Energy Policy on the Horizon
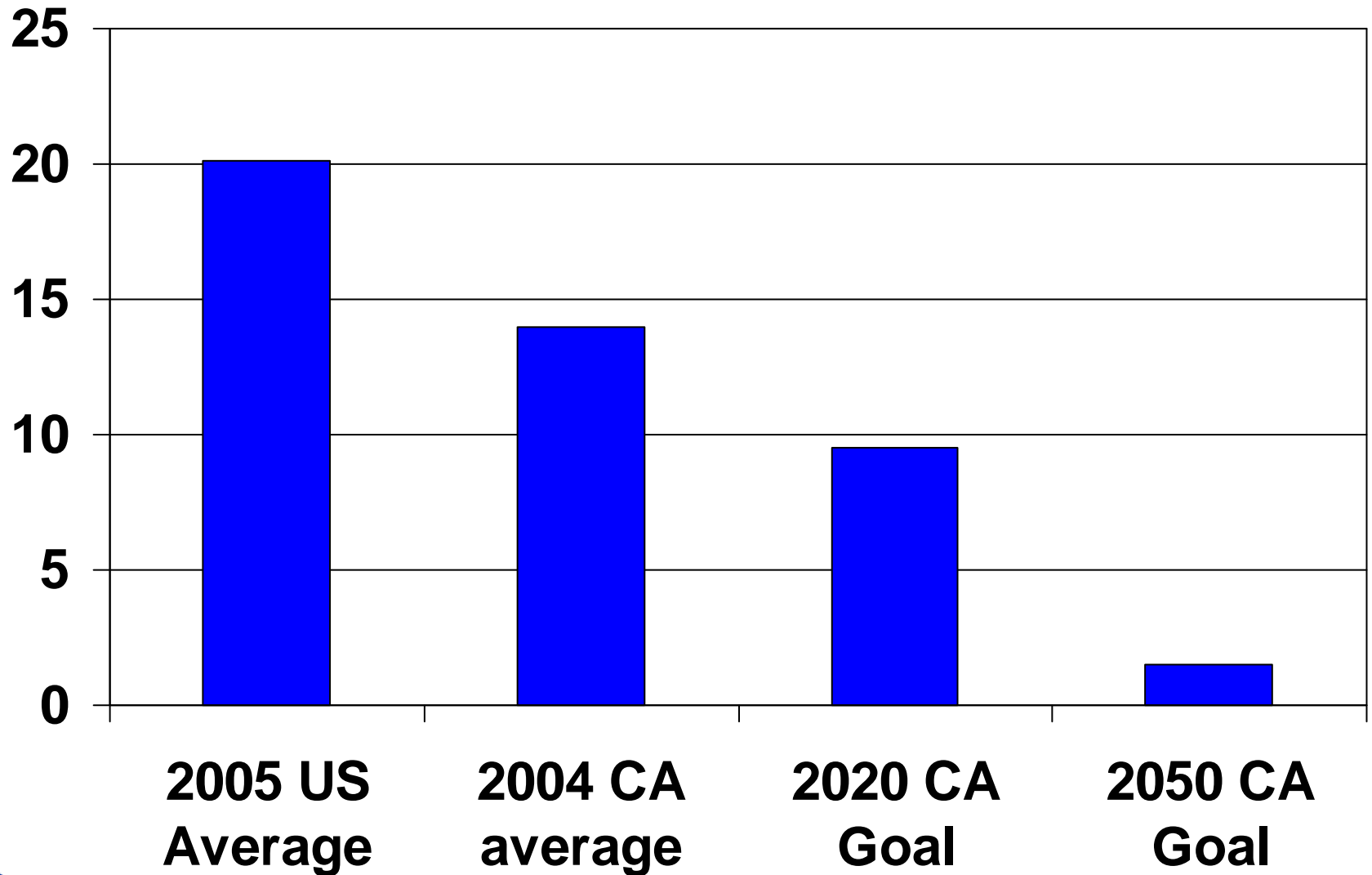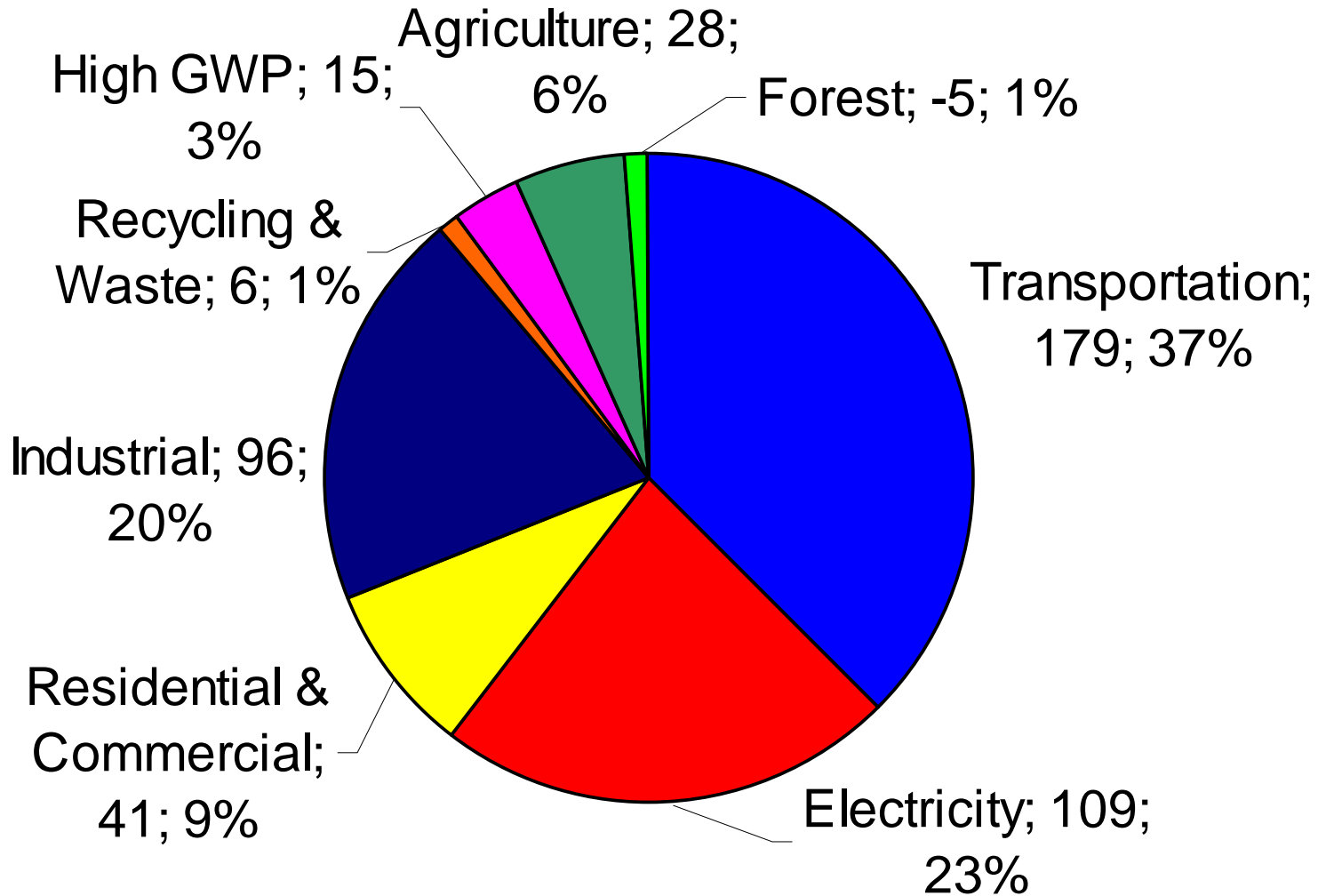

Noah Long
NRDC
May 6, 2009

Outline

- The Climate Challenge

- California's Leadership on Energy Efficiency

- Current CA Policy

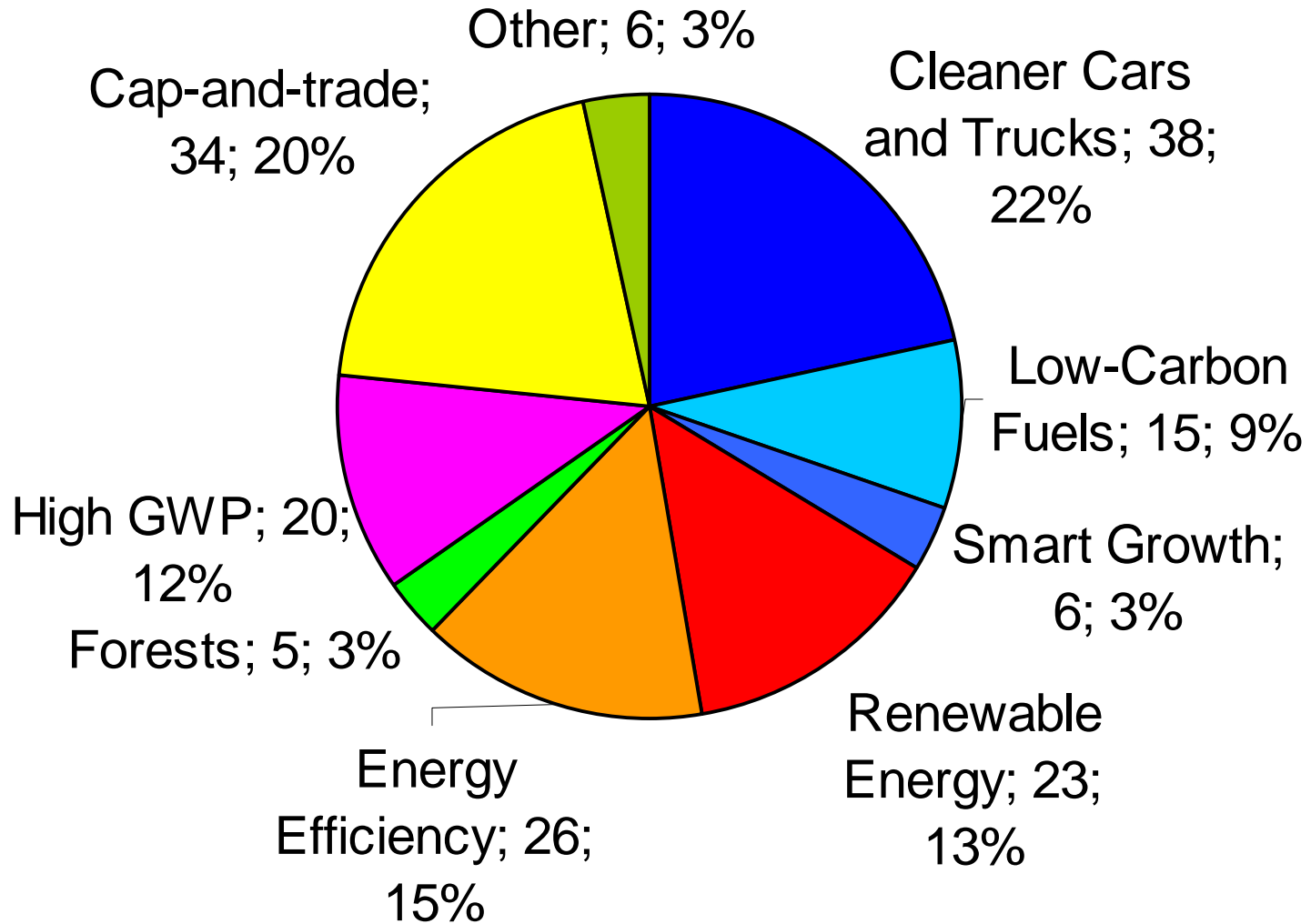- Federal Stimulus

- Renewable Energy Policy

What we have to do: reduce metric tons CO2E emissions per person

CA GHG Emissions, 2004

CA GHG Reductions, per AB 32 Scoping Plan, Dec 2008

Other; 6; 3%

Cap-and-trade; 34; 20%

Cleaner Cars and Trucks; 38; 22%

Low-Carbon Fuels; 15; 9%

High GWP; 20; 12%

Forests; 5; 3%

Smart Growth; 6; 3%

Energy Efficiency; 26; 15%

Renewable Energy; 23; 13%

Efficiency: A Negative Cost Solution

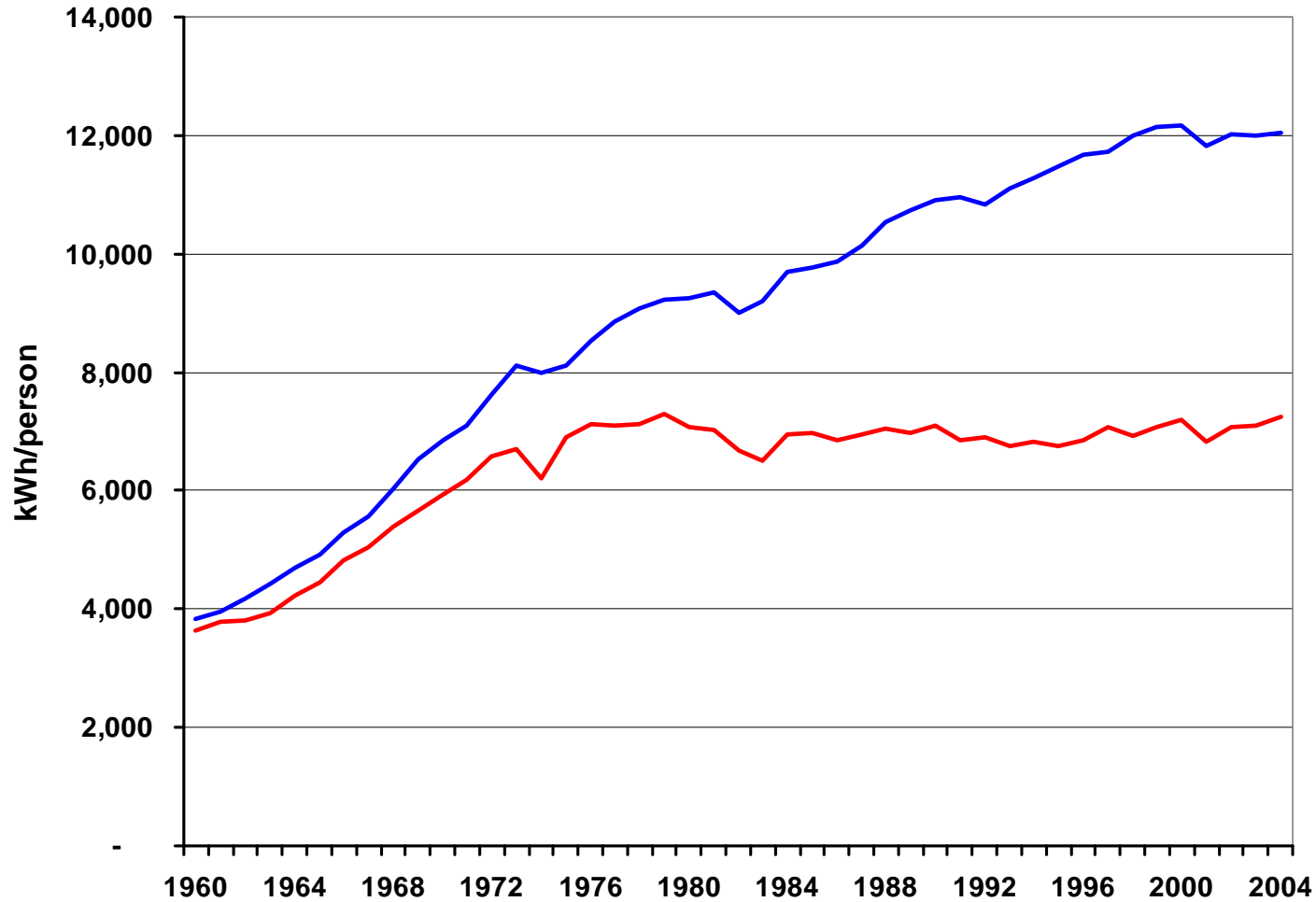# Average Monthly Gas and Electric Bills

2005
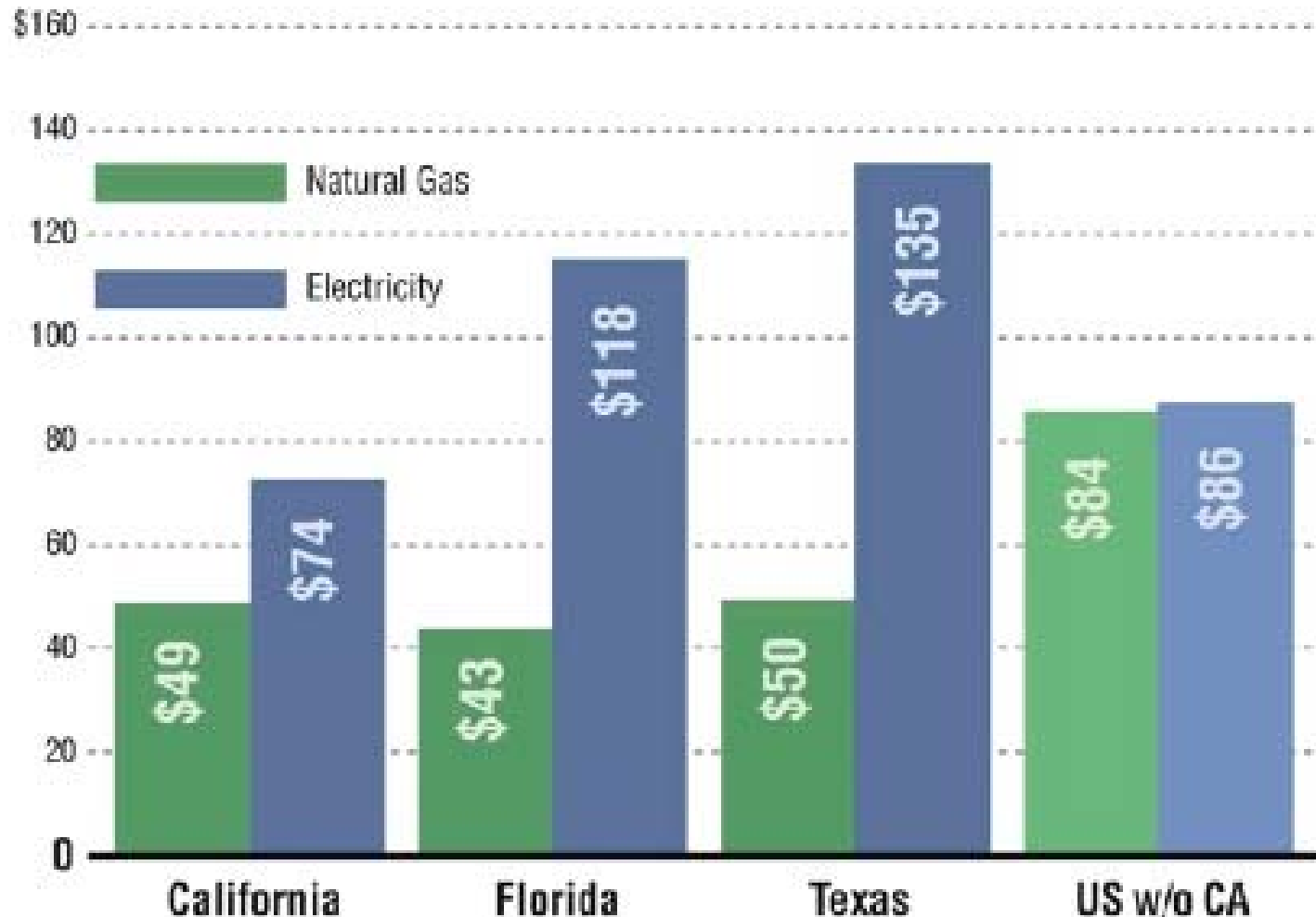
Source: Energy Information Agency, U.S. Department of Energy

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Electricity: CA EE policies
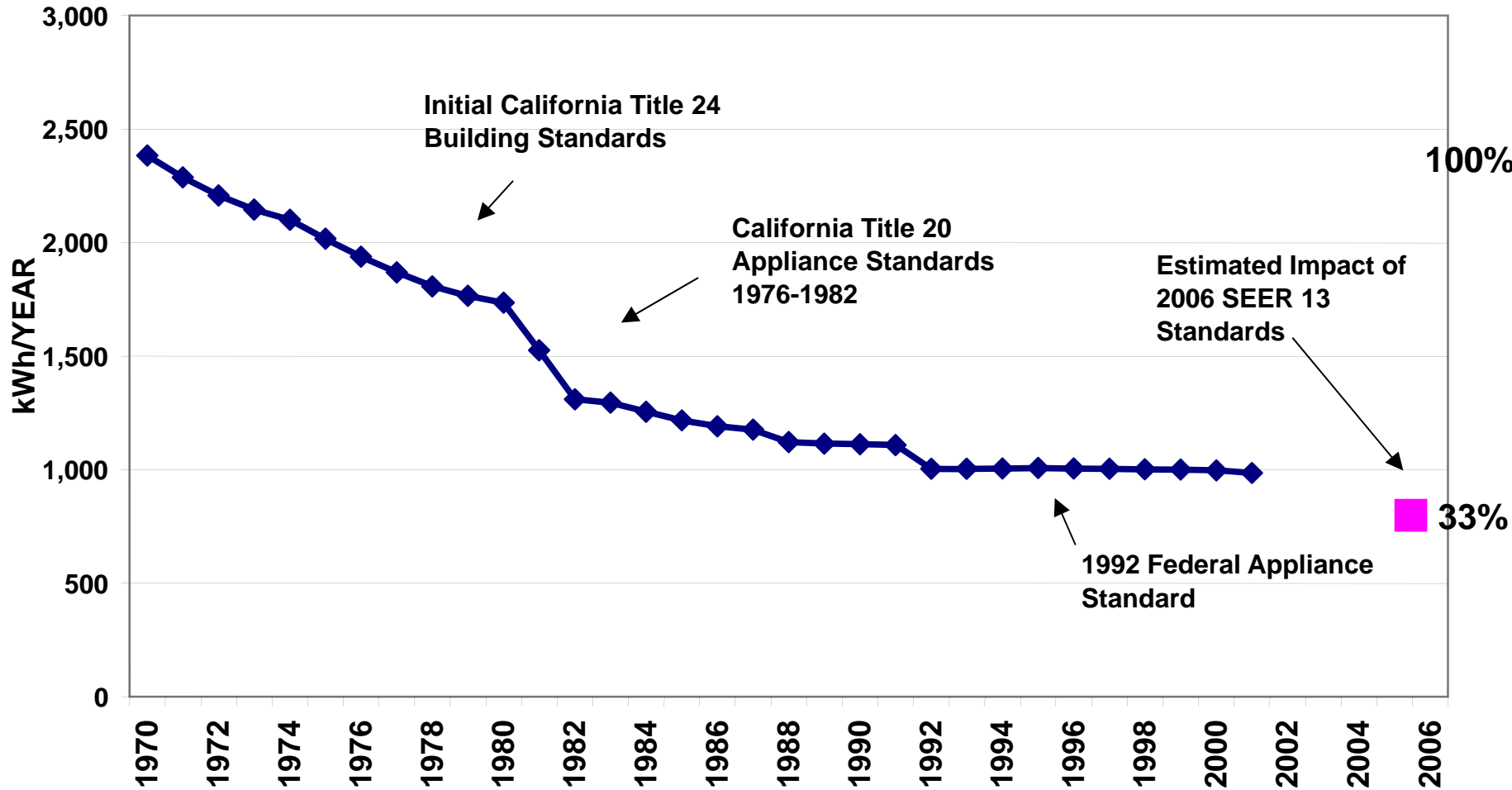
Per Capita Electricity Consumption

Annual Usage of Air Conditioning in New Homes in California
Annual drop averages 4% per year

Initial California Title 24 Building Standards

California Title 20 Appliance Standards 1976-1982

Estimated Impact of 2006 SEER 13 Standards

100%

33%

1992 Federal Appliance Standard

Source: CEC Demand Analysis Office

9

U.S. Refrigerator Energy Use v. Time

Chart showing U.S. Refrigerator Energy Use v. Time. X-axis: Year Manufactured (1947 to 2000). Left Y-axis: Average Energy Use Per Unit (kWh/yr.) from 0 to 2400. Right Y-axis: Adj. Volume, ft³ from 0 to 22.

Legend:
- U.S. Sales Weighted Average Energy Use (red line)
- Adj. Volume (ft3) (blue line)

Annotations:
- 1978 CA Standard
- 1980 CA Standard
- 1987 CA Standard
- 1990 NAECA Standard
- 1993 DOE Standard
- 2001 DOE Standard

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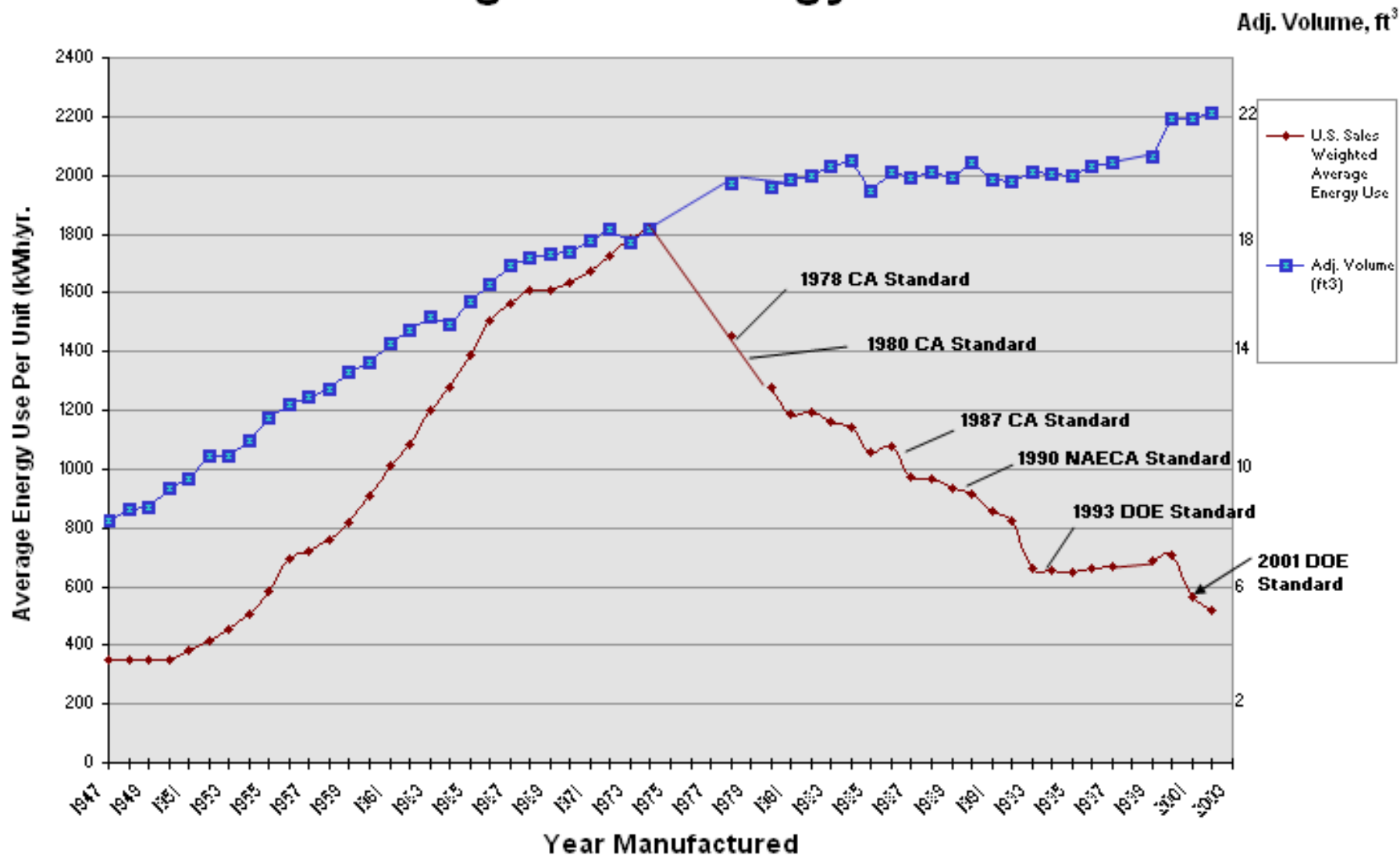
Investor Owned Utility Program Framework

1. Make energy efficiency the first priority

2. Remove financial disincentives (decoupling)

3. Create Funding Mechanisms

4. Integrate efficiency into utilities' resource procurement

5. Set aggressive targets

6. Use a 3-year cycle with well-designed programs

7. Ensure independent evaluation of savings

8. Implement performance-based incentives

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1. Make Energy Efficiency the First Priority Resource

- Energy Resource Loading Order (Energy Action Plan 2003):

  1. Energy Efficiency (EE)
  2. Renewable Energy
  3. Clean Distributed Generation
  4. Efficient Fossil Fuel Generation

- EE codified as a priority (SB 1037, 2005)

- Statewide goal of 100% cost-effective Energy Efficiency (2007 IEPR)

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2. Remove Financial Disincentives

- Modest, regular true-ups in rates ensure that fixed costs are recovered in kilowatt-hour charges are not held hostage to sales volume.

- If sales are higher than expected, return over-collected revenues to customers, and vice versa.

- Volumetric prices still provide customers with a conservation incentive.

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How Decoupling Works

Traditional Regulation:

$$\text{Utility rates} \; = \; \frac{\text{Authorized revenue requirement (both fixed and variable costs).}}{\text{Electricity sales forecast}}$$

Example

- Sales forecast = 100 kWh
- Variable cost = 4¢ per kWh
- Fixed cost = $6.00
- Authorized revenue requirement = $4.00 + $6.00 = $10.00
- Rate per kWh = 10¢ per kWh ($10.00 / 100kWh)

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The Problem with Traditional Regulation

If the utility sells more or less electricity than forecasted, it will either under- or over-recover the fixed-cost element of its revenue requirement.

Example of Sales *Below* Forecast

- Actual sales = 95 kWh
- Variable cost = 4¢ per kWh x 95 kWh = $3.80
- Fixed cost = $6.00
- Actual total costs = $3.80 + $6.00 = $9.80
- Actual revenues = 95 kWh x 10¢ per kWh = $9.50

Utility has under-collected its fixed costs.

RESULT: Utility has an incentive to sell as much electricity as possible, and A DISINCENTIVE TO PROMOTE EFFICIENCY

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Example of a True-Up: $.30 over collection

The utility's rate is adjusted to return the $0.30 that was over-collected the past year to customers.

Sales forecast for the following year = 100 kWh

- Variable cost = 4¢ per kWh
- Fixed cost = $6.00
- Revenue requirement = $4.00 variable cost + $6.00 fixed cost – $0.30 over-collection = $9.70
- Rate per kWh = 9.7¢ per kWh ($9.70 / 100 kWh)

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3. Create Funding Mechanisms
4. Integrate Efficiency into Procurement

Table 1 - Projected Program Impacts By Year Aggregated Savings Across Utilities' Mandated Scenarios

	2009		2010		2011		3-Year Cumulative	
	Total	% of 2009 Goal	Total	% of 2010 Goal	Total	% of 2011 Goal	Total	% of 2011 Goal
Energy Savings – Electricity - Gross								
Annual Net Electricity Savings (GWh/yr)	3,292	111%	4,327	163%	4,455	168%	12,074	146%
CPUC Electricity Target (GWh/yr)	2,974		2,657		2,657		8,288	
Annual Net Peak Demand Savings (MW)	649	104%	861	156%	891	159%	2,401	138%
CPUC Peak Demand Target (MW)	622		552		562		1,736	
Annual Net Therm Savings (MTh/yr)	57	80%	66	71%	72	76%	195	75%
CPUC Therm Target (MTh/yr)	71		93		95		259	

Table 2 - Portfolio Cost Effectiveness - Aggregated Utilities' Mandated Scenarios

Cost-Effectiveness	2009-2011 GROSS	2009-2011 - NET
Total Costs (TRC)	$ 5,748,543,975	$ 5,075,523,831
Total Savings (TRC)	$ 9,263,698,313	$ 6,343,141,085
Total Net Benefits (TRC)	$ 3,515,154,339	$ 1,267,617,254
Benefit/Cost Ratio (TRC)	1.63	1.22
Benefit/Cost Ratio (PAC)	2.14	1.51
Levelized Cost per kWh Saved (cents/kWh) - PAC	$ 0.057	$ 0.081
Levelized Cost per therm Saved ($/therm) - PAC	$ 0.439	$ 0.624

*note: both the cents/kWh and $/therm are simple averages

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5. Set Aggressive Targets
6. Use Multi-Year Programs

- California Public Utilities Commission sets ten-year energy saving targets.

- CPUC approves 3-year programs (we think 5 years might be even better)

- Long-term stability is key to:

  – Capture long-term savings (e.g. new construction)

  – Create a sustainable infrastructure of contractors and implementers

  – Influence manufacturers and national businesses

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Investor Owned Utility Goals

By 2013, the IOU goals will:

➢ Avoid 10 giant power plants & save consumers $10 <u>billion</u>

➢ Cut pollution equal to emissions from 2 million cars
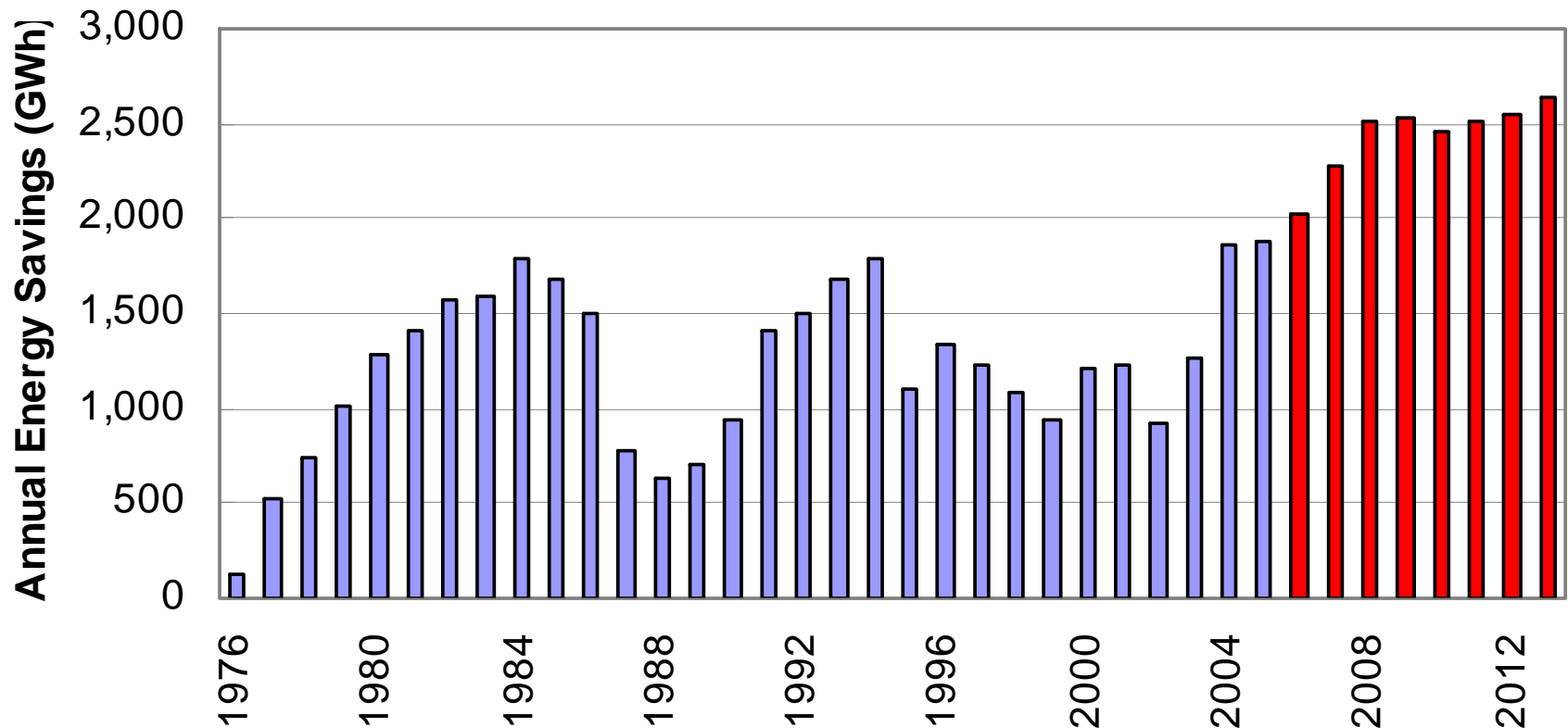
Sources: California Energy Commission; IOU Annual Reports; California Public Utilities Commission

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The Goals Dilemma

- High goals motivate investment in efficiency, but may not motivate experimentation, especially when earnings depend on success

- Low "conservative" goals cause excessive investment in traditional energy sources

- How can we motivate large investments in EE and also allow for technology and behavior experimentation?
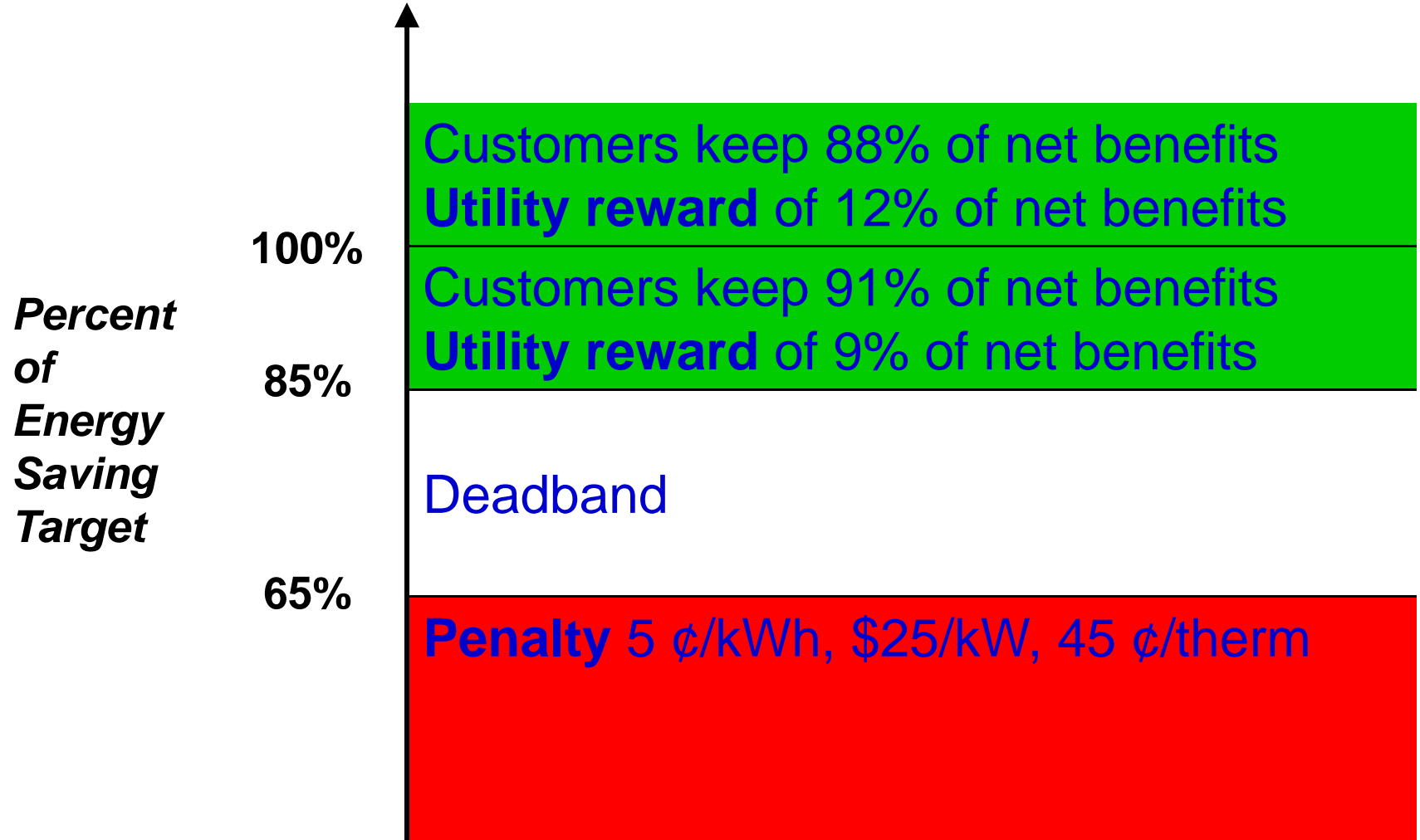
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7. Independent Evaluation of Savings

- Evaluations help ensure that efficiency is a reliable procurement resource.
- California Public Utilities Commission oversees independent evaluation of the programs' savings based on rigorous protocols.
- Savings evaluated using statistical billing analyses and/or engineering analyses using verified field data.
- Process evaluations, market assessments, surveys of existing practice, etc.

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8. Implement Performance-Based Incentives

- CPUC adopted a performance-based incentive mechanism for IOUs to invest in EE (Sept 20, 2007)

- Aligns the IOUs' incentives with customer interests by making EE as attractive as building new power plants

- Balanced reward/penalties (both a "carrot" and a "stick")

- Performance defined by:
  - Ability to meet energy savings goals
  - Creation of net benefits for customers

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8. Performance-Based Incentive

Percent of Energy Saving Target

100%

85%

65%

Customers keep 88% of net benefits
Utility reward of 12% of net benefits

Customers keep 91% of net benefits
Utility reward of 9% of net benefits

Deadband

**Penalty** 5 ¢/kWh, $25/kW, 45 ¢/therm

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CA EE Strategic Planning

- Long term planning through 2020
- Aggressive goals
- Linkage to AB 32 Scoping Plan
- Big Bold Initiatives
  - Net zero energy new residential by 2020
  - Net zero energy new commercial by 2030
  - Reshape the HVAC industry

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Publicly Owned Utilities

- Senate Bill 1037 (2005) & Assembly Bill 2021 (2006)
- By 2016, POU goals will:
  - **Avoid 2 giant power plants & save consumers $2 <u>billion</u>**
  - **Cut pollution equal to emissions from 400,000 cars and trucks**
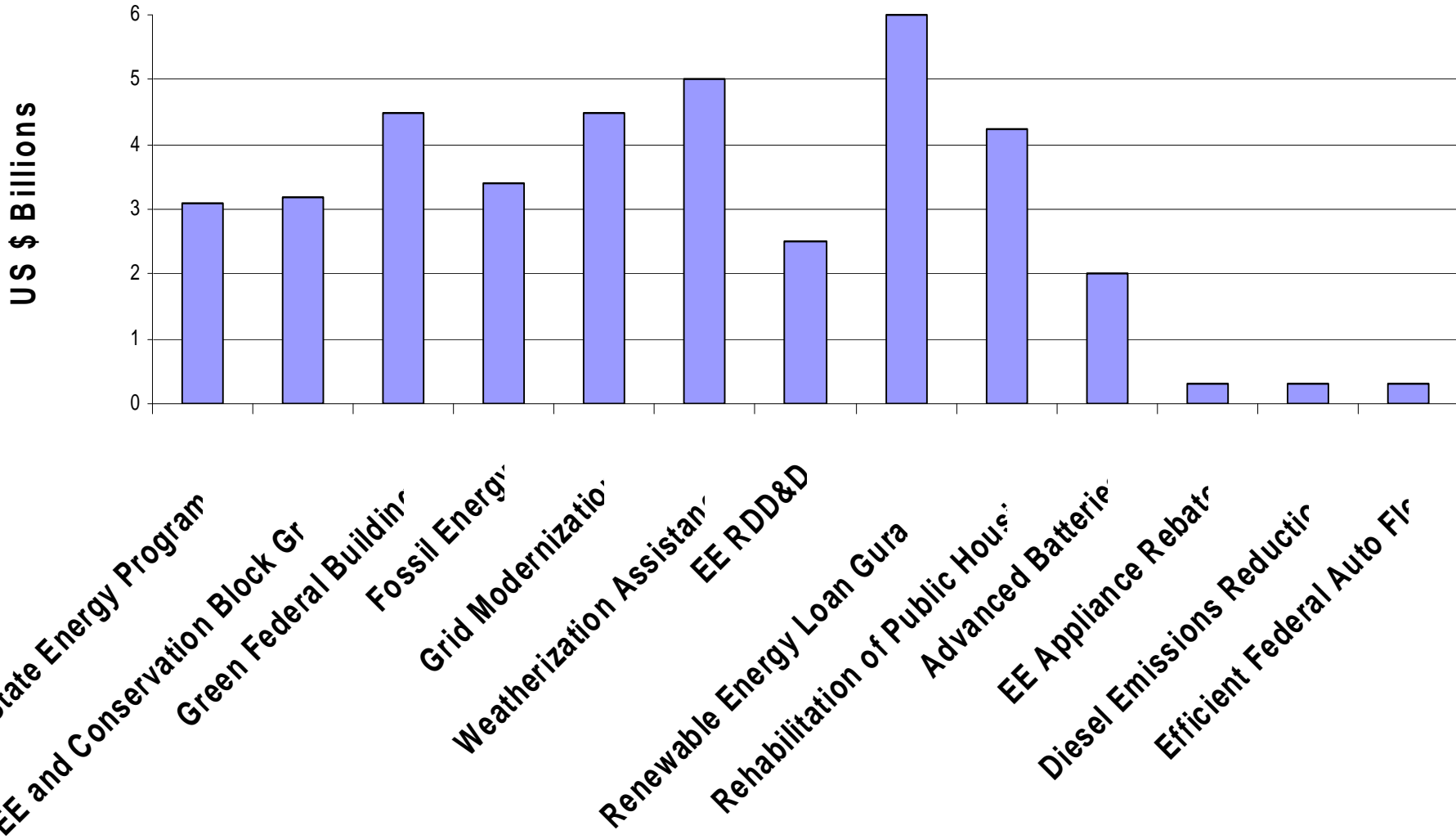
Comparison of POU and IOU Energy Savings Targets
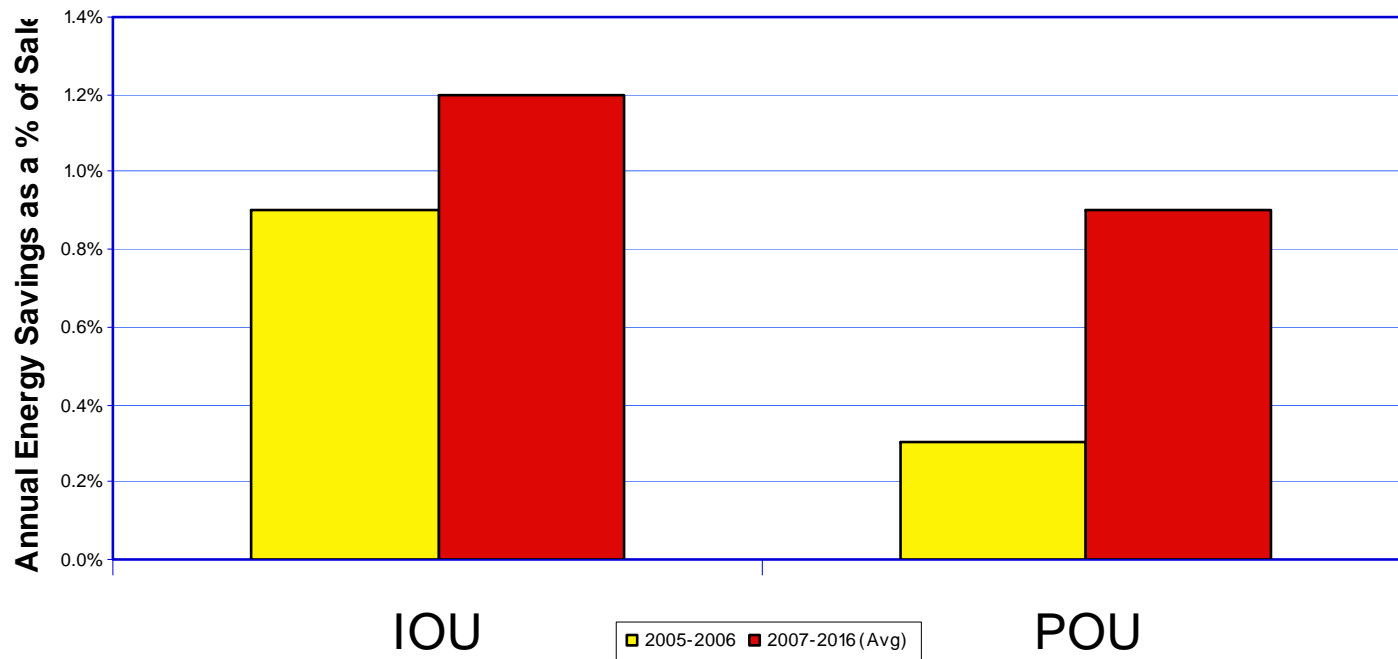
Looking Forward…

- All Cost Effective EE

- Continue to Ramp up POU efficiency programs

- Link between water efficiency and energy

- Existing housing stock transformation

- Build state-wide programmatic consistency

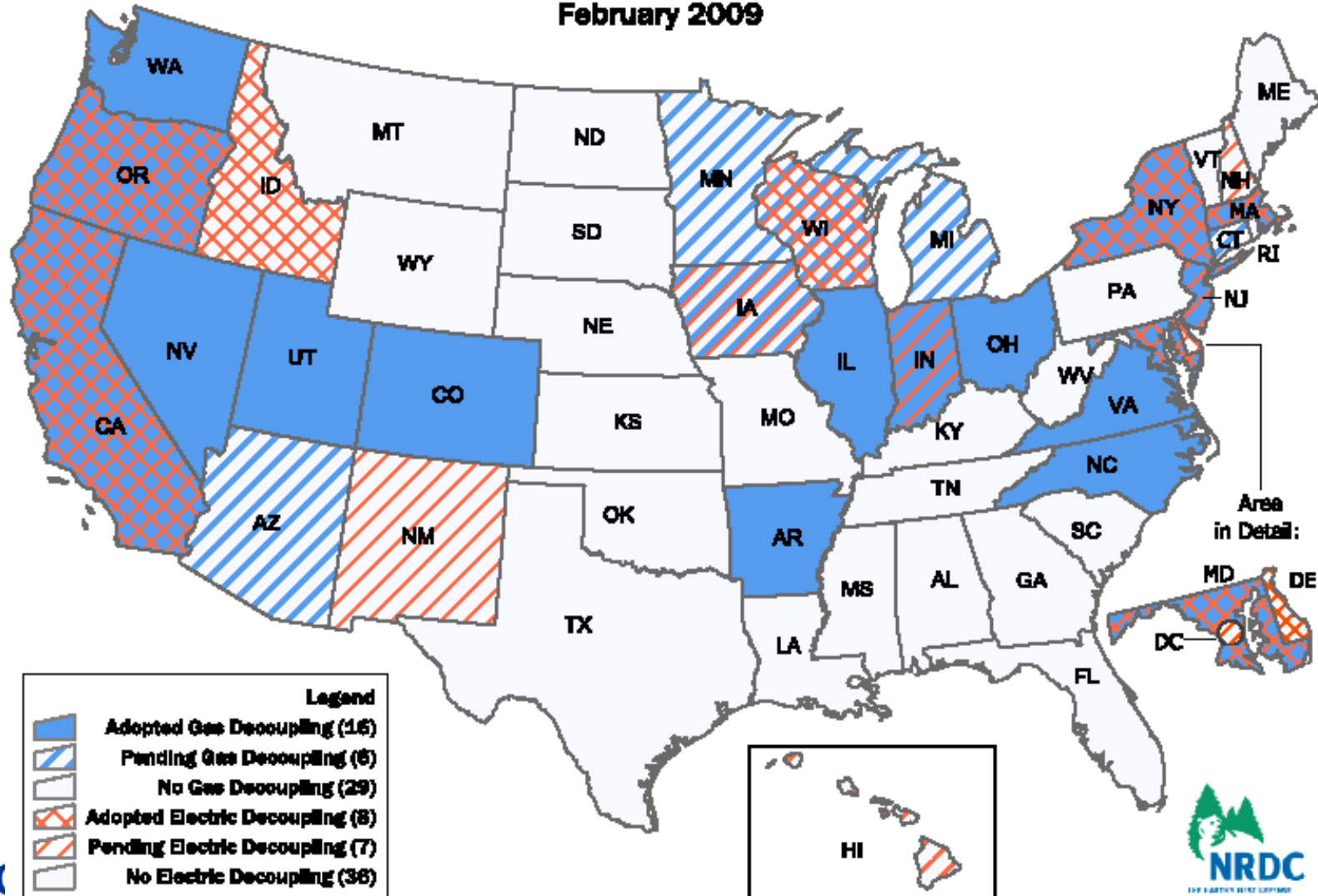- Promote an Energy Efficiency Innovation Revolution

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ARRA New Energy Stimulus Funding

ARRA Section 410: $3.1 Billion, For The Right Policies

Gas and Electric Decoupling In the US
February 2009

Legend

- Adopted Gas Decoupling (16)
- Pending Gas Decoupling (6)
- No Gas Decoupling (29)
- Adopted Electric Decoupling (8)
- Pending Electric Decoupling (7)
- No Electric Decoupling (36)

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Renewable Portfolio Standards

ME: 30% by 2000
10% by 2017 - new RE

☼ **NH: 23.8% in 2025**

☼ **MA: 15% by 2020 +**
1% annual increase
(Class I Renewables)

MN: 25% by 2025
(Xcel: 30% by 2020)

VT: (1) RE meets any increase in retail sales by 2012; (2) 20% by 2017

*WA: 15% by 2020

ND: 10% by 2015

WI: requirement varies by utility; 10% by 2015 goal

MT: 15% by 2015

OR: 25% by 2025 (large utilities)
5% - 10% by 2025 (smaller utilities)

SD: 10% by 2015

MI: 10% by 2015

RI: 16% by 2020

CT: 23% by 2020

☼ ***NV: 20% by 2015**

*UT: 20% by 2025

☼ **OH: 25%** by 2025**

IA: 105 MW

IL: 25% by 2025

☼ **NY: 24% by 2013**

☼ **NJ: 22.5% by 2021**

CA: 20% by 2010

☼ **CO: 20% by 2020** (IOUs)
*10% by 2020 (co-ops & large munis)

MO: 11% by 2020

☼ **PA: 18%** by 2020**

☼ **AZ: 15% by 2025**

☼ **NC: 12.5% by 2021** (IOUs)
10% by 2018 (co-ops & munis)

☼ **MD: 20% by 2022**

☼ ***DE: 20% by 2019**

☼ **NM: 20% by 2020** (IOUs)
10% by 2020 (co-ops)

☼ **DC: 20% by 2020**

*VA: 12% by 2022

TX: 5,880 MW by 2015

HI: 20% by 2020

☼ **Minimum solar or customer-sited RE requirement**
* Increased credit for solar or customer-sited RE
**Includes separate tier of non-renewable "alternative" energy resources

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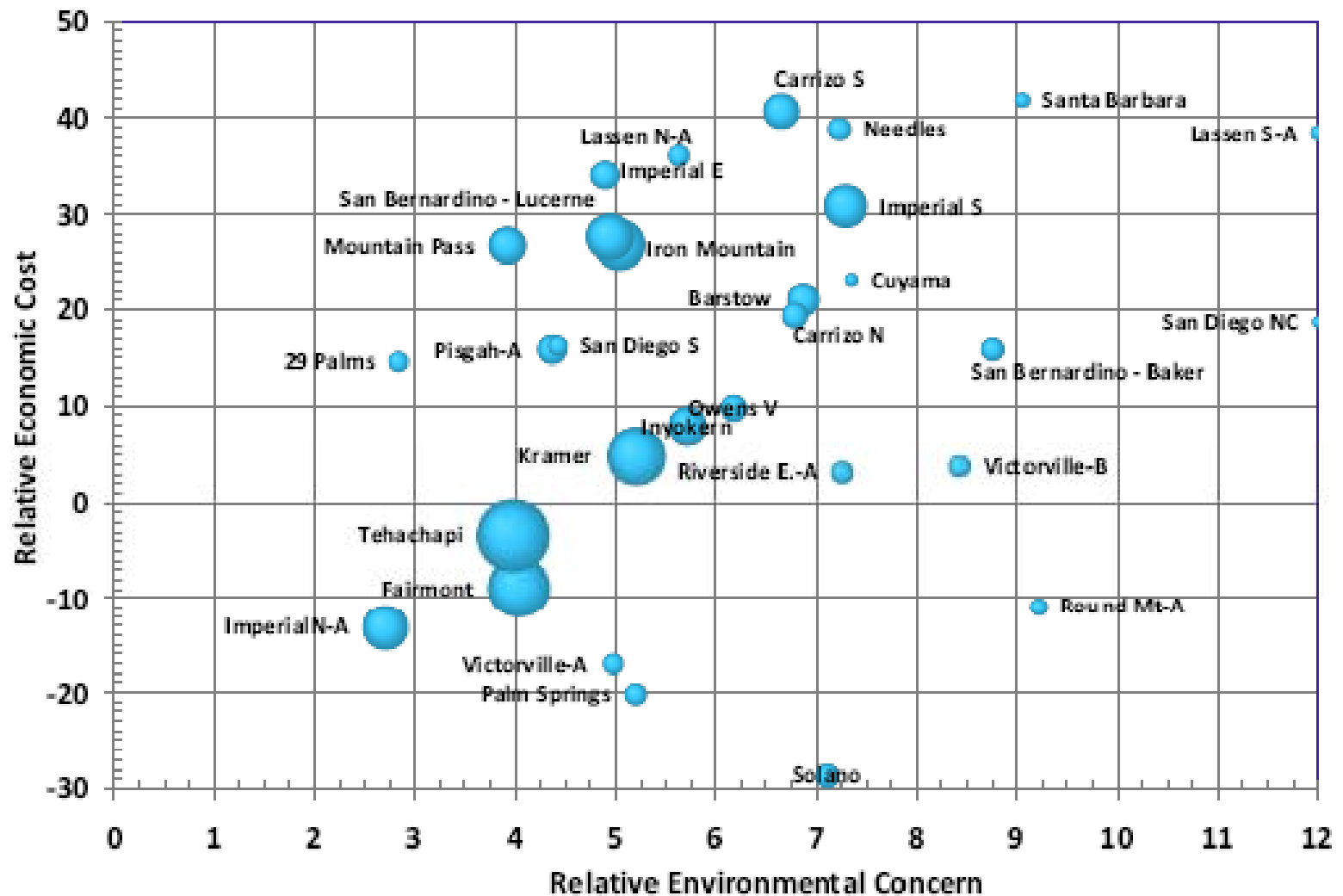# Renewable Energy Transmission Initiative

Figure ES-1. Economic and Environmental Assessment of California CREZs.
Circle size is proportional to CREZ energy potential (GWh/yr)

Contact:

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