

## **REGULATORY FRAMEWORKS BEHIND DISTRIBUTED ENERGY RESOURCE MARKETS**

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# Agenda

Overview

What is the New Normal with Distributed Energy Resources?

View of the Utility Financial Officer

Regulation of DER – Selected Situations

Conclusions

Firm Overview

# Market and Policy Development Overview

- ◆ Distributed Energy Resources (DER) are manifold:
  - PV
  - Wind, fuel cells, micro-turbines, and others
  - Storage and Electric Vehicles
  - Energy Efficiency (EE)
  - Demand Response
  - Combined Heat and Power
- ◆ On all sides: dynamic forces
  - Climate change goals, externality/future costs, subsidies
  - Technological change in energy demand and supply; natural gas supply and price
  - Economic growth, jobs, financial risks, international economic concerns
  - Digital information revolution => consumer behavior and satisfaction
- ◆ In the center: Energy Customer, the regulated Distco/Utility company, and Regulators (state and FERC)
- ◆ Proposition: the regulatory structure, at both the Federal and State levels, and the market design(s) need to be developed consistently.

# Overview

- ◆ Overall goal is development of efficient markets that support the policy goals for DER.
- ◆ DER has many dimensions - an Illustration.

<i>Market Development Issues</i>	Climate Change Mitigation	Centralized ISO or decentralized market	Grid Safety / Reliability Maintained	Cost Effective to Society / TRC	Bill Savings to Participants	Possible Cross Subsidization Issue / Disruption to Utility Model	Measurement and Verification Issues
<i>Distributed Resources</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>
<b>Photo Voltaic</b>	++	? Decentral	? (IEEE 1547)	Policy decision	+	? (CPUC NEM Costs)	+
<b>Wind, fuel cells, microturbines, and Storage</b>	++	? Both	? (IEEE 1547)	Policy decision	+	?	+
<b>EE</b>	++	Central/ISO	0	Policy decision	+	?	? (FERC 676-G; state proceedings)
<b>Demand Response</b>	+	Central/ISO	+	Policy decision	+	?	? (FERC 676-G; state proceedings)
<b>Combined HP</b>	+	?	? (IEEE 1547)	Policy decision	+	?	+

NOTATION FOR INDICATIVE EVALUATION:

++

high contribution;  
neutral.

+

contribution, minimal issues;

?

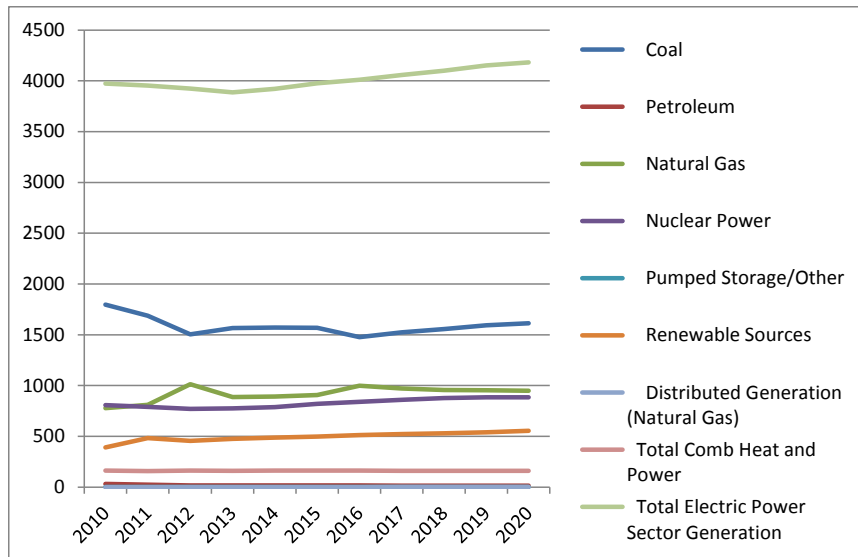
some issues to resolve;

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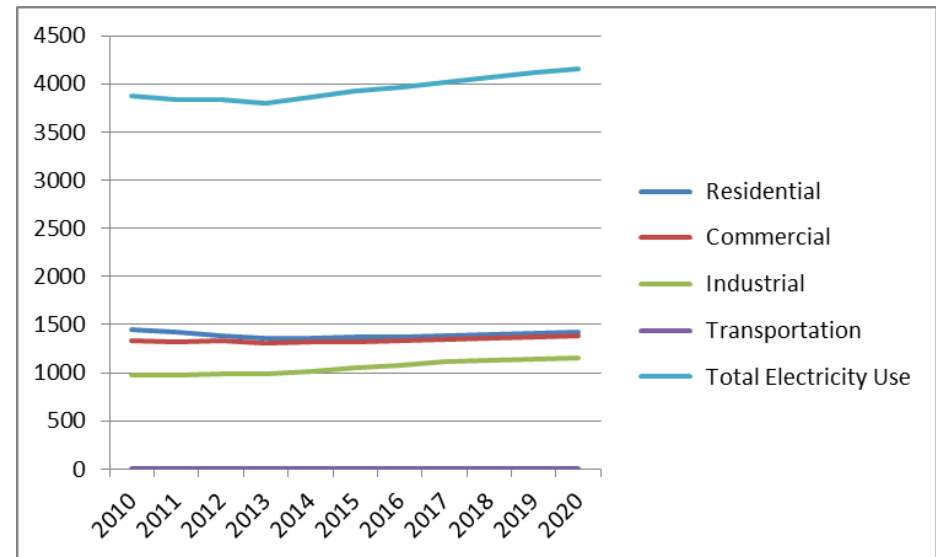
# Overview – what is the New Normal?

- ◆ Sales growth is the lifeblood of the Traditional Cost of Service Model
- ◆ Baseline aggregate MWh growth, as seen by EIA AEO 2013
  - Restart growth in 2014
  - 2013-2020: +1.1% in Production, +1.3% in Total Use, +4.5% in Direct Use
- ◆ DER presents the issue of falling revenue for Host Utility
- ◆ In *Smart Power*, Dr. Fox-Penner highlighted this issue and sketched two new business models, to be discussed below.

Production (billion kWh)

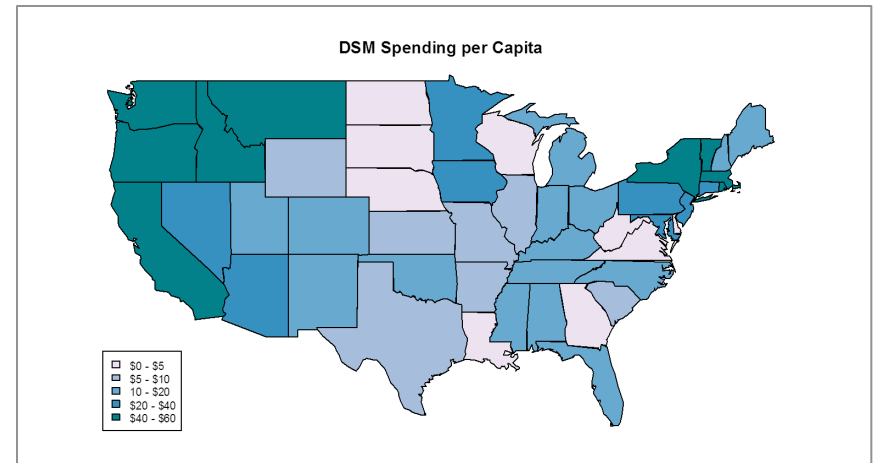
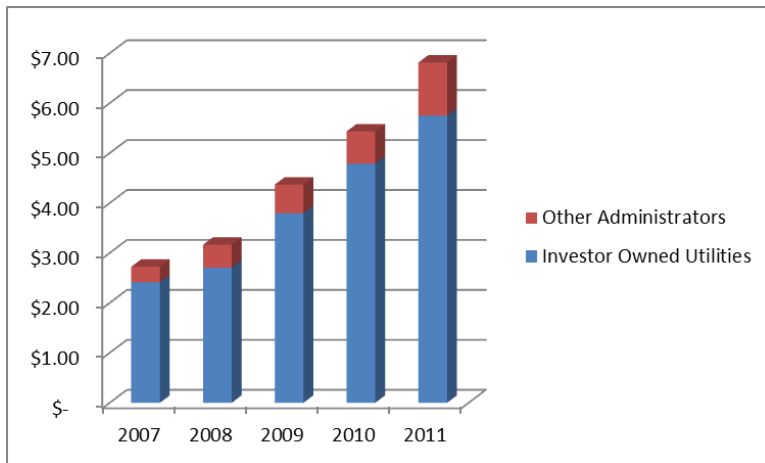


Consumption (billion kWh)



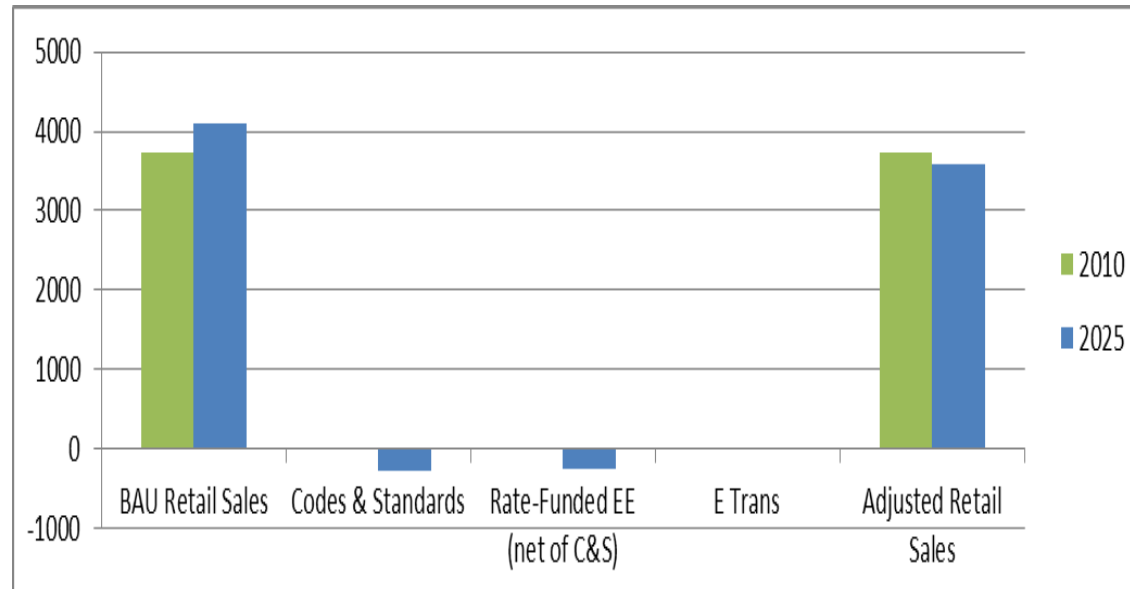
# Energy Efficiency Programs are Growing

- ◆ Ratepayer-funded EE expenditures nationally have grown over 25% annually for 5 years.
- ◆ States are spending different amounts
- ◆ 3/5s of states have long term EE Resource Standards or Goals



# Energy Efficiency Impacts may be Larger

- ◆ IEE *Report on Factors Affecting U.S. Energy Consumptions 2010-2035* March 2013, projects in Moderate Scenario: Building Codes & Appliance Efficiency Standards will reduce sales more than Ratepayer-Funded EE, and erase growth.
- ◆ Moderate reduction case, growth drops to -0.2% through 2025.
- ◆ That does not include incremental PV or CHP resources.



# How Utility Financial Officer Views DER

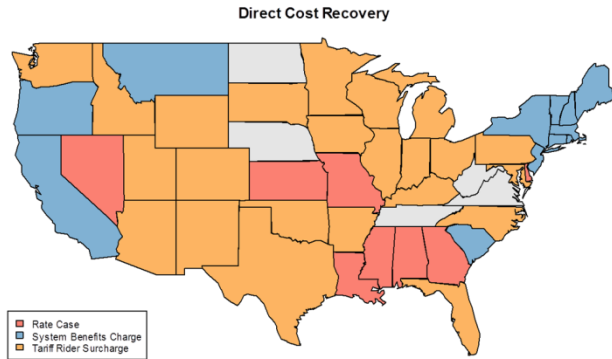
- ◆ Financial model for regulated utilities changed moderately in 50 yrs;  
Cost of service regulation
  - Regulated Price = Sum of Prudent Costs  
= Fuel + Purchased Power  
+ Amortized plant + Allowed return (profit) + All O&M expenses
  - Expenses went up between Rate Cases; so did MWh sales
  - DER not just another expense; it reduces sales
- ◆ For EE, three financial issues have been addressed in certain states:
  - Simultaneous direct cost recovery
  - Lost fixed revenue recovery between general rate cases
  - Profit incentive, “least cost plan should be equally profitable”
- ◆ For other DER, lost fixed revenue and RIM effects are increased.



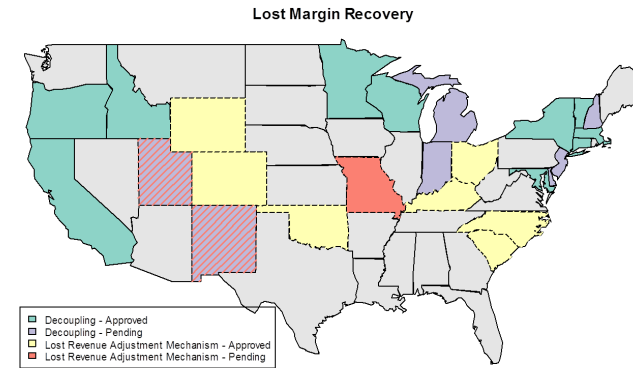
# Patchwork of EE Policies cover the three issues

## Status in 2012

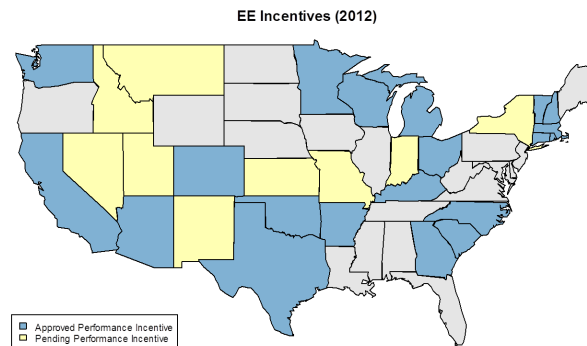
### Direct Cost



### Lost Fixed Cost



### Profit Incentive



# Distributed Resources as Game Changer for U.S. Electric Utility Industry

- ◆ EEI-sponsored paper in Jan. 2013, *Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business*.
- ◆ DER and DSM are portrayed as producing a potential downward spiral.
  - They lower retail kWh sales and revenues and also increase the costs in terms of integration, direct metering, and subsidies.
  - With costs fixed, this increases prices, which increase the bills to Non Participants.
  - More participate in DER and DSM, renewing the spiral.
  - Political pressures mount to undo the automatic recovery and decoupling rate policies.
- ◆ Financial system is not now concerned but could react
  - Current level of DER lost revenue is 1% nationally.
  - Focus out 24 months means this future risk is not in the valuation calculus; values are strong today!

# Smart Power's Two New Utility Business Models

## ◆ Smart Integrator

- Operates the power grid and all control systems to attain superior reliability.
- Does not own or sell the power, which is provided by market mechanisms approved by the Regulators.
- Since regulated, Revenue Decoupling of some kind will be needed.
- Whether the utility operates B2C or B2B with 3<sup>rd</sup> party energy management businesses is open question.

## ◆ Energy Services Utility

- Share the mission of the SI.
- Since regulated, Revenue Decoupling of some kind will be needed.
- Active participant in the EE and DR investments at customer premise, taking a leading role.
- Profit incentive tied to efficient production of energy services, not selling kWh.

# CPUC Policy supporting Distributed Resources

## PV and other DER

January 2007, California launched \$3.3 billion effort to install 3,000 MW of new solar resources in 10 years and substantially reduce the cost of solar generating installations

- ◆ By 2011, 1,000 MW of PV were installed.
- ◆ Net Energy Metering is allowed, but with a Cap at 5% of non coincident peak demand, expected to be reached in 2015.
- ◆ New NEM cost-effectiveness study underway by E3: Compares the retail credits / payments to NEM generators vs. the offset costs to the utility system.
- ◆ 2010 NEM study showed 20 year NPV net cost to general ratepayers of \$237 million or \$0.12/kWh exported from the PV resource.

## CHP

In D.10-12-035, the CPUC approved the “Qualifying Facility and Combined Heat and Power Program Settlement Agreement.” All major parties joined the Settlement, which:

- ◆ Provide transition from existing QF program to new QF/CHP program
- ◆ Designed to promote new, lower GHG-emitting CHP facilities and encourage the repowering or retirement of existing, higher GHG-emitting CHP facilities
- ◆ Two goals: 3,000 MW new CHP in 48 months; 6.7 MMT GHG reduction by 2020

# CAISO Policy supporting DER

## Demand Response participation in CAISO markets

### In early 2013, CAISO and Pacificorp announced development of a regional Energy Imbalance Market

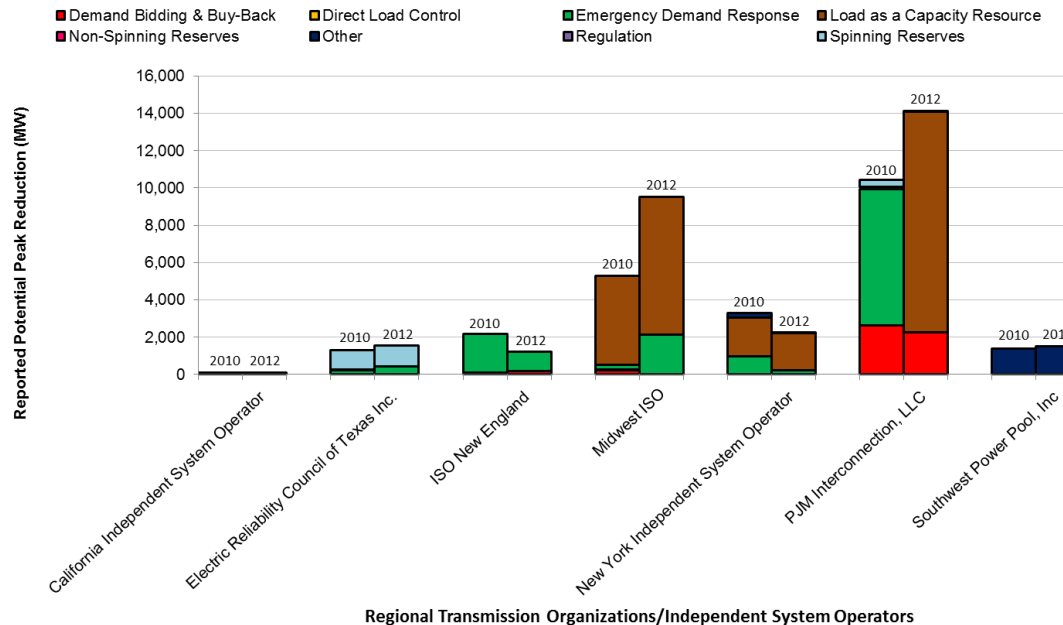
- ◆ CAISO and Pacificorp entered into a memorandum of understanding.
- ◆ CAISO is the only real-time energy market in the Western U.S., and advanced ISO market systems automatically balance electricity deviations every five minutes.
- ◆ The new regional real-time market service, referred to as an “energy imbalance market” or EIM, would provide ease of entry for many utilities in WECC in a five-minute energy dispatch service.
- ◆ CAISO expects to initiate a formal stakeholder process in the second quarter of 2013 and seek FERC approval for the tariff modifications by the end of 2013.

# FERC Policy supporting Distributed Resources

Goals for DER: comparable treatment in wholesale markets and realization of the national potential for DR

- ◆ Order 745 – pay LMP under certain conditions
- ◆ IEEE 1547 – address the Interconnection of DER to grid. A current issue is disturbance tolerance standards for PV.

FERC policy carried out by the RTOs



# Conclusions

- ◆ Distributed energy resources are going to increase, with the speed dependent on the policies, market stimulation, and exogenous factors. This bears close scrutiny.
- ◆ Regulation of the many aspects of DER development is fragmented. As the pace of DER development increases and spreads across states, timely and consistent regulation policy developments will be needed.
- ◆ FERC is promoting policies through all of the RTOs and DER is well established in some wholesale markets.
- ◆ CA's aggressive GHG policies put it in at the front. Its policy makers have many appropriate policies in place. The tension over the NEM for CA Solar Initiative shows that there are competing forces and price increases need attention.

# Firm Overview

*The Brattle Group* provides consulting and expert testimony in economics, finance, and regulation to corporations, law firms, and governments around the world.

We combine in-depth industry experience and rigorous analyses to help clients answer complex economic and financial questions in litigation and regulation, develop strategies for changing markets, and make critical business decisions.



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