

# Policy Matters! Building a Market for Grid Storage in California

Prepared for the University of California



Presented by Janice Lin

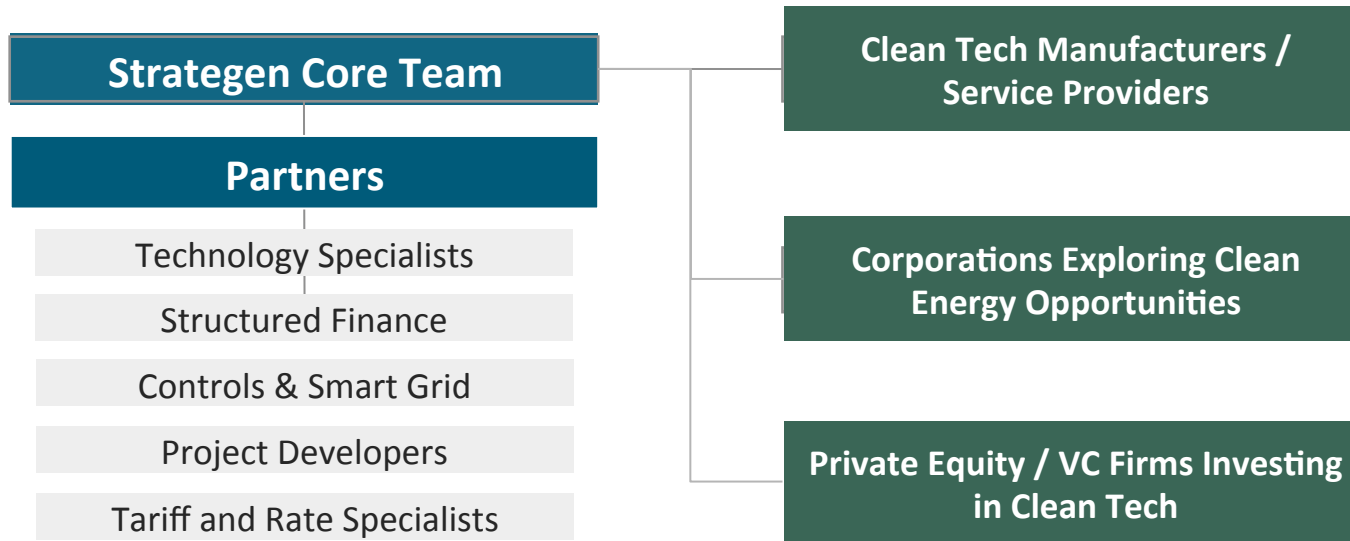
Tuesday October 5, 2011

5:00-6:30 pm

Berkeley, CA

# Strategen Overview

We combine strategic thinking with deep industry expertise to create profitable businesses



## A sampling of our clients:



# About CESA

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Our Mission: *Expand the role of storage technology to promote the growth of renewable energy and create a cleaner, more affordable and reliable electric power system*

- » Core principles for a healthy market – diversity is important!
  - Technology neutrality
  - Ownership/business model neutrality
- » No advocacy for ‘advocacy sake’. We are seeking tangible market results
- » Explicit support of renewable energy in our mission...and our membership
- » Philosophy of ‘coalition building’ with all stakeholders – strength in diversity
- » We have limited resources, and so must be very focused in our efforts
  - California Legislature
  - CPUC
  - CAISO
  - CEC
  - CARB
  - FERC



# CESA – Strength in Diversity and Collaboration

## Steering Committee



## General Members



# Why California?

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Energy Storage is fundamental to many key California policy initiatives

- » BIG: 13% of US GDP, 8<sup>th</sup> largest economy in the world, ahead of Canada and Spain.
- » 'Foundational' Legislation
  - Energy Storage Procurement Targets: (AB 2514)
  - RPS Legislation (SB X1-2)
  - Self-Generation Incentive Program: SGIP (SB 412, AB115)
  - Smart Grid Systems (SB 17)
  - Global Warming Solutions Act of 2006 (AB 32)
  - Solar Energy System Incentives: CSI (SB 1)
- » Pro-storage policy makers in Legislature and at key agencies: CPUC, CAISO, CEC & CARB
- » Incentives available for customer sited applications via SGIP and possibly PLS too
- » Participation in Renewable Integration Stakeholder Process—California Independent System Operator (CAISO)
- » Many CA storage projects currently underway

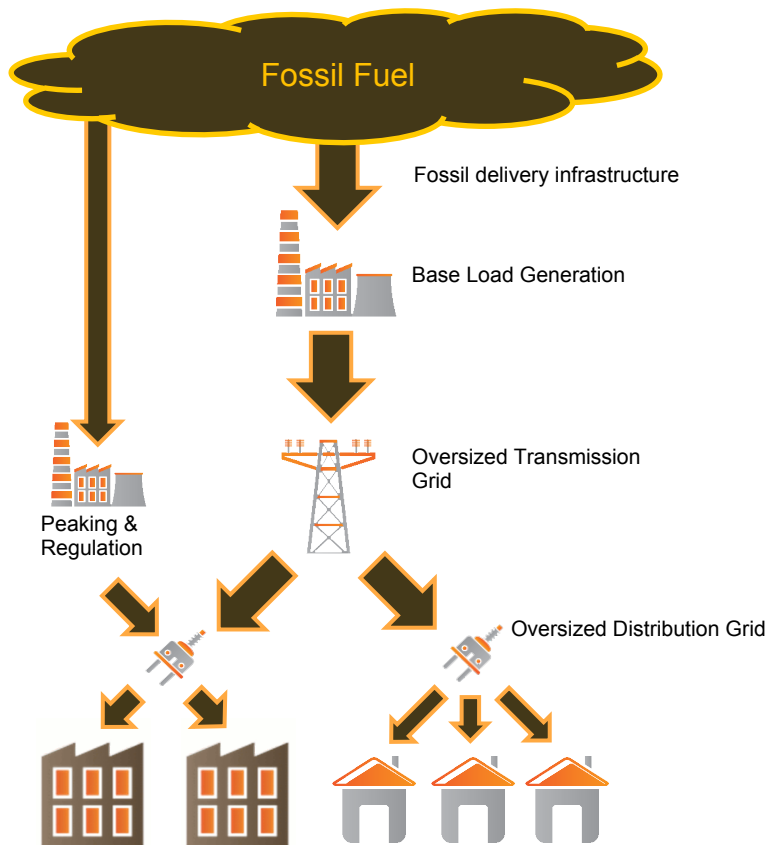


**CESA is driving results-oriented change in all of these areas**

# We already have LOTS of storage in our electric power system ... the WRONG kind of storage!

## Current Grid Infrastructure

- Built for load and generation peaks that occur only a few times per year
- Massive fossil storage required

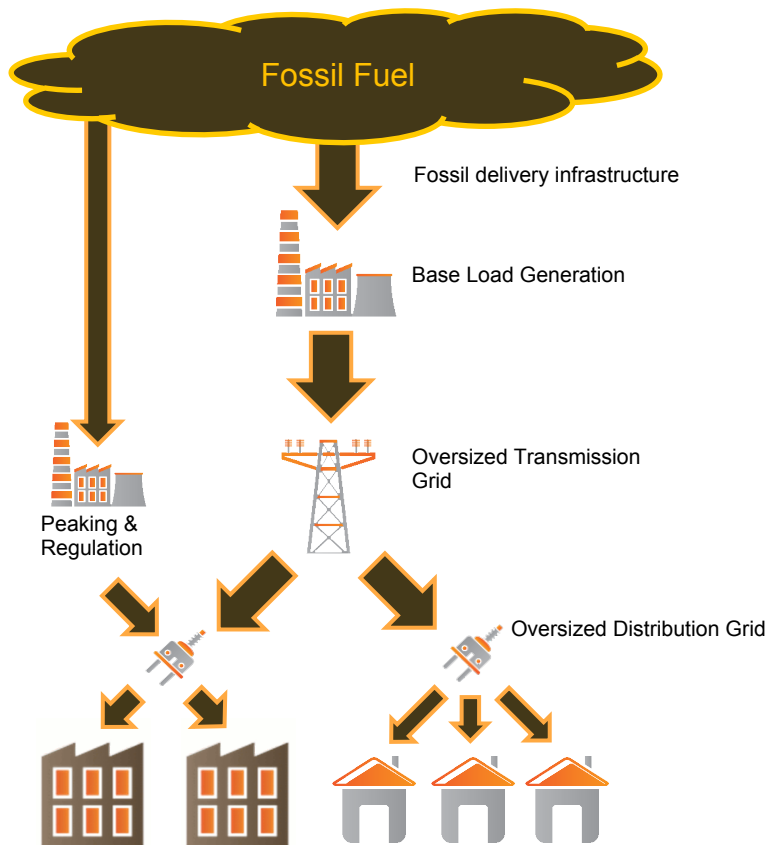


1. The approach is similar to Heijunka in the Toyota Production System, which levels production schedules in order to reduce overall waste

# Energy storage enables greater overall system efficiency ... and a cleaner, smarter grid

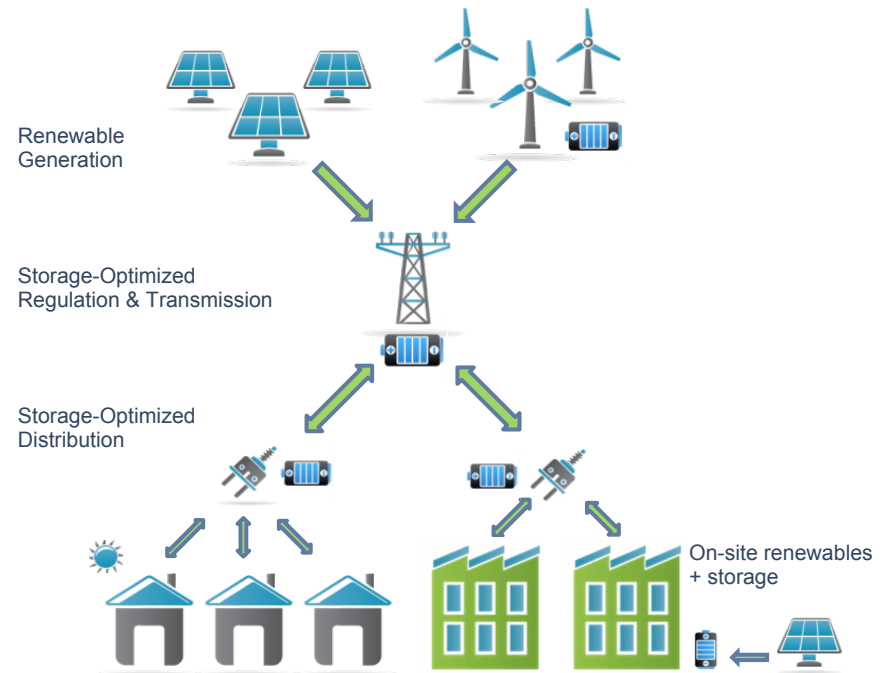
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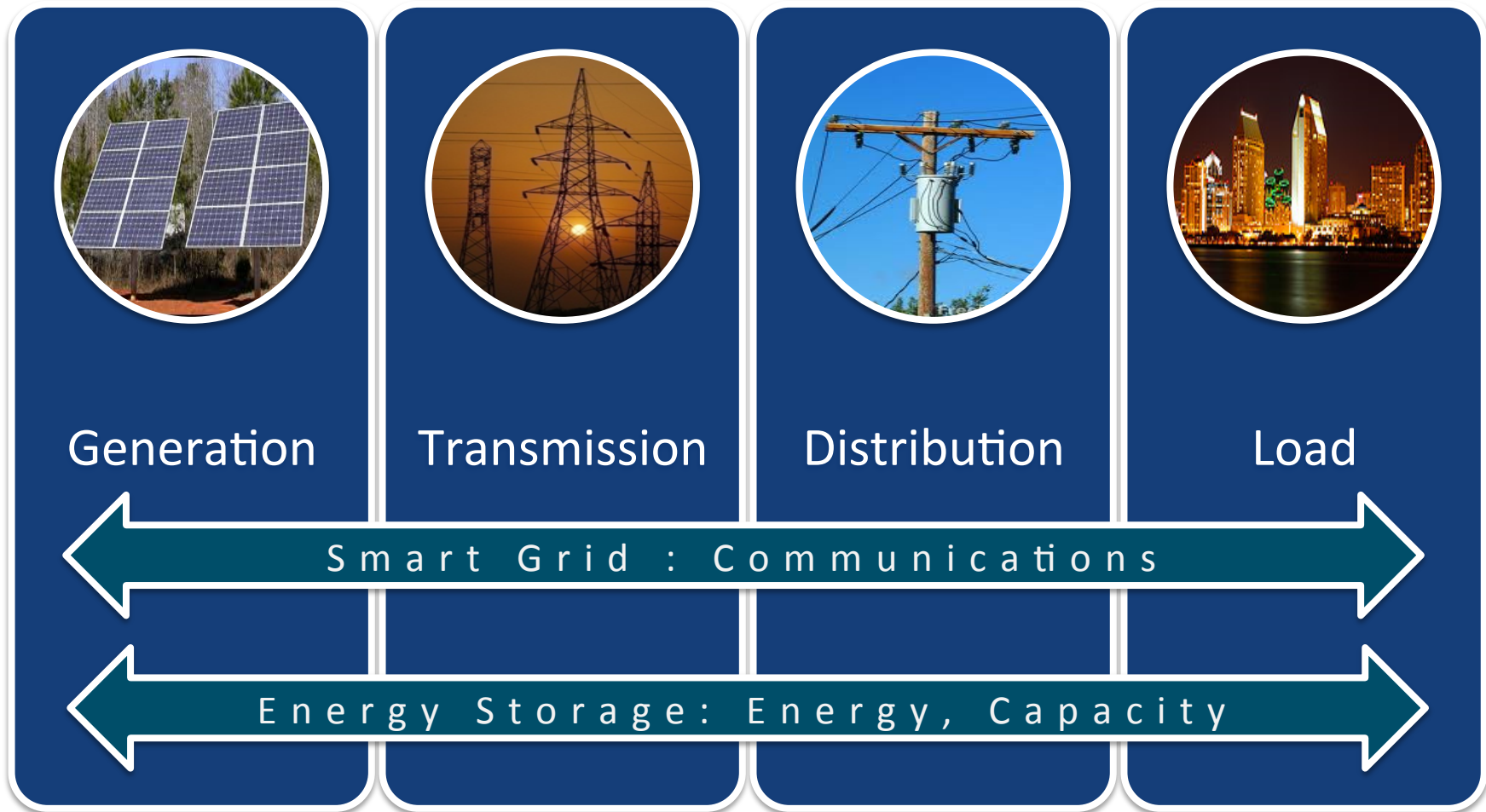
## Future Grid Infrastructure

- Strategic buffers level generation and load, reducing Mura (unevenness) and Muri (overburden)<sup>1</sup>
- Result: more efficient & reliable electrical system



1. The approach is similar to Heijunka in the Toyota Production System, which levels production schedules in order to reduce overall waste

# Storage has the potential to optimize the assets we already have...



Decisions made in these 'silos' determines market structure and compensation for energy storage!



# The Key Barrier for Grid Storage is Our Current Regulatory Framework

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**Storage is both blessed and cursed with its ability to provide many benefits throughout our electric power system**

- » While energy storage is an established industry, grid-connected storage is a new application, with limited organized resources to drive regulatory change
- » Multiple jurisdictions regulate grid storage installations, and thus compensation mechanism
  - FERC
  - CPUC
  - CAISO
  - CEC
- » Regulatory proceedings are typically divided in specific asset classes, but storage spans across all asset classes

**Policy intervention is needed**

# AB 2514 – Landmark New Storage Legislation

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## AB 2514 evaluates procurement targets for new storage capacity

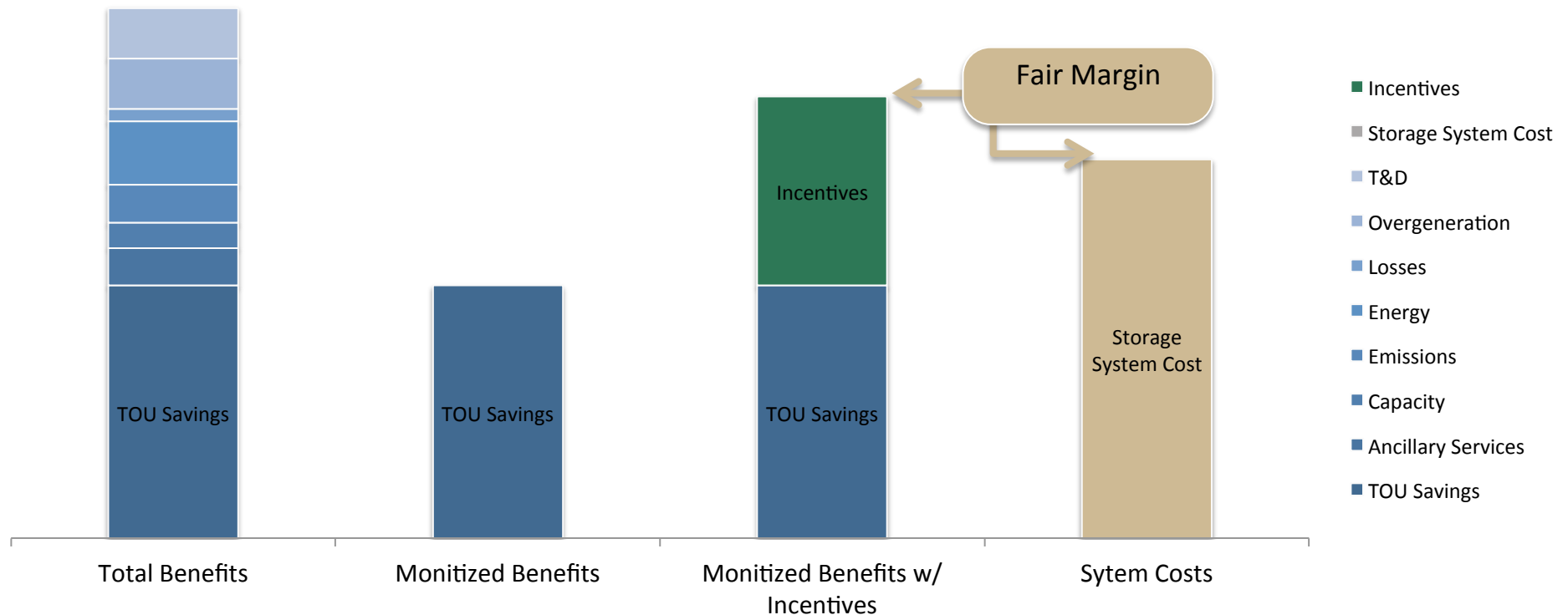
- » Would establish **Energy Storage Procurement Targets for 2015 and 2020 (2016 and 2021 for POU's)**
- » Sponsored by Jerry Brown, former California Attorney General, now Governor
- » Authored by Assembly member Nancy Skinner, Chair, Assembly Rules Committee
- » Directs CPUC to convene a proceeding to evaluate energy storage procurement targets:
  - Technology neutral – but must be cost effective
  - Application neutral – key to implementation
  - Utility owned, customer owned, and third party owned are eligible
  - Applies to systems installed after 1/1/10
  - Requires CPUC to consider info from CAISO and integration of storage with other programs, including demand side management
  - Electrical corporations with <60k customers are exempt
- » Status – signed into law 9/29/10, **implementation underway at CPUC!!**

**AB 2514 provides necessary focus on storage**

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# Incentives Are Critical to Aligning Benefits with Costs Near Term

Distributed storage has many value streams that can't be directly monetized by the end user



**Market transformational incentives for distributed storage will enable the vision for California's future clean energy supply**

# CA Self Generation Incentive Program – ‘08-’10

System Size	Incentive Structure	Renewable Fuel Cell	Non-renewable Fuel Cell	Wind	Energy Storage
0-1 MW	100%	\$4.50	\$2.50	\$1.50	\$2.00
1-2 MW	50%	\$2.25	\$1.25	\$0.75	\$1.00
2-3 MW	25%	\$1.125	\$0.625	\$0.375	\$0.50

## Minimum technical operating parameters:

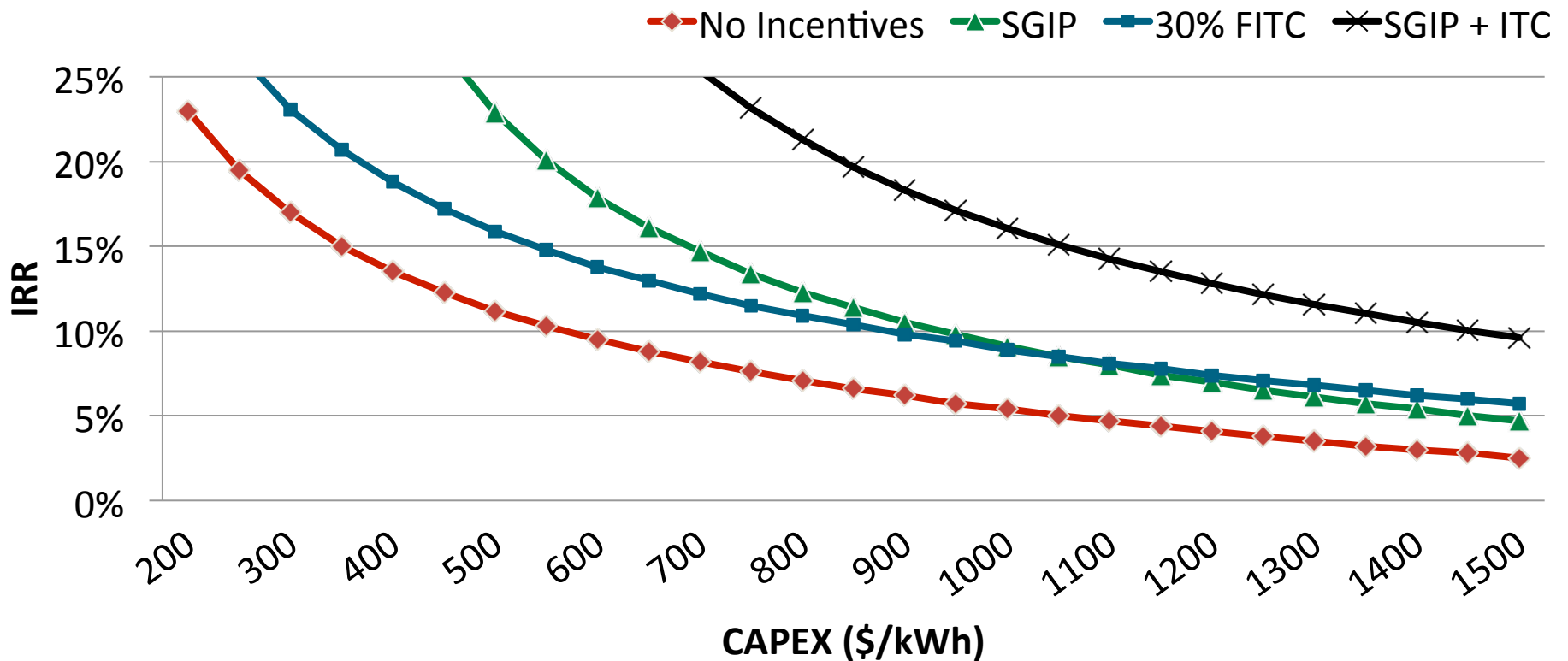
- » Ability to be used daily in concert with an on-site generation resource, and still meet its 20-year lifetime requirement
- » Ability to handle hundreds of partial discharge cycles each day
- » Ability to be discharged for at least four hours of its rated capacity to fully capture peak load reductions in most utility service territories
- » Ability to meet Institute of Electrical and Electronics Engineers, Inc. interconnection standards
- » Must comply with all local environmental and air quality requirements

NOTE: Subject to change with implementation of SB412

# Impact: Incentives can significantly aid customer adoption

## Project IRR for 100kW 4hour Standalone Energy Storage Project

### IRR vs. CAPEX for Various Incentive Regimes



\*Assumes 65% AC Roundtrip Efficiency, \$700/kWh installed storage cost, \$0.075/kWh discharged O&M cost, 20 year proforma,

# Energy Storage is Needed to Meet 33% Integration Needs!

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**Table 1**  
**Potential Capacity Needed for Renewable Integration<sup>2</sup>**

Operating Characteristic	Potential Capacity Shortage in 2020
Upward Balancing Flexibility	4,600 MW <sup>3</sup>  (Of this, 2,000 MW may be supplied by OTC replacement generation to meet local reliability.)
Downward Balancing Flexibility	800 MW  (Downward flexibility may be satisfied using curtailment and/or additional storage)

\*CAISO Memorandum to ISO Board of Governors, August 18, 2011.

# FERC Update Summary

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- **November 18, 2010, FERC issued a NOPR on Variable Energy Resources**
  - Require intra hourly scheduling
  - Require VER's to provide meteorological/forecasting data
  - Create a generic ancillary services rate schedule
- **February 17, 2011 FERC issued a NOPR on Frequency Regulation Compensation**
  - Require a uniform price for regulation capacity and a performance payment
  - Reward providers of frequency regulation services based on accuracy
- **May 19, 2011 FERC issued a NOI on Promoting Transmission Investment Through Pricing Reform**
  - “Western Grid” qualified battery storage as wholesale transmission facilities.
  - To move away from case by case determination.
- **June 16, 2011 FERC issued an NOI on Third-Party Provision of Ancillary Services: Accounting and Financial Reporting for New Electric Storage Technologies**
  - To facilitate the development of robust competitive markets for ancillary services.
  - Will address the issue of storage asset classification.

# SB 412 Implementation: D.11-09-015

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Final CPUC decision is very favorable to Energy Storage, providing \$2/W for Energy Storage – standalone or coupled with PV!

## Key Comparisons

	Then	Now
<u>Eligibility:</u>	Cost Effectiveness	<b>GHG Reductions</b>
<u>Size Restriction:</u>	5 MW max	<b>No min/max: Must meet onsite load</b>
<u>Discharge Capacity:</u>	4 hours	<b>2 hours</b>
<u>Payment Method:</u>	Technology Based No PBI	<b>50 % up front 50 % PBI</b>



# The SGIP's Future is Assured: AB 1150 (Perez)

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## AB 1150 will authorize new funding and extend the SGIP beyond 2012

- » Signed into law by Governor Brown September 22, 2011
- » Authorizes the extension \$83M/year of rate-payer based funding through December 31, 2014 (\$249 million, total)
- » Statutorily clarifies eligibility of energy storage (Section 1. 379.6 a(1)):

*It is the intent of the Legislature that the self-generation incentive program increase deployment of distributed generation **and energy storage systems** to facilitate the integration of those resources into the electrical grid, improve efficiency and reliability of the distribution and transmission system, and reduce emissions of greenhouse gases, peak demand, and ratepayer costs.*

# CAISO – Regulation Energy Management

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## Regulation Energy Management

- » REM – enables fast storage to participate in CAISO market as part of Renewable Integration Market and Product Review (RIM), Phase 2
- » Revised Straw Proposal includes no reference to pay-for-performance or mileage payments.
- » CAISO is waiting for guidance from FERC.
- » The storage community is advocating for more timely consideration.

**Now is a great time to get involved!**

# Storage is a Key Component of Governor Brown's Clean Energy Goals (2020)

## California Clean Distributed Energy Resources Program

- Building 12,000 MW of localized renewable energy generation
- Increase combined heat and power production by 6,500 MW
- Dealing with peak energy needs and **developing energy storage**
- Timeline to make new homes and commercial buildings zero net energy



## Energy Efficiency

- Adopting stronger appliance efficiency standards
- Making existing buildings more efficient (Title 24)
- Load management standards



## California RPS Procurement

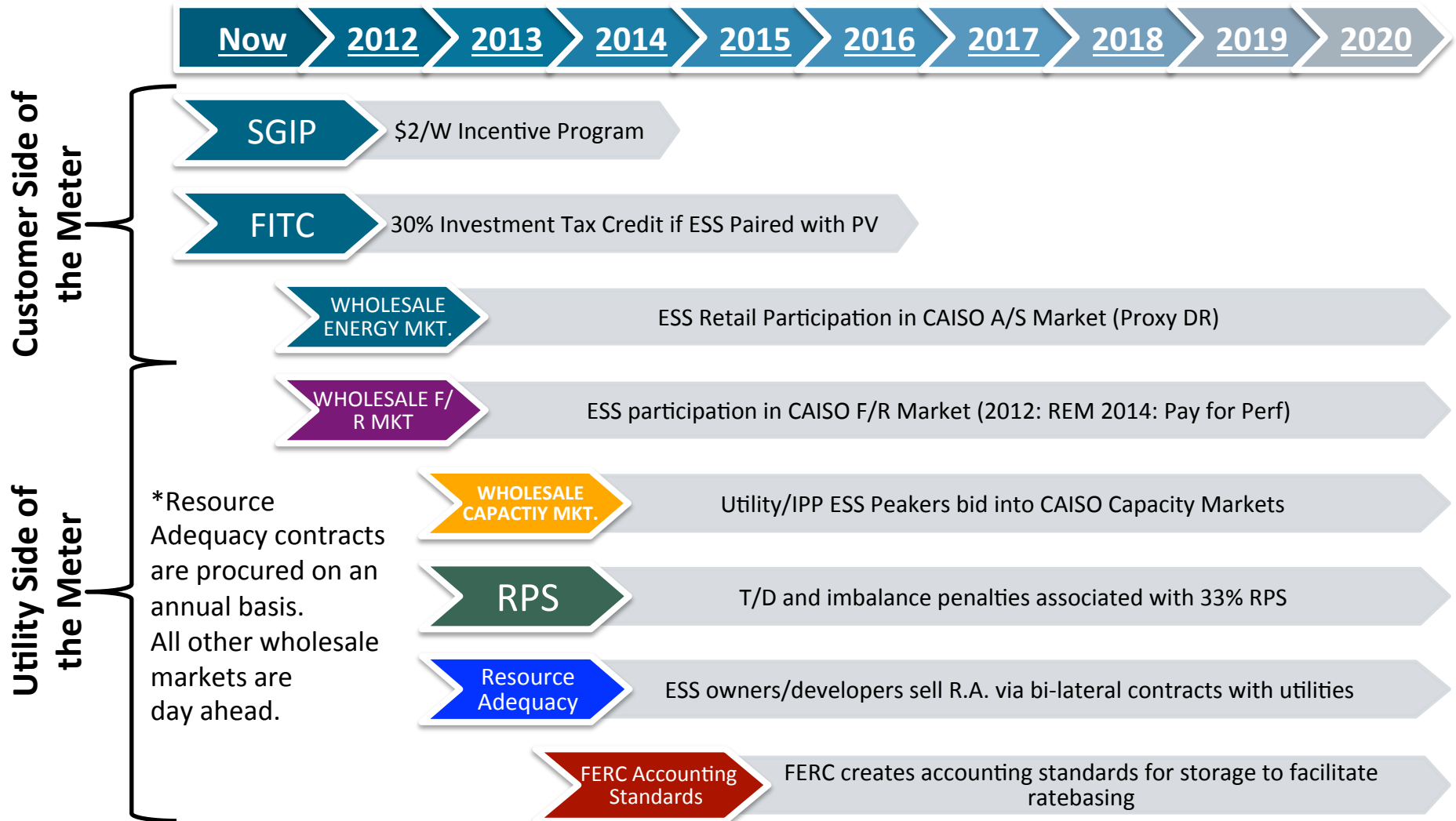
- Building 8,000 MW of large scale renewable generation
- Planning and permitting new necessary transmission within 3 years



With storage, achieving distributed energy goals will create a virtuous cycle

# California Applications: Compensation Timeline

Top California storage applications will become increasingly attractive as economic incentives and markets come online



# Questions?

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**For more information about CESA membership, public filings, and other energy storage educational documents, please visit us online at:**

**[www.storagealliance.org](http://www.storagealliance.org)**

End of Presentation

