electricity storage?
- Relevant storage initiatives before this year
- The adoption of Assembly Bill 2514 earlier this year
- Next steps at the California Public Utilities Commission (CPUC)
- Other relevant California initiatives relating to storage

# Why Electricity Storage?

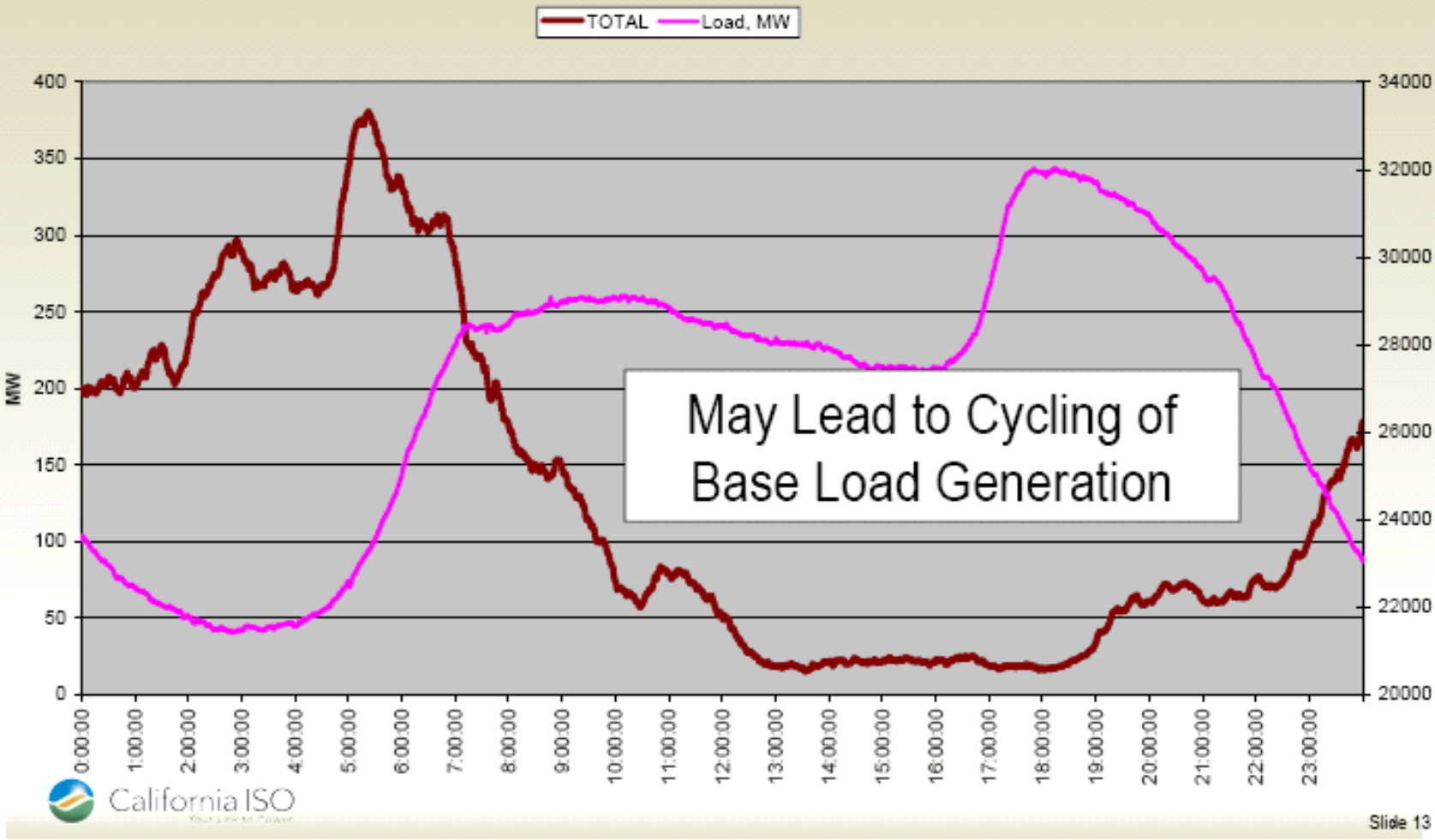
- **System reliability**
  - Inherent short-interval variability of renewable resources requires enhanced regulation and ramping capability
- **Enhancing the value of renewables**
  - Diurnal variation in the availability of the wind and the sun requires the use of alternative sources of bulk energy

# Policy Drivers Supporting Implementation of Storage Technologies in California

- California's Renewable Portfolio Standard (RPS)
  - 20% RPS by 2010 (likely achieved by 2012); 33% by 2020
  - Increases need for load-following capability and regulation-up/down to support integration of wind and solar
- Once-through cooling regulations (~2012-2022)
  - Proposed rules for repowering or retirement of 22 GW of thermal plants with once-through cooling in California
  - Will adversely affect ramping and energy regulation capability of generation fleet
- Greenhouse gas (GHG) policy
  - AB 32 compliance begins in 2012; target: 1990 emissions by 2020
  - Will increase costs of relying on carbon-emitting thermal plants used for energy regulation and ancillary services


SUSTAINABLE ENERGY FUTURES

# California Wind Generation Output may Peak During Off-peak Periods



# But Storage Is Not Being Widely Used in California Right Now

- The chief barrier is neither the availability of reliable storage technologies nor their cost
- The barriers are:
  - The current accounting of disaggregated benefits in a deregulated utility industry
  - The lack of clear policy direction to utilities that energy storage is a superior alternative to gas-fired peakers.
- Although the broad implementation of electricity storage will provide substantial social and economic benefits, California's current market structure has led to underinvestment.

# Assembly Bill (AB) 2514

- Introduced on February 19, 2010 by Assembly Member Nancy Skinner (D-Berkeley)
- Amended significantly in the Assembly and the State Senate between April and August
- Passed the Senate on August 24 and the Assembly on August 27
- Signed by Governor Schwarzenegger on September 29, 2010

# The Politics of AB 2514

- Key supporters:
  - California Electricity Storage Alliance
    - A broad advocacy coalition committed to expanding the role of energy storage to promote the growth of renewable energy.
      - CESA's members are a diverse mix of energy storage technology manufacturers, renewable energy component manufacturers, developers and systems integrators
      - Website: http://www.storagealliance.org/
  - The Attorney General's Office
    - Jerry Brown, then the Attorney General, was just inaugurated as Governor on January 3
- Other key players
  - The California Public Utilities Commission
    - Initially skeptical of the bill and sought substantial changes
  - The investor-owned electric utilities
    - Initially opposed the bill

SEF

SUSTAINABLE ENERGY FUTURES

# Major Changes to AB 2514 Between Introduction and Enactment

- The original version of the bill proposed to include the following mandates:
  - Establishment of a **Storage Portfolio Standard** (SPS) – 2.25% of peak load (averaged over 5 years) by 2012 and 5% of peak load (averaged over 5 years) by 2020
  - The CPUC shall initiate a proceeding by April 1, 2011
  - **Increased Rate of Return** – for utility investments in energy storage, the CPUC may authorize a 1/2 to 1% increase in rate of return, as it may for renewable energy.
  - **Load Shifting Program** – Each utility must implement 5-year program for maximum shifting of air conditioning and refrigeration load from peak to off-peak (2011-2015)
  - **Planning** – the CEC's Integrated Energy Policy Report shall evaluate energy storage systems, the benefits of various types of storage and optimal locations for such systems.
  - **Enforcement** – If a utility fails to meet the SPS, it must submit a compliance plan to CEC; penalties may be sought for violations.
- All of these provisions were significantly modified or stripped from the bill by the time it was adopted for the following reasons:
  - "Mandate fatigue" – strong utility opposition to new mandatory standards
  - CPUC wanted more discretion regarding rates of return and was concerned about a lack of staffing to run such a complex new proceeding
  - Uncertain role for CEC in planning and enforcement

# Key Provisions of AB 2514, as Adopted

- The new law directs the CPUC:
  - To open a proceeding by **March 1, 2012** to determine appropriate targets, if any, for each load-serving entity (LSE) under the Commission's jurisdiction to procure viable and cost-effective energy storage systems
  - If determined to be appropriate, to adopt, by **October 1, 2013:**
  - An energy storage system procurement target, to be achieved by each LSE by **December 31, 2015**
  - A second target to be achieved by each LSE by **December 31, 2020**

SEF

*SUSTAINABLE ENERGY FUTURES*

# AB 2514 – Key Legislative Findings

- Expanding the use of energy storage systems can:
  - Assist electrical corporations in integrating increased amounts of renewable energy resources into the transmission and distribution grid in a manner that minimizes emissions of greenhouse gases
  - Optimize the use of the significant additional amounts of variable, intermittent, and off-peak generation from wind and solar energy
  - Reduce costs to ratepayers by avoiding or deferring the need for:
    - New fossil fuel-powered peaking plants
    - Distribution and transmission system upgrades
  - Avoid or reduce the use of electricity generated by high carbon-emitting electrical generating facilities during high electricity demand periods
  - Provide the ancillary services otherwise provided by fossil-fueled generating facilities, which will reduce emissions of carbon dioxide and criteria pollutants
- There are significant barriers to obtaining the benefits of energy storage systems


SUSTAINABLE ENERGY FUTURES

# Next Steps at the California Public Utilities Commission (CPUC)

- On July 9 of this year, the Commission's Policy and Planning Division issued a white paper entitled, *Electric Energy Storage: An Assessment of Potential Barriers and Opportunities*
  - *http://www.cpuc.ca.gov/NR/rdonlyres/71859AF5-2D26-4262-BF52-62DE85C0E942/0/CPUCStorageWhitePaper7910.pdf*
- Key observations:
  - There have been two main barriers in the past to the widespread deployment of electricity storage
    - economics(too expensive)
    - technological (inefficient, impractical)
  - However, more recently, certain storage technologies have progressed through successful pilot and demonstration phases and are poised to become commercially viable

# Next Steps at the California Public Utilities Commission (CPUC) - 2

- Storage offers California multiple economic and environmental benefits
- As valuable as adding storage could be for California's power grid, many storage technologies are still early in their development, and existing commercial projects are in relatively short supply worldwide
- As a result, storage faces several regulatory obstacles because of the lack of familiarity that regulators have with the various storage technologies
- Regulators are uncertain how EES technologies should fit into the electric system, in part because storage provides multiple services such as generation, transmission and distribution
- Furthermore, regulators do not yet know how the costs and benefits of storage should be allocated among these three main elements of the electric system

# Next Steps at the California Public Utilities Commission (CPUC) - 3

- An **Order Instituting Rulemaking** (OIR) was adopted by the Commission on December 16, 2010
  - http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/128658.PDF
  - The adoption of the OIR was prompted by the adoption of AB 2514, as well by the Commission's own desire to initiate policy for California utilities to consider the procurement of viable and cost-effective energy storage
- The proceedings following on the adoption of the OIR will unfold as follows:
  - The Commission has solicited initial procedural comments to be submitted by January 21, 2011
  - A preliminary workshop will be scheduled later in the first quarter of 2011


*SUSTAINABLE ENERGY FUTURES*

# Next Steps at the California Public Utilities Commission (CPUC) - 4

- Thereafter, the assigned Commissioner and Administrative Law Judge (ALJ) would issue a **Preliminary Ruling** specifying the particular topics on which additional information and input will be solicited from the parties to the proceeding
- Then, the parties would meet in person at a **Prehearing Conference** (PHC) convened by a CPUC Administrative Law Judge to discuss scoping and scheduling issues
- After the PHC, the assigned Commissioner would issue a **Scoping Memorandum** setting forth the scope of the proceeding and establishing a procedural schedule

# Next Steps at the California Public Utilities Commission (CPUC) - 5

- Thereafter, the substance of the proceeding could be expected to include:
  - A series of **workshops** on specific topics
  - The filing of **comments** by the parties on each topic
  - In the event that the comments on important issues that are filed by various parties rely on conflicting factual information or data , the assigned Commissioner can require the filing of sworn testimony and the conduct of **administrative hearings** at which witnesses can be cross-examined
  - One or more **proposed decisions** by the assigned Commissioner and the ALJ on which the parties can file comments
- AB 2514 specifies that the CPUC should complete all proceedings by October 2013

# Other Current Storage-Related Efforts in California - CEC

- **California Energy Commission** (CEC)
  - The CEC's 2011 Integrated Energy Policy Report (IEPR) will focus on assessing the new infrastructure needed to meet the state's RPS and GHG-reduction goals
  - A draft staff paper issued last November recognizes that storage technologies can support daily ramping requirements needed to effectively integrate renewables
    - http://www.energy.ca.gov/2010publications/CEC-200-2010-010/CEC-200-2010-010-SD.PDF
  - On November 16, 2010, the CEC held a workshop to share information and solicit comments on technologies to support renewable energy integration, which focused on energy storage and automated demand response
    - http://www.energy.ca.gov/2011_energypolicy/documents/2010-11-16_workshop/presentations/

# Other Current Storage-Related Efforts in California – California ISO

- **Renewable Integration: Market and Product Review**
  - Stakeholder initiative began in July 2010
  - A comprehensive, phased process to work with stakeholders to identify and develop potential changes to the ISO's wholesale market design
    - Focus on new market products and procedures needed to accommodate a substantial increase in renewable energy production over the next decade
- Based on initial comments, a Regulation Energy Market (REM) straw proposal was issued on November 15, 2010
- REM is intended to remove barriers that limit the full participation of limited energy resources (especially flywheels and large Li-ion batteries) in the ISO's regulation and real-time energy markets
  - Without REM, limited energy resources can participate in the regulation market but only for a portion of their capacity
  - The proposed market enhancement is scheduled to be adopted by the CAISO Board of Directors in early February

# The KEMA Study

- The California ISO collaborated with KEMA on a study (June 2010) that assessed the effects of high renewable penetrations on intra-hour system operations of the California ISO control area
  - How might grid-connected electricity storage be used to accommodate the effects of renewables on the system?
    - Meeting California's 33% RPS goal will require major alterations to system operations
    - 3,000 to 5,000 MW or more of new fossil-fuel-fired generation would be needed to meet load and planning reserve margin requirements
  - What are the relative benefit of deploying electricity storage versus new conventional generation to regulate and balance load requirements?
  - **Key conclusion**: storage technologies are likely to be more effective than conventional generation in meeting the grid's need to accommodate large output changes of energy resources in a relatively short period.
    - This study provides policy options to ensure the optimum use of electricity storage as more and more renewable generation resources are connected to the system
    - http://www.energy.ca.gov/2010publications/CEC-500-2010-010/CEC-500-2010-010.PDF


SUSTAINABLE ENERGY FUTURES

# Prospects for the Broad Dissemination of Storage Technology in California

- CPUC
- CEC
- California ISO
- San Diego Union-Tribune article of October 29, 2010
  - "Cost-effective electric storage is the holy grail for our business."
    - Michael Niggli, President of San Diego Gas & Electric Company
- Earlier this year, the Southern California Public Power Authority (SCAPPA) contracted for 53 megawatts of "Ice Bear" storage systems
  - This is the first cost-effective, utility-scale, distributed energy storage project in the United States


SUSTAINABLE ENERGY FUTURES

# Questions?


Larry Chaset

Attorney at Law and Founder

Sustainable Energy Futures

E-mail: lgchaset@sustainableenergyfutures.net

Telephone: +1-510-282-4935



SUSTAINABLE ENERGY FUTURES