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30 Years of Energizing Efficiency

Energy Efficiency As A Power Resource

Steven Nadel, Executive Director
American Council for an Energy-Efficient Economy
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The American Council for an Energy-Efficient Economy (ACEEE)

30 year old, non-profit 501(c)(3) dedicated to advancing energy efficiency through research and education.

35+ staff in Washington DC, + field offices in DE, MI, WA and WI.

Focus on End-Use Efficiency in Industry, Buildings, Utilities, and Transportation; Economic Analysis & Human Behavior; and State & National Policy

Worked on utility-sector energy-efficiency programs and policies since 1980s

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Savings Potential from Jan. 2009 Electricity Advisory Committee Report

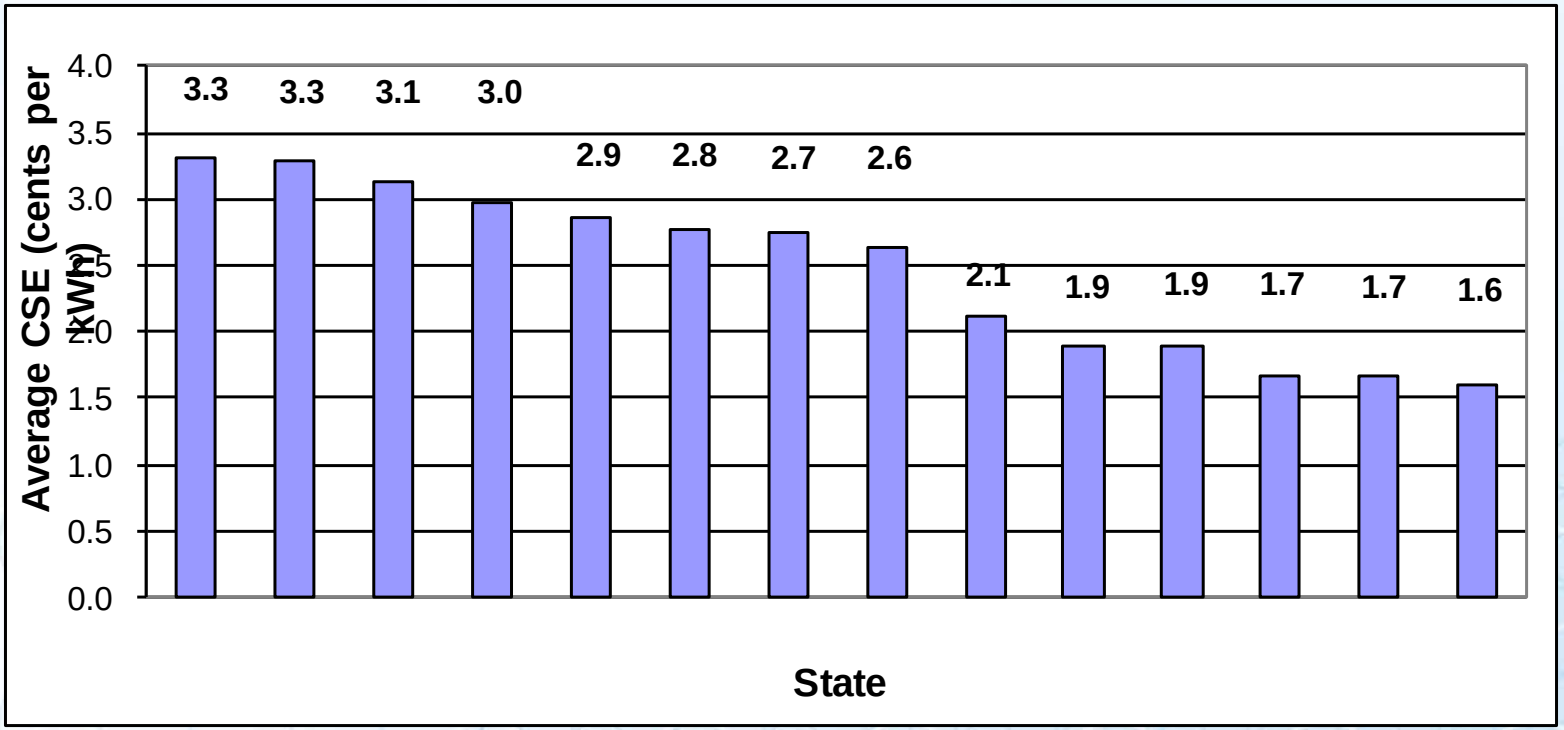
Table 2-1. Meta-Analysis of Electricity Energy Efficiency Potential Study Results

Region of Study	Total Efficiency Potential over Study Time Period (%)			Study Time Period (years)	Average Annual Efficiency Potential (%)		
	Technical	Economic	Achievable		Technical	Economic	Achievable
U.S. (Interlaboratory Working Group 2000)	NA	NA	24%	20	NA	NA	1.2%
Massachusetts (RLW 2001)	NA	24%	NA	5	NA	4.8%	NA
California (Xenergy/EF 2002)	18%	13%	10%	10	1.8%	1.3%	1.0%
Southwest (SWEEP 2002)	NA	NA	33%	17	NA	NA	1.9%
New York (NYSERDA/OE 2003)	36%	27%	NA	20	1.8%	1.4%	NA
Oregon (Ecotope 2003)	31%	NA	NA	10	3.1%	NA	NA
Puget (2003)	35%	19%	11%	20	1.8%	1.0%	0.6%
Vermont (Optimal 2003)	NA	NA	31%	10	NA	NA	3.1%
Quebec (Optimal 2004)	NA	NA	32%	8	NA	NA	4.0%
New Jersey (Kema 2004)	23%	17%	11%	16	1.4%	1.1%	0.7%
Connecticut (GDS 2004)	24%	13%	NA	10	2.4%	1.3%	NA
New England (Optimal 2005)	NA	NA	23%	10	NA	NA	2.3%
Northwest (NW Council 2005)	25%	17%	13%	20	1.3%	0.9%	0.6%
Georgia (ICF 2005)	29%	20%	9%	10	2.9%	2.0%	0.9%
Wisconsin (ECW 2005)	NA	NA	4%	5	NA	NA	0.7%
California (Itron 2006)	21%	17%	8%	13	1.6%	1.3%	0.6%
North Carolina (GDS 2006)	33%	20%	14%	10	3.3%	2.0%	1.4%
Florida (ACEEE 2007)	NA	25%	20%	15	NA	1.7%	1.3%
Texas (ACEEE 2007)	NA	30%	18%	15	NA	2.0%	1.2%
Utah (SWEEP 2007)	NA	NA	26%	15	NA	NA	1.7%
Vermont (GDS 2007)	35%	22%	19%	10	3.5%	2.2%	1.9%
Average	NA	NA	NA	12.8	2.3%	1.8%	1.5%
Median	29%	20%	16%				

Note: "Technical potential" are measures that are technologically possible to implement without regard to cost effectiveness. "Economic potential" is a subset of technical potential and is limited to measures that are cost effective (although the definition of "cost effective" varies from study to study.) "Achievable potential" is what can actually be achieved as a result of specific programs, policies, and implementation rates.

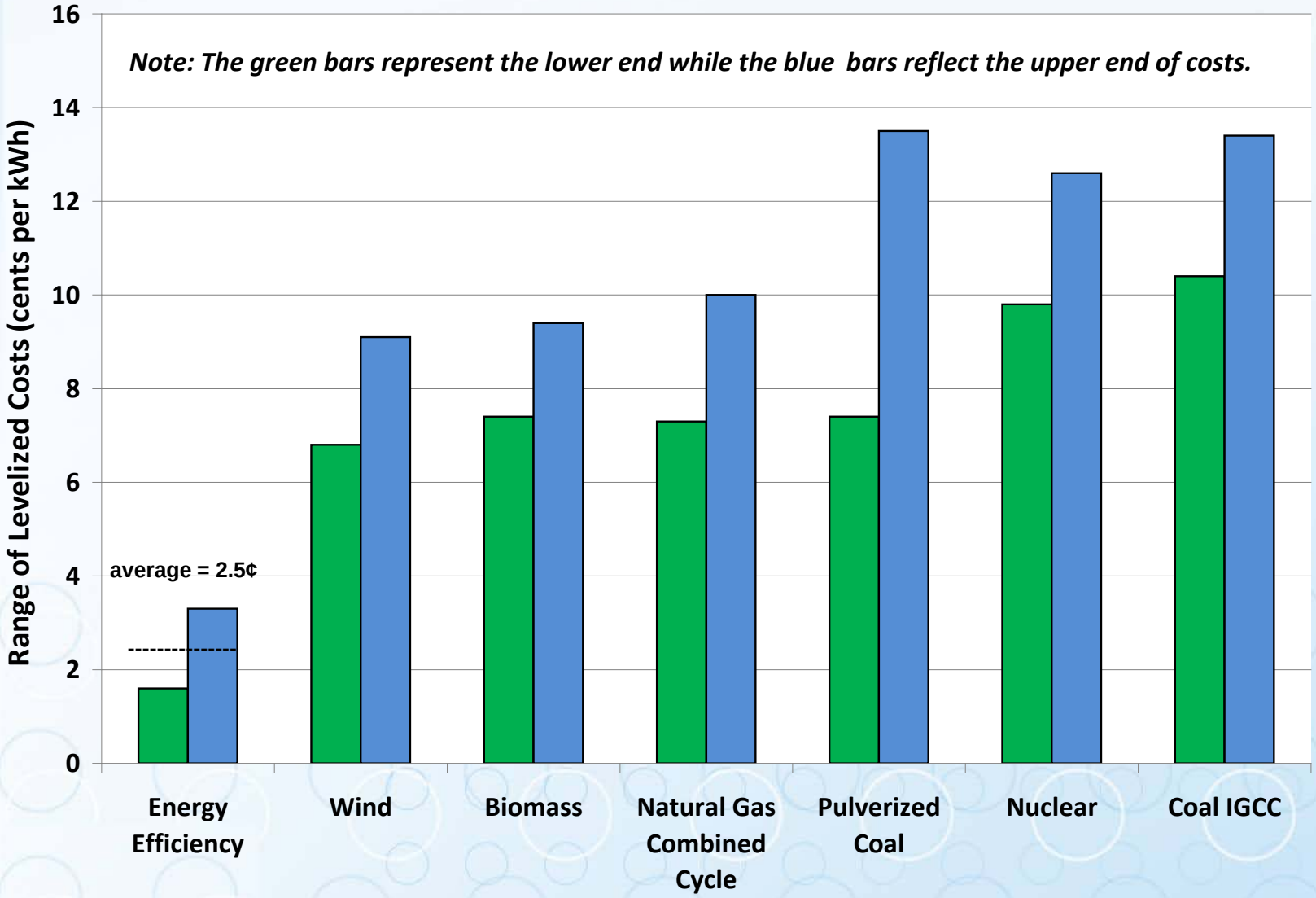
Source: American Council for an Energy-Efficient Economy 2008.[81]

Average Statewide Utility Cost of Saved Energy for Efficiency Programs



Source: Friedrich et al., 2009, ACEEE

Levelized Utility Cost of Electricity Resources



Sources: ACEEE 2009 for EE, Lazard 2008 for others

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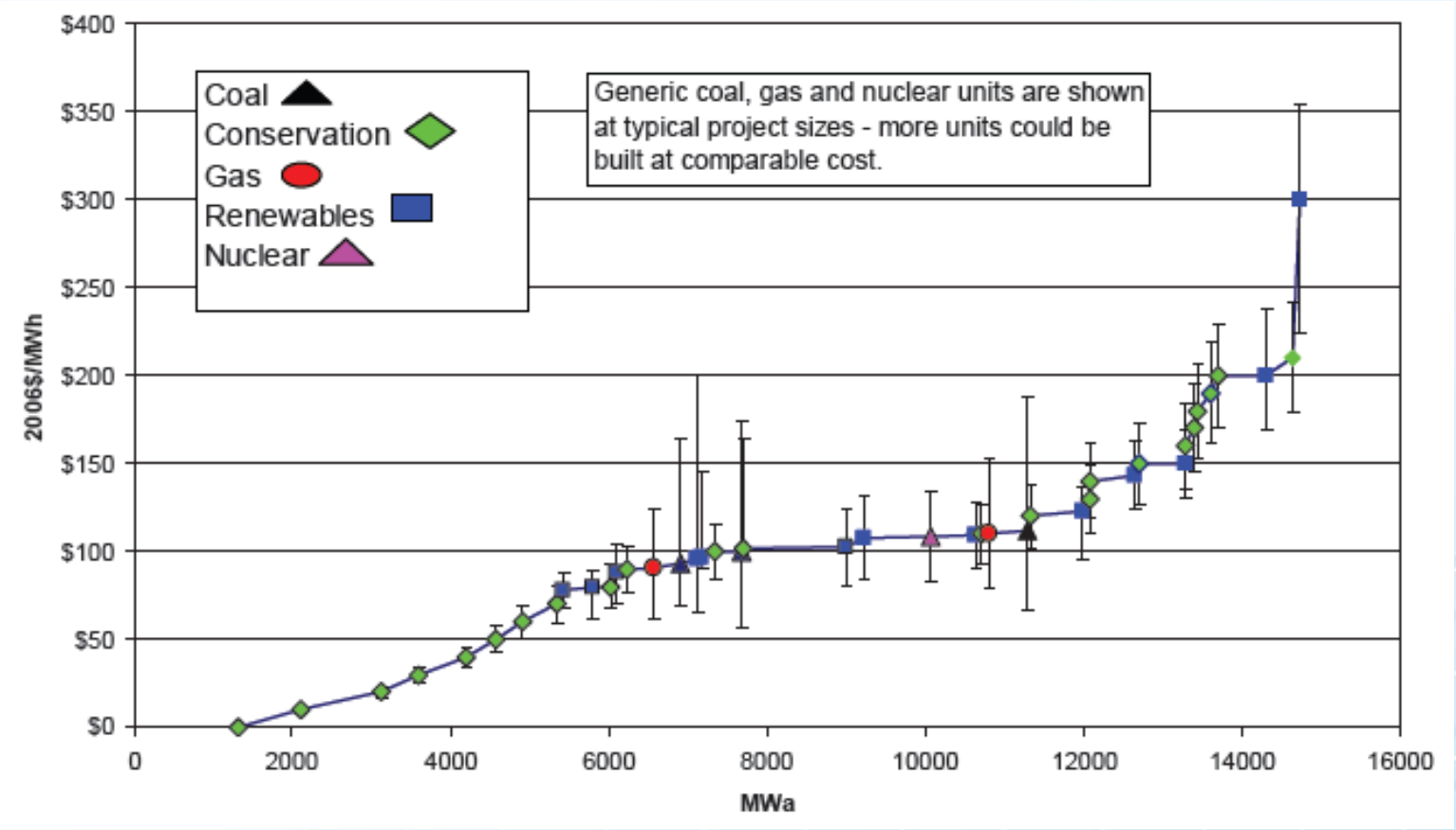
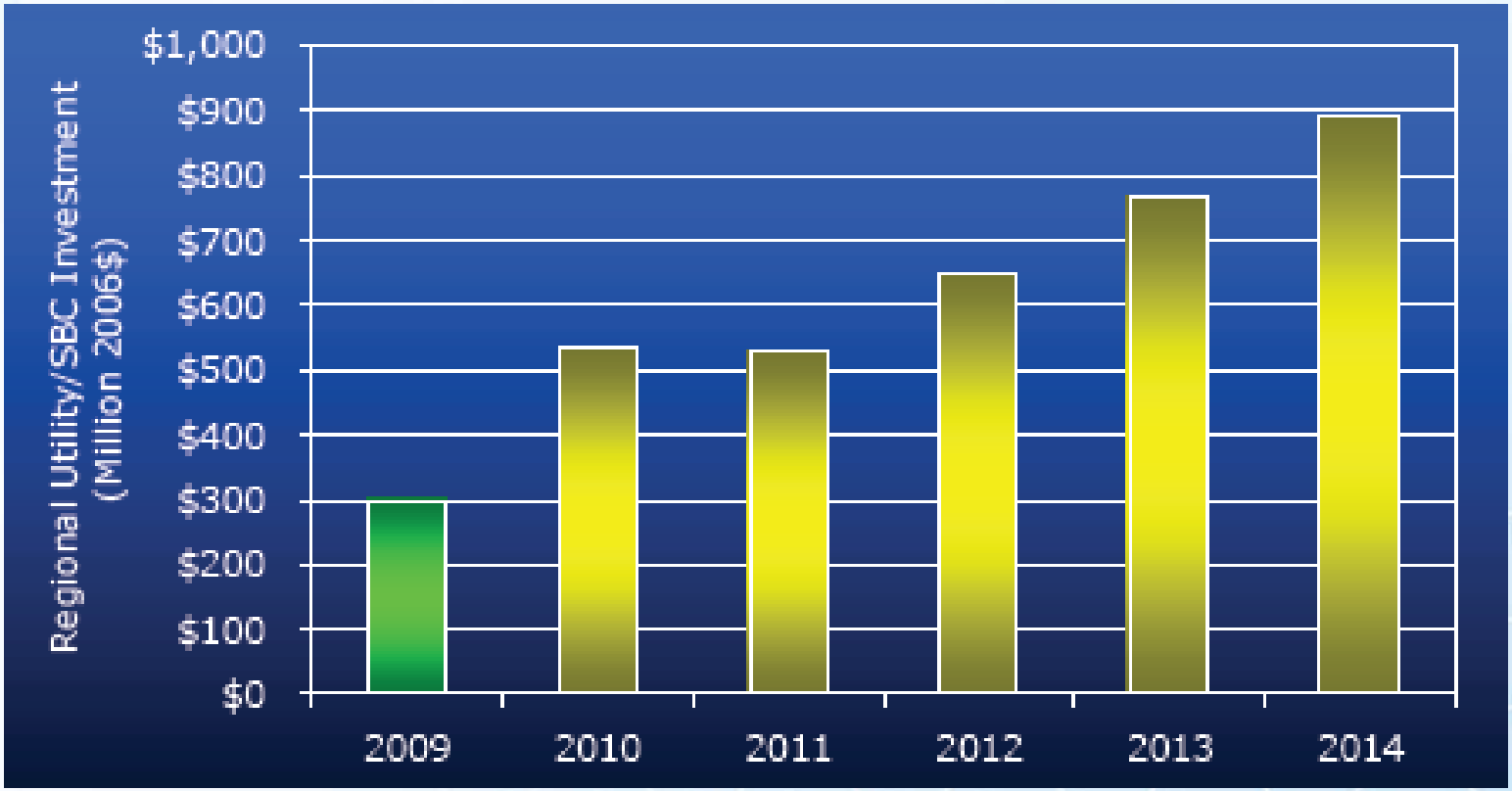
Summary of 6th Northwest Power Plan Energy Portfolio Analysis



Source: Tom Eckman, Northwest Power and Conservation Council

Northwest 6th Power Plan

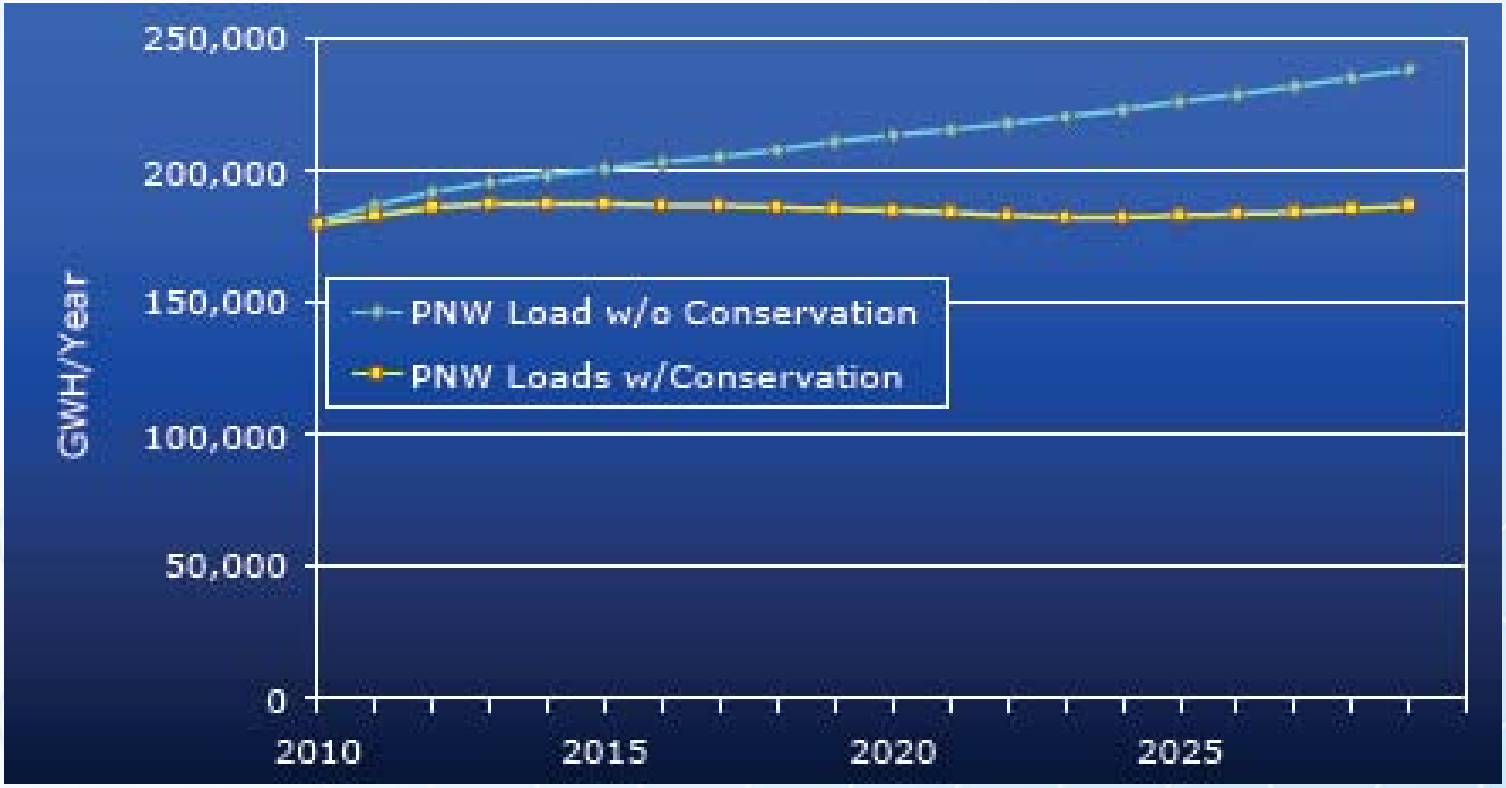
- Increase efficiency spending 2-3X



Source: Tom Eckman, Northwest Power and Conservation Council

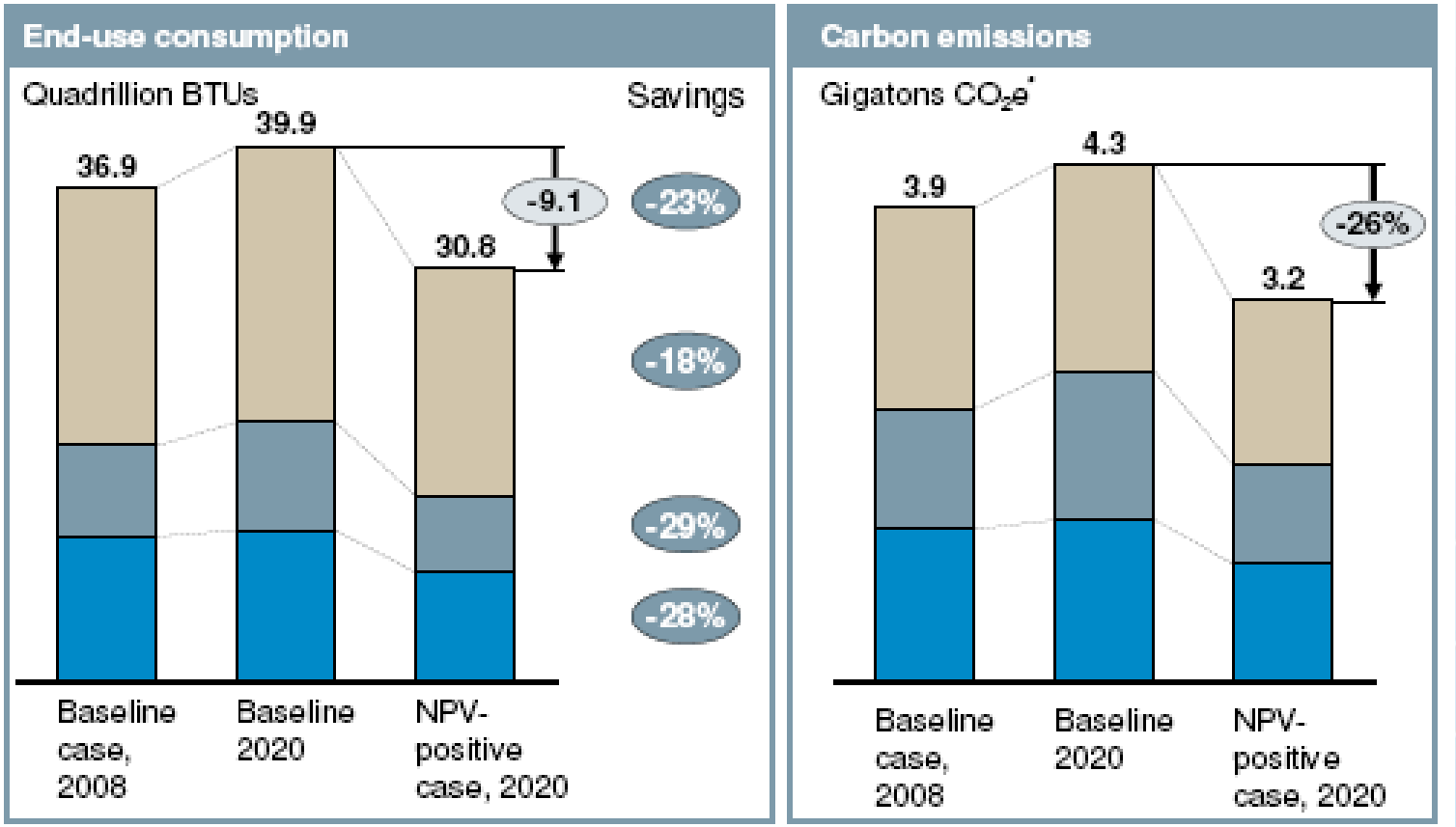
Northwest 6th Power Plan

- Meet 90% of growth with efficiency

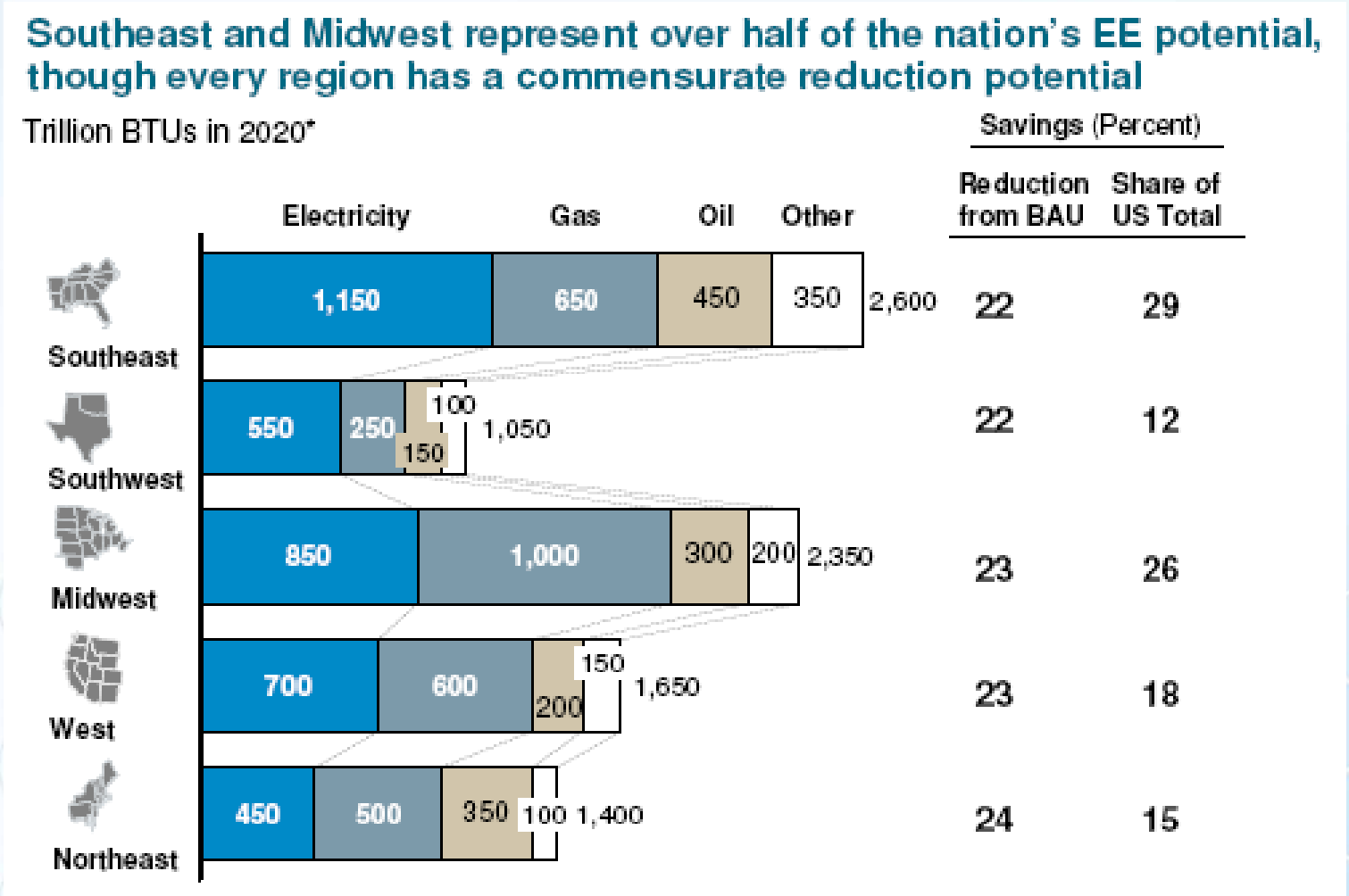


Source: Tom Eckman, Northwest Power and Conservation Council

McKinsey 2009 Analysis of Energy-Efficiency Potential

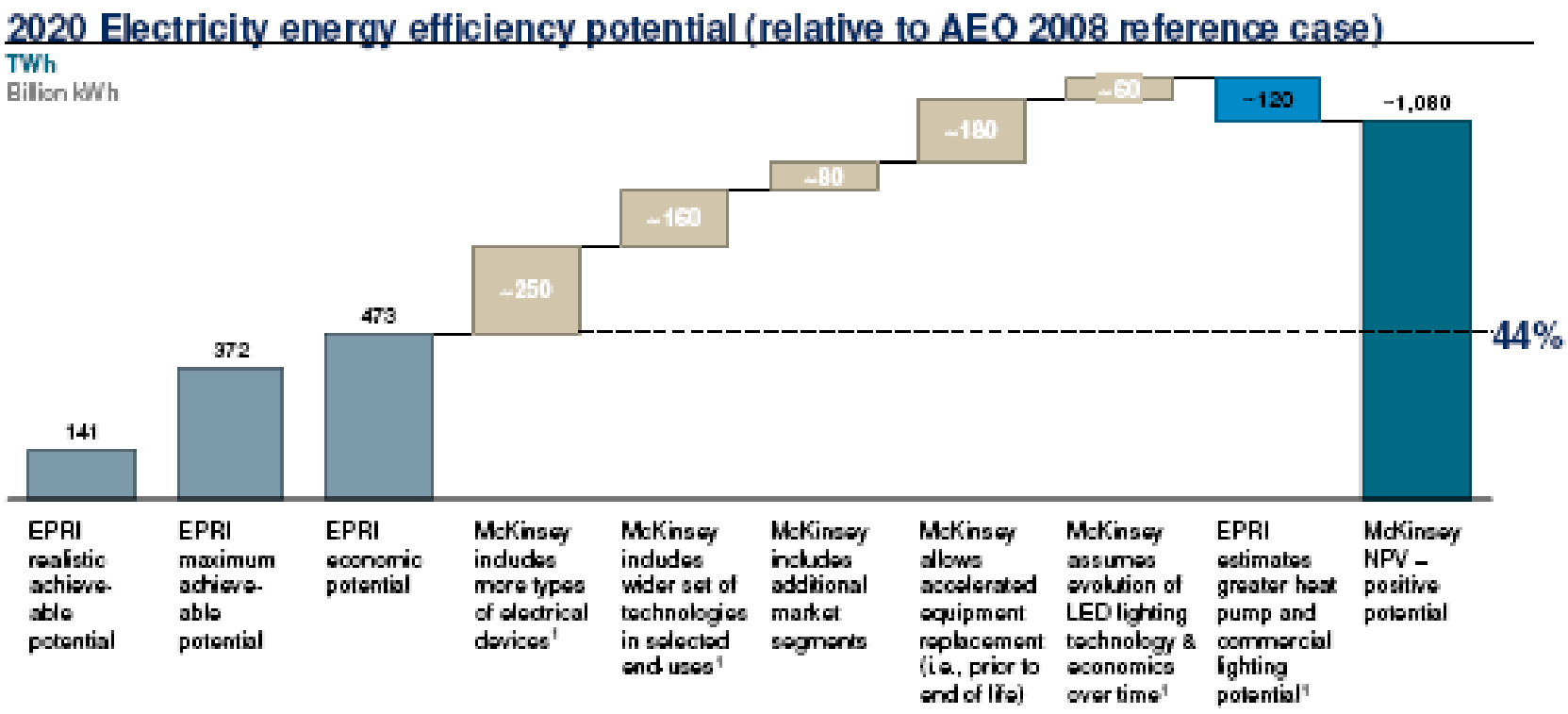


Efficiency Potential Extends Across All Regions



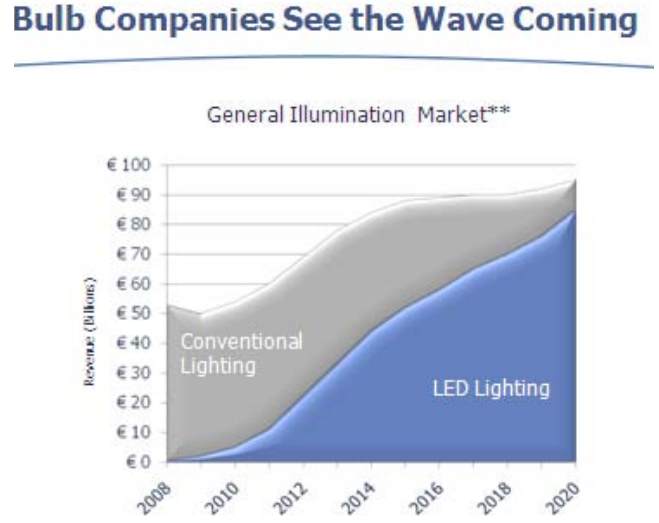
Source: McKinsey 2009

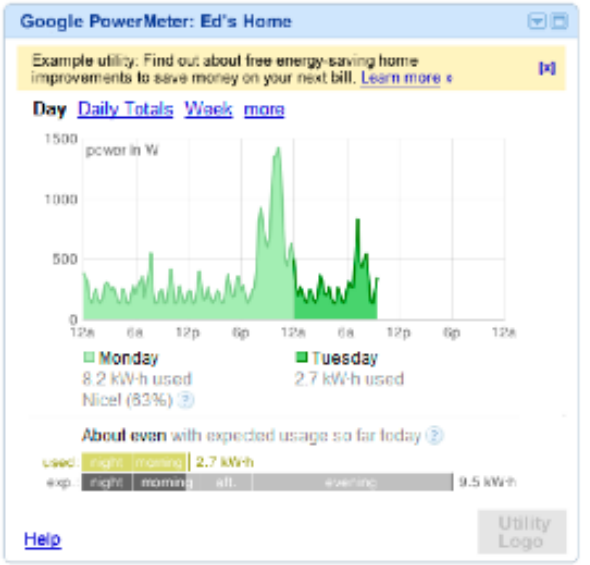
Comparison between EPRI and McKinsey energy efficiency potential values, year 2020

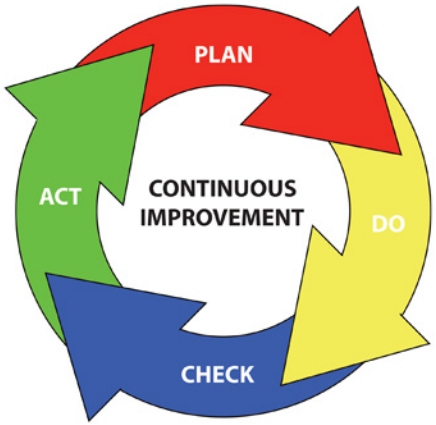


Source: McKinsey

New Technologies







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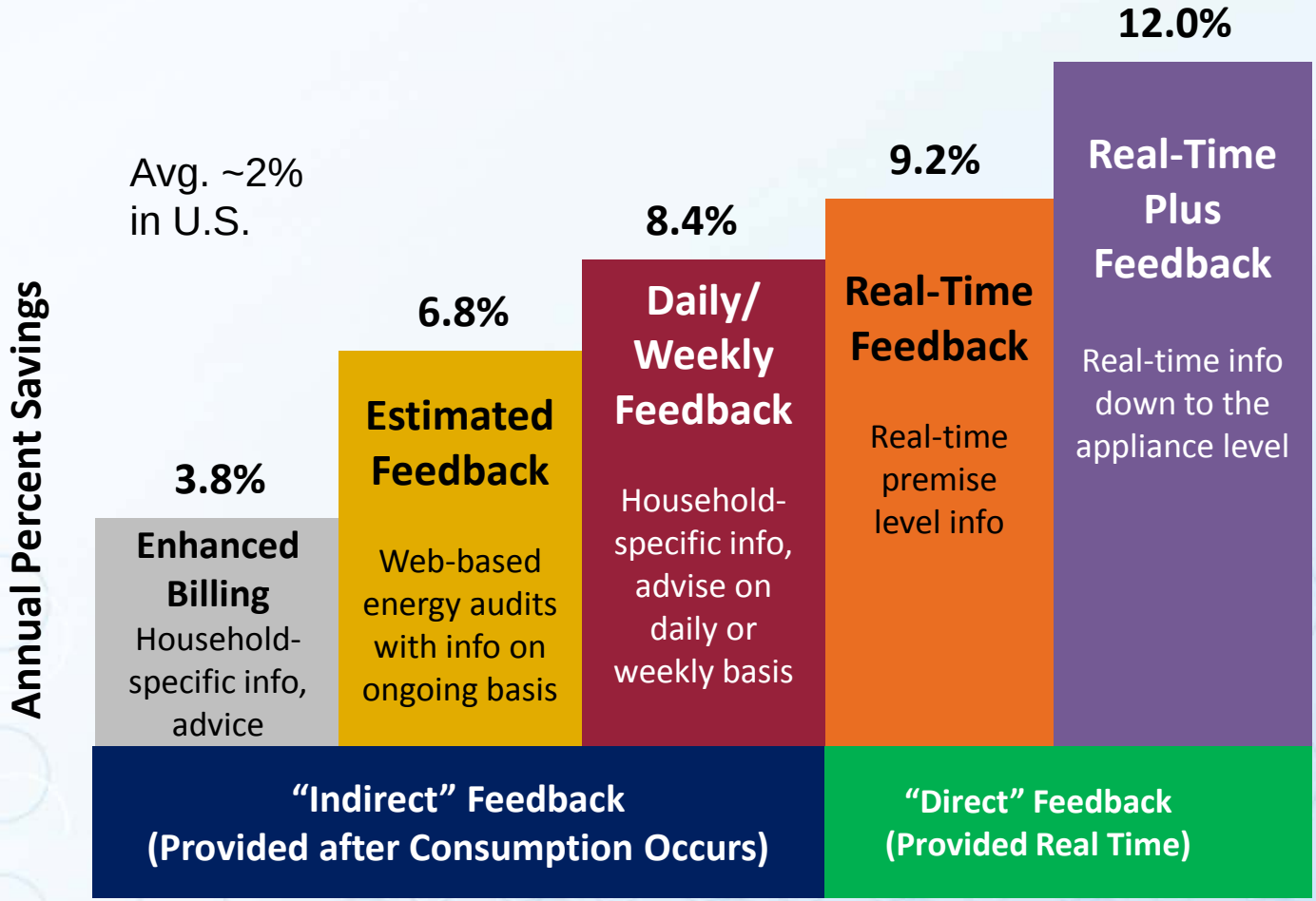
Providing Consumers with Feedback on Energy Use

Small samples, need further testing



Demand Response and Savings

Feedback can be effective at:

- generating peak-load reductions and
- reducing overall levels of household energy consumption.

The focus of feedback programs influences the level of overall savings.

Program Focus	Peak Savings		Overall Energy Savings	
	Range	Average	Range	Average
Peak Demand	1.2% to 33%	12.50%	-5.5% to 8.0%	3%
Overall Conservation & Efficiency	n.a.	n.a.	1.2% to 32%	10%

Overall energy savings are much higher for programs focused on overall efficiency and conservation.

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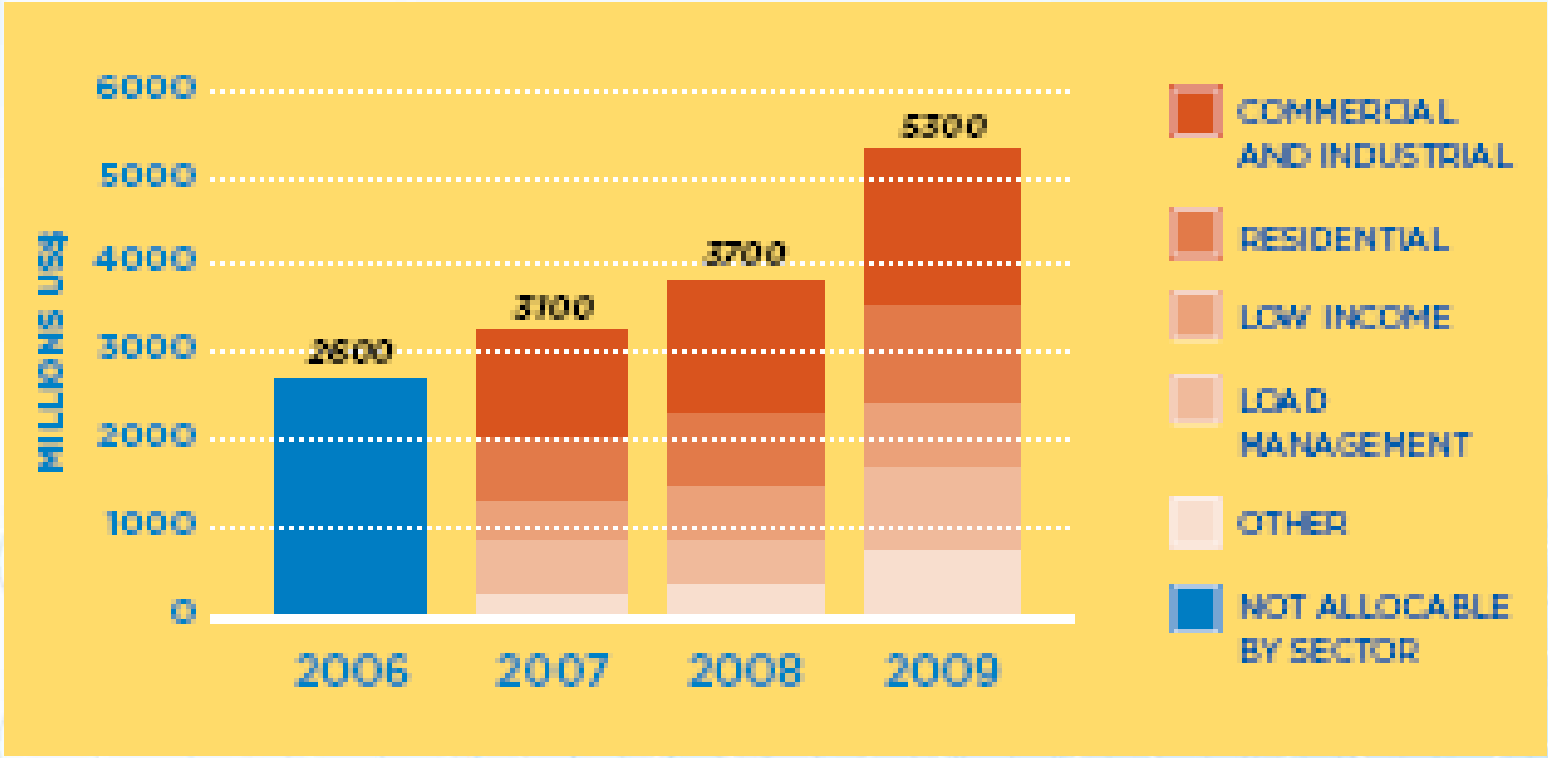
U.S. Electric and Gas Utility Budgets for Energy Efficiency & Load Management



Source: Consortium for Energy Efficiency

LBL Estimate of Future Utility EE Spending

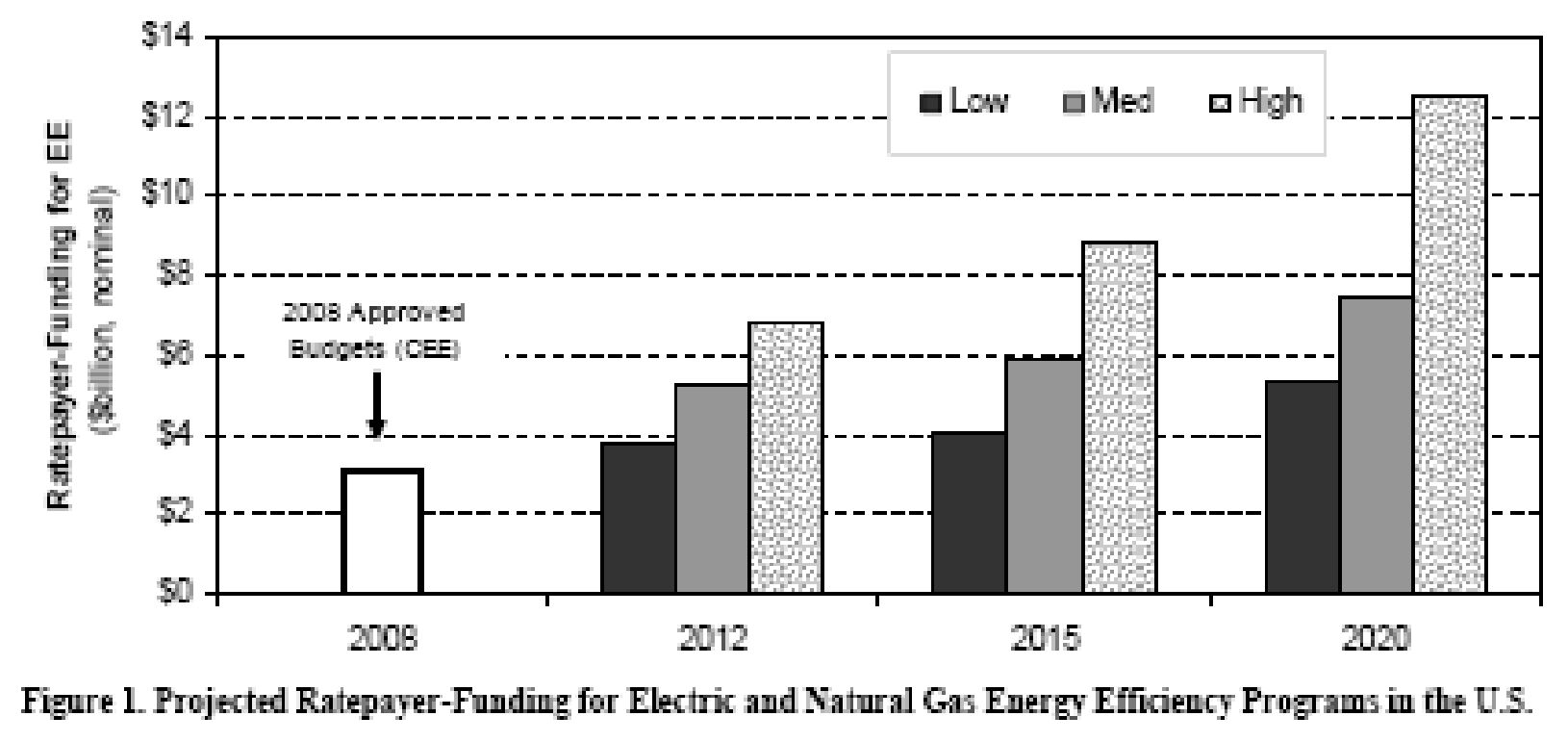


Figure 1. Projected Ratepayer-Funding for Electric and Natural Gas Energy Efficiency Programs in the U.S.

Source: Barbose, Goldman and Schlegel 2009

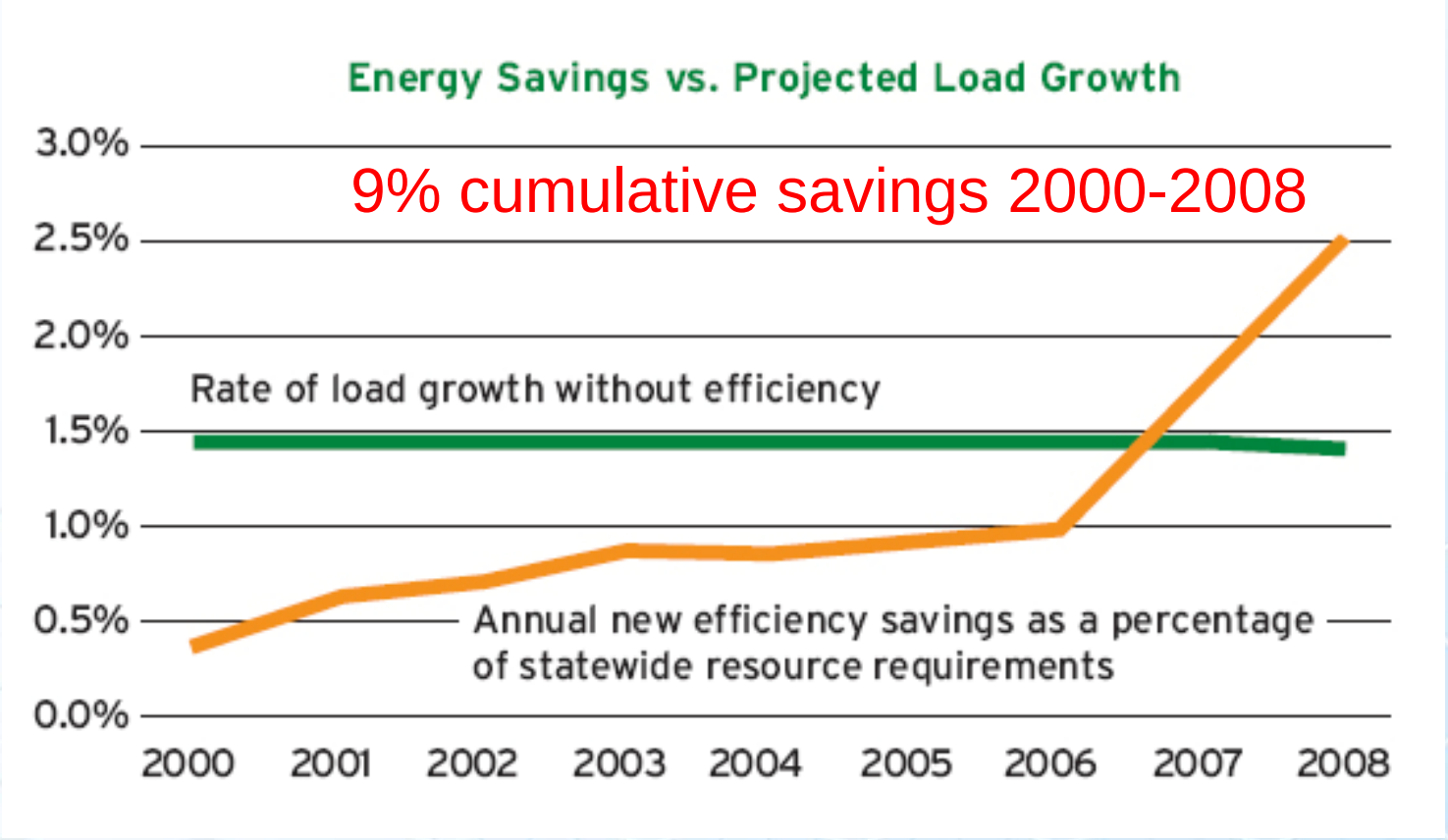
Policy Approaches for EE In the Utility Sector

- IRP and include EE in rates

(can require utilities to acquire all cost-effective EE)

- System benefits charge (e.g. 2 mils/kWh)
- Energy efficiency resource standard (savings targets)
- Wholesale-level approaches
- Codes and standards

Vermont – Raising Efficiency to a New Level



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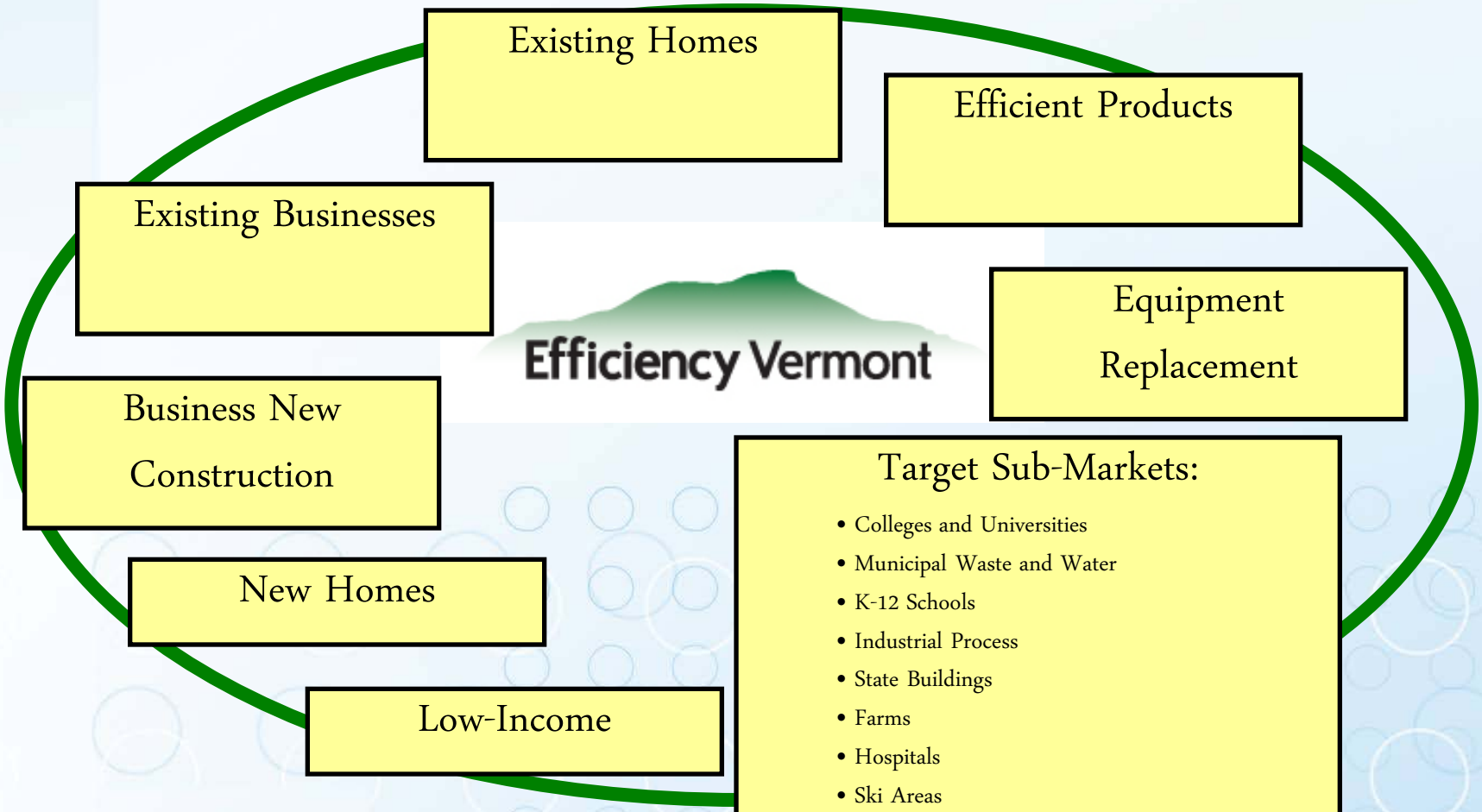
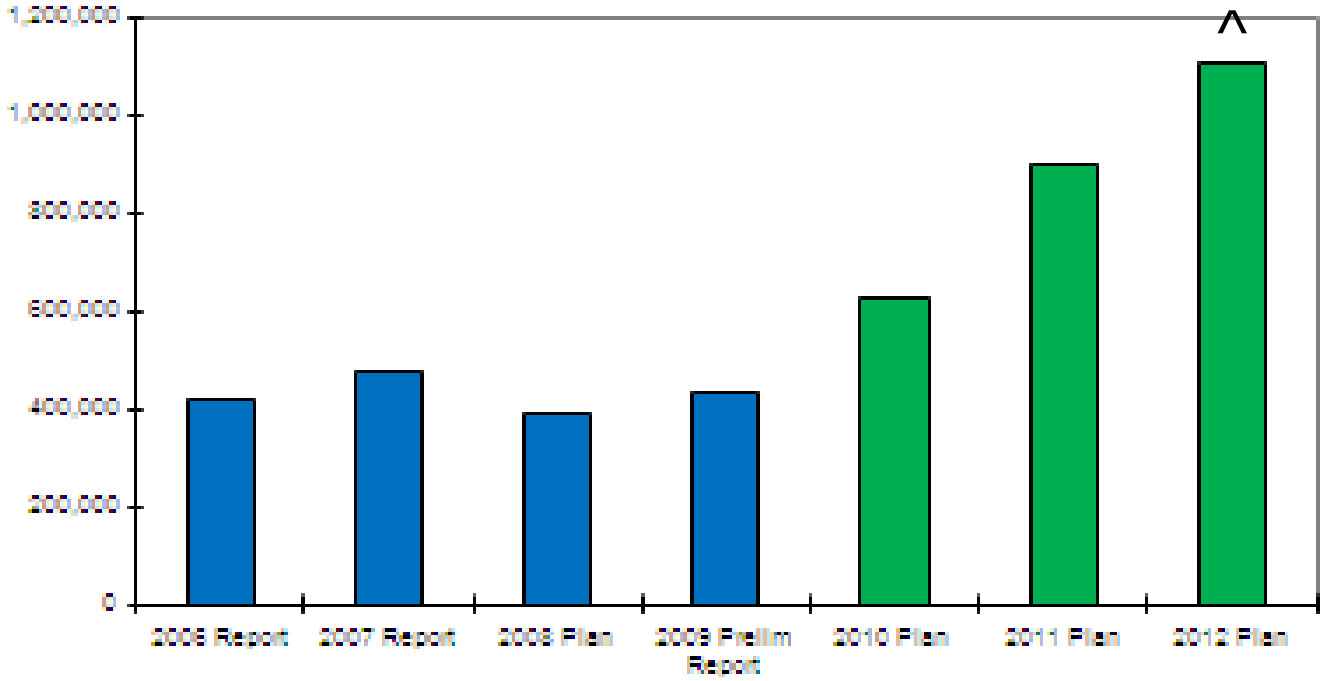
Source: Efficiency Vermont and VT Dept of Public Service

What Markets Do We Work In?



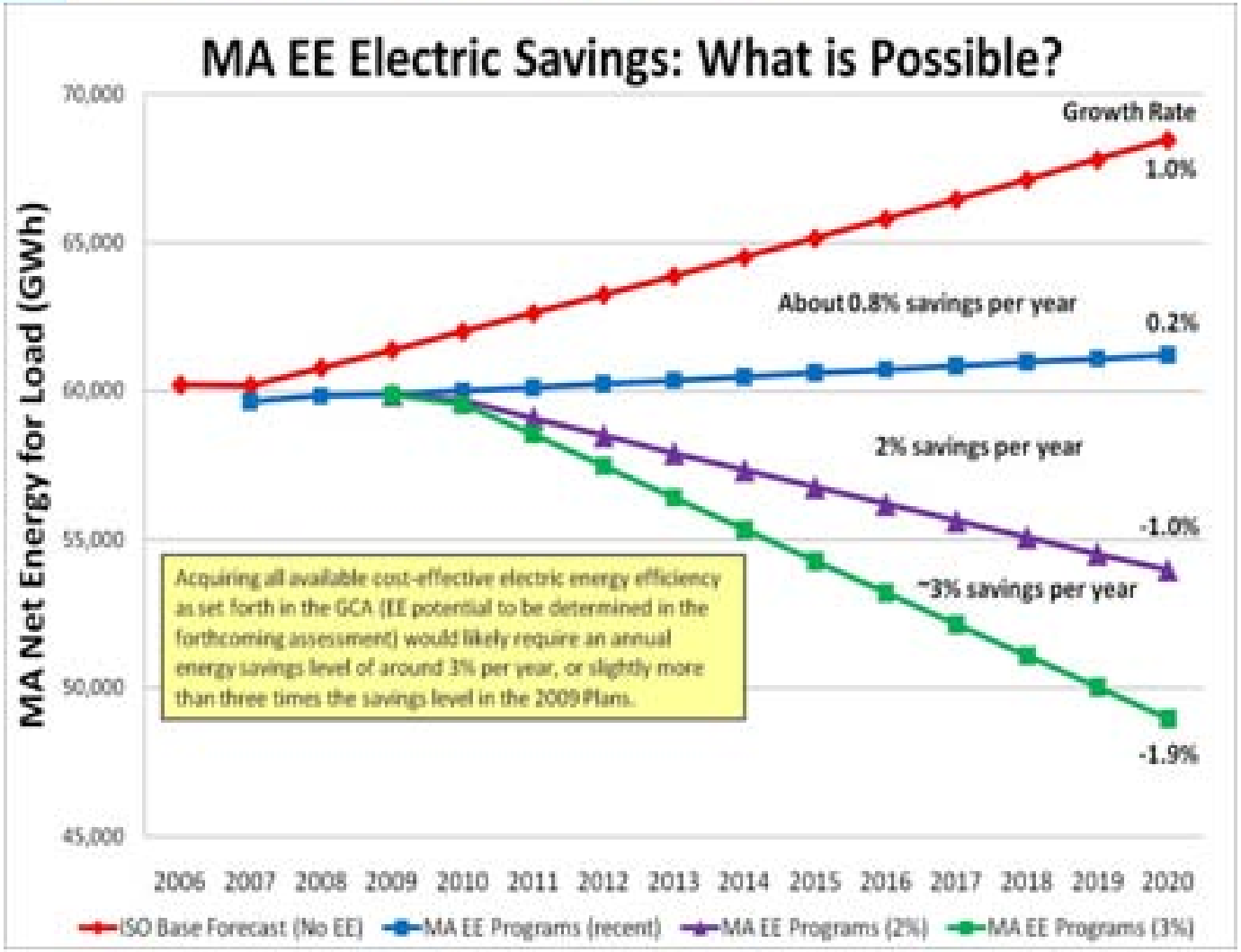
Annual MWh 2010-2012

2.4% savings



DOER
Massachusetts Department of Energy Resources

Creating A Greener Energy Future For the Commonwealth



2020 Cumulative Electricity Savings Targets by State

Vermont	30%	Indiana	14%
New York	26%	Rhode Island	14%
Massachusetts	26%	Hawaii	14%
Maryland	25%	California	13%
Delaware	25%	Ohio	12%
Illinois	18%	Colorado	12%
Connecticut	18%	Utah	11%
Minnesota	17%	Michigan	11%
Iowa	16%	Pennsylvania	10%
Arizona	15%	Washington	~10%

Includes extensions to 2020 at savings rates that have been established

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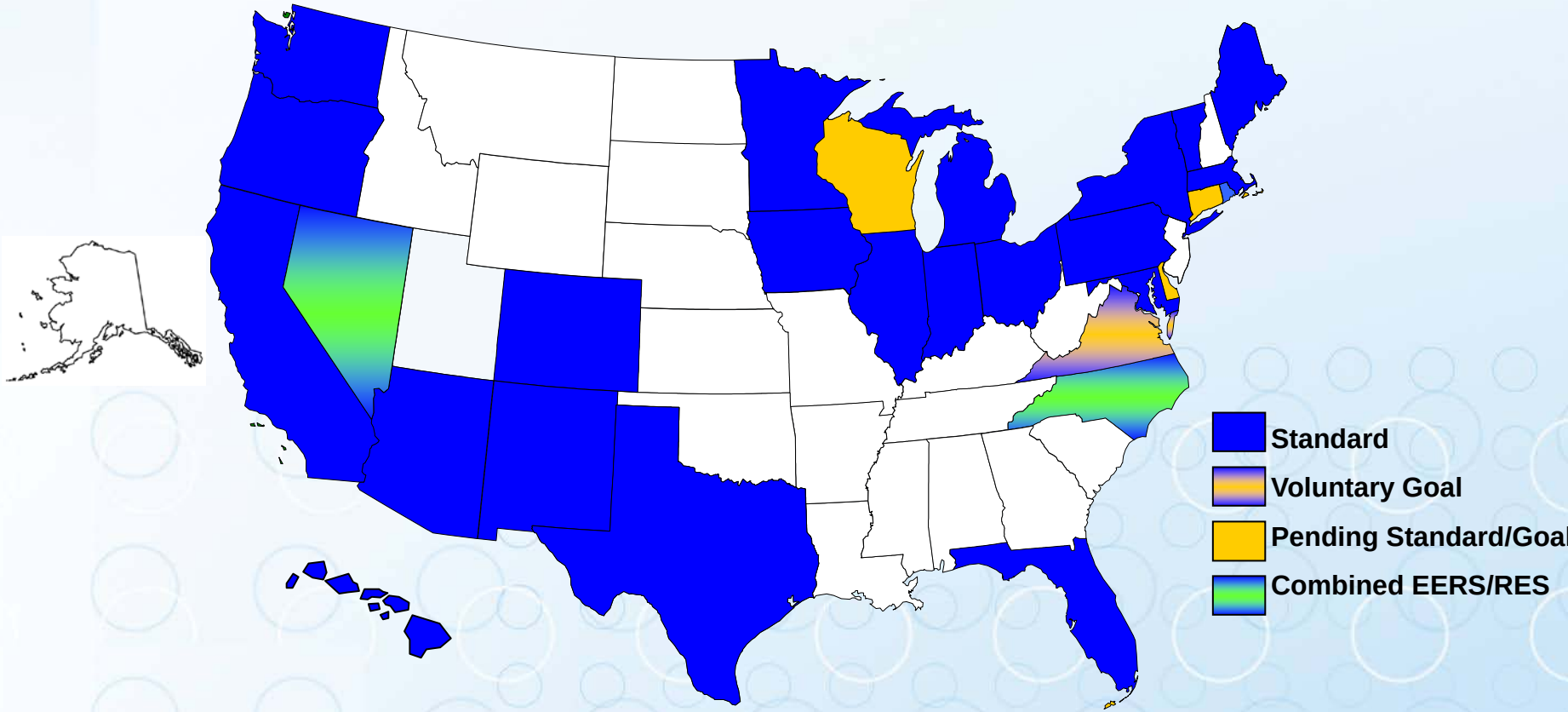
State Energy Efficiency Resource Standard (EERS) Activity

Twenty-seven states have an EERS in place or pending



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EERS Implementation

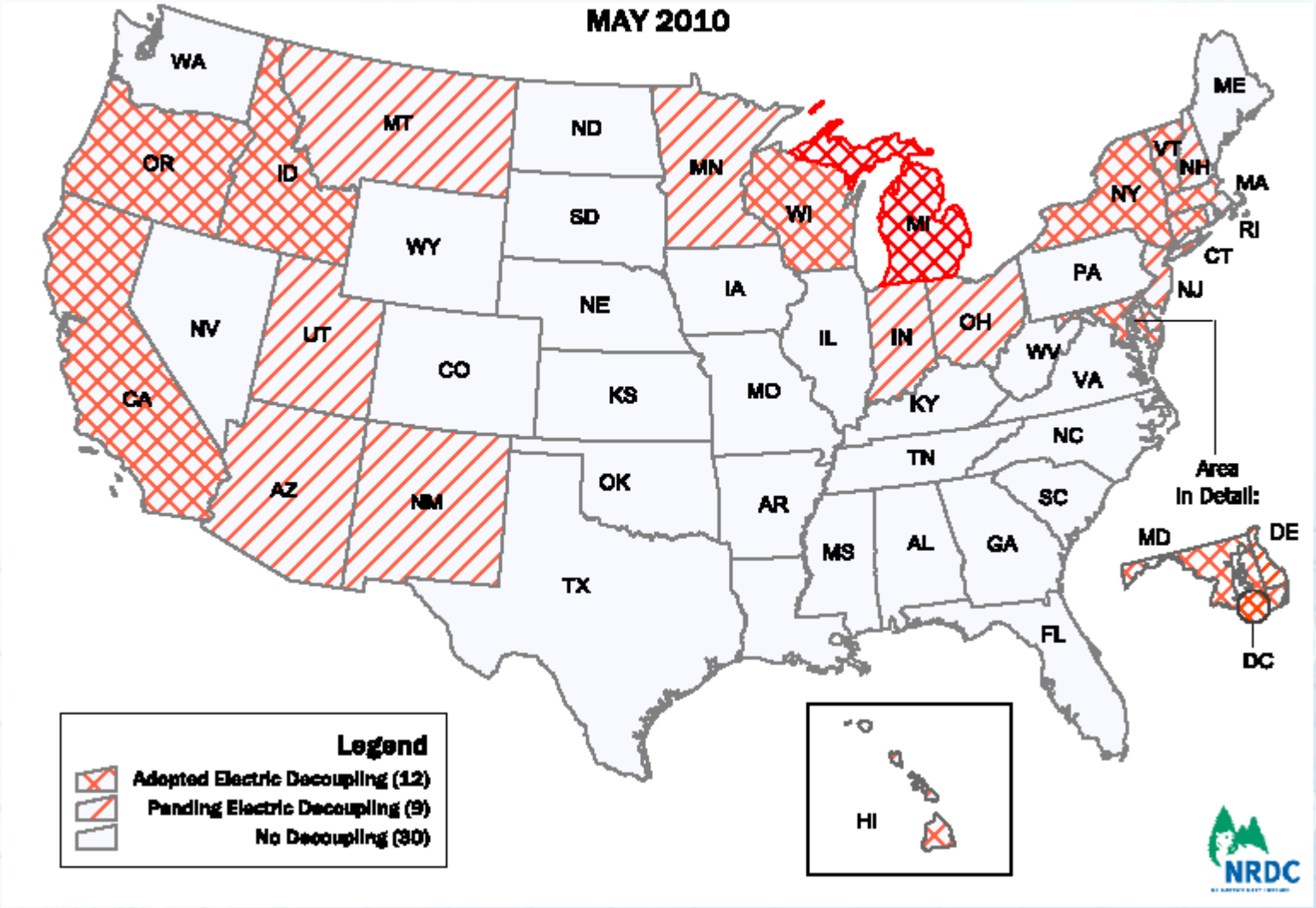
So far implemented in about 10 states

- In all cases have met or are on-track for meeting targets

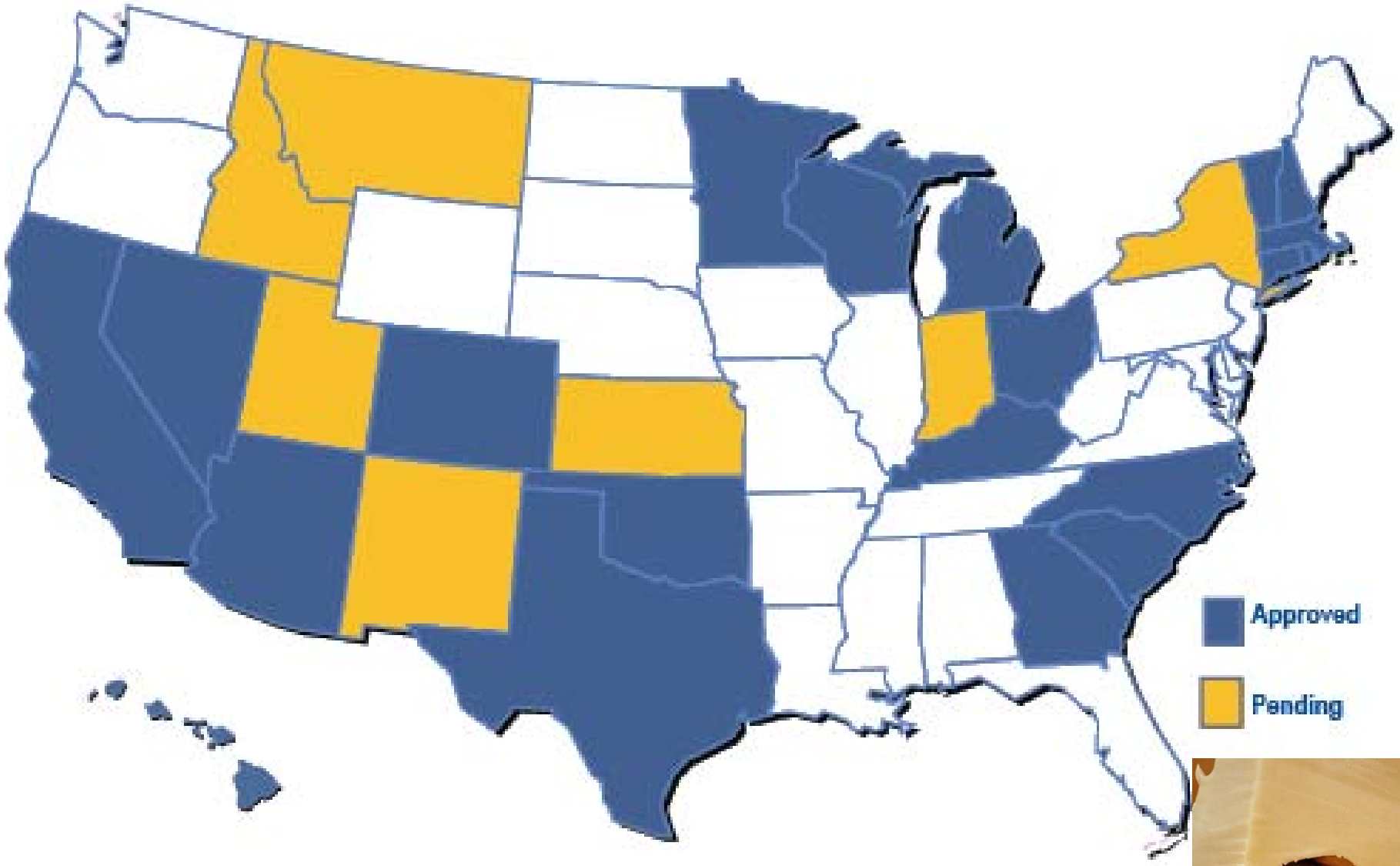
Majority of states still developing regulations and have yet to start programs

Some very ambitious targets may be challenging

Electric Decoupling in the U.S.



Performance Incentives for Electric Efficiency by State



Source: Institute for Electric Efficiency

Promoting Efficiency at the Wholesale Level

- Forward capacity markets
- Considering EE as part of transmission planning
- Paying LMP (or similar) for EE at wholesale level, just as FERC is now proposing for DR
- Other creative ideas

Total Results from ISO New England Forward Capacity Market Auctions

Participant Type	Distributed Generation Fossil Fuel	Distributed Generation Renewable	Energy Efficiency	RTDR & Load Management	RTEG	Total Cleared MW
Merchant	51.275	0.400	41.725	1217.110	564.926	1875.436
Quasi Gov	41.121	0.788	193.575	0.000	0.000	235.484
Utility	34.525	0.000	931.203	149.511	123.283	1238.522
Grand Total	126.921	1.188	1166.503	1366.621	688.209	3349.442

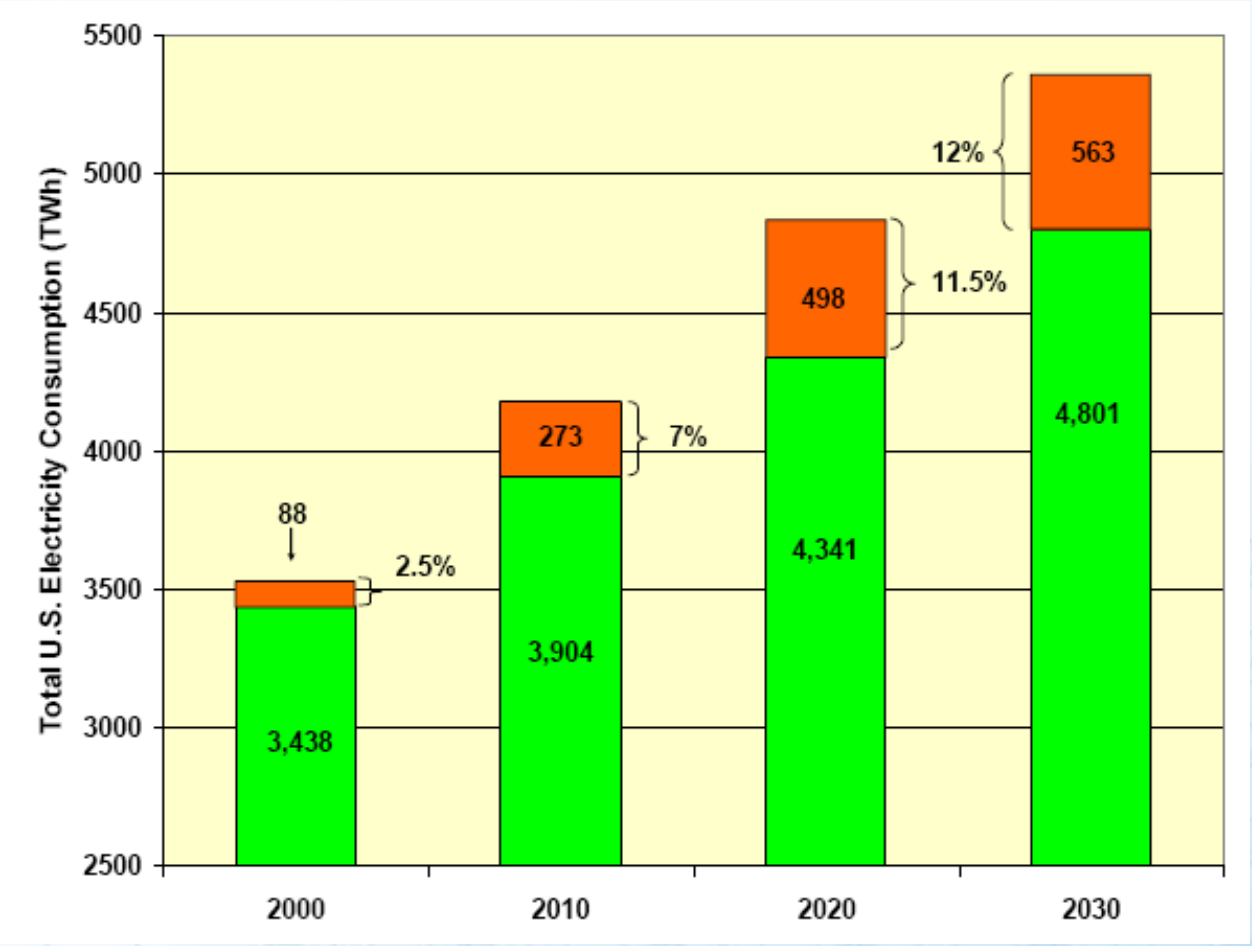
Notes:

- Merchant = Includes competitive (non-regulated) demand response providers, energy service companies, retail suppliers, and non-government customers.
- Government = Includes government and quasi-government entities. Does not include municipal utilities.
- Utilities = Includes all utility companies (investor-owned and public power).

Source: ISO New England, Oct. 2010

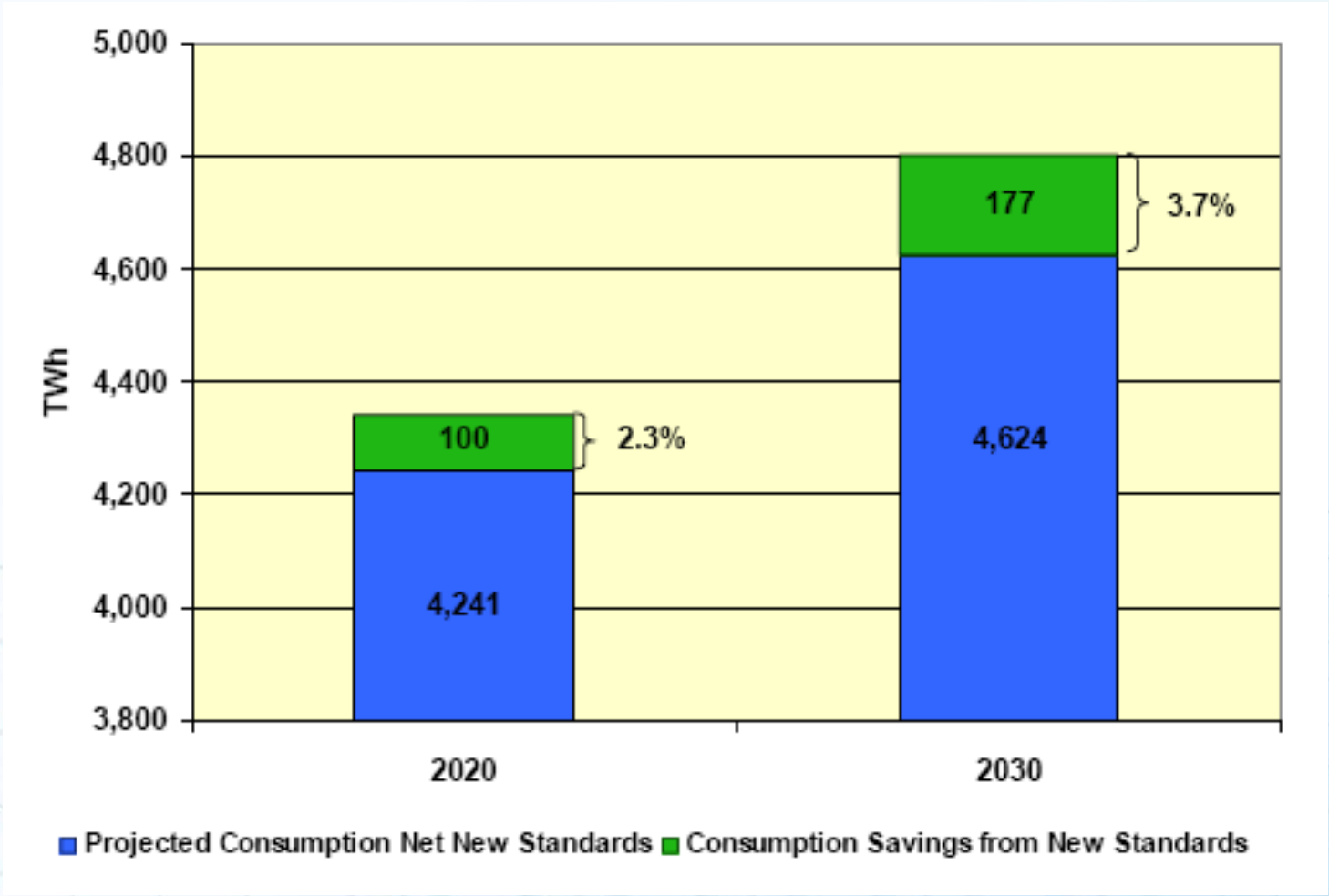
ISO New England

Savings from Existing Appliance Standards Relative to U.S. Electricity Use

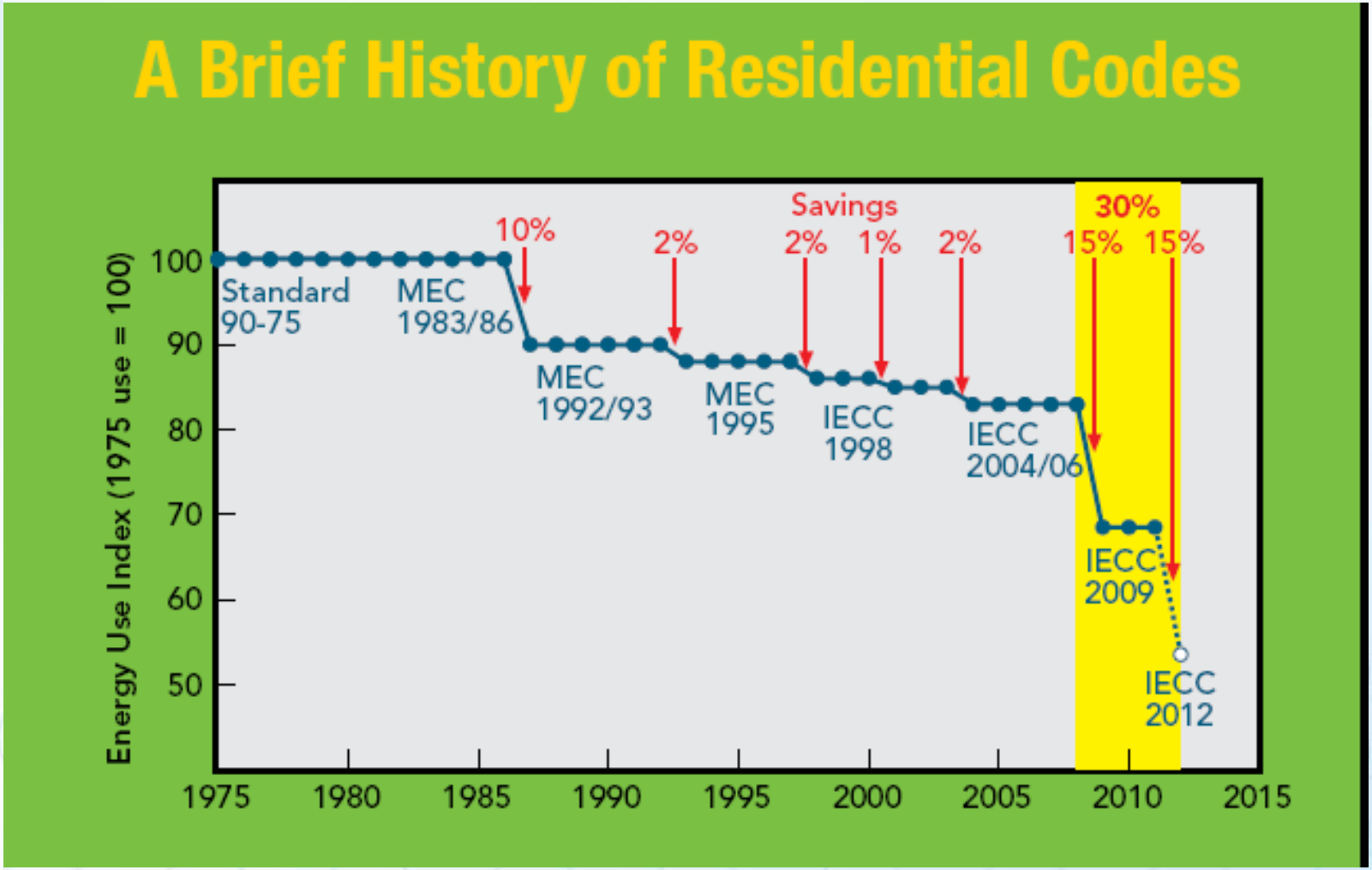


Source: Neubauer et al., 2009, ACEEE

Potential Savings from Updated Standards

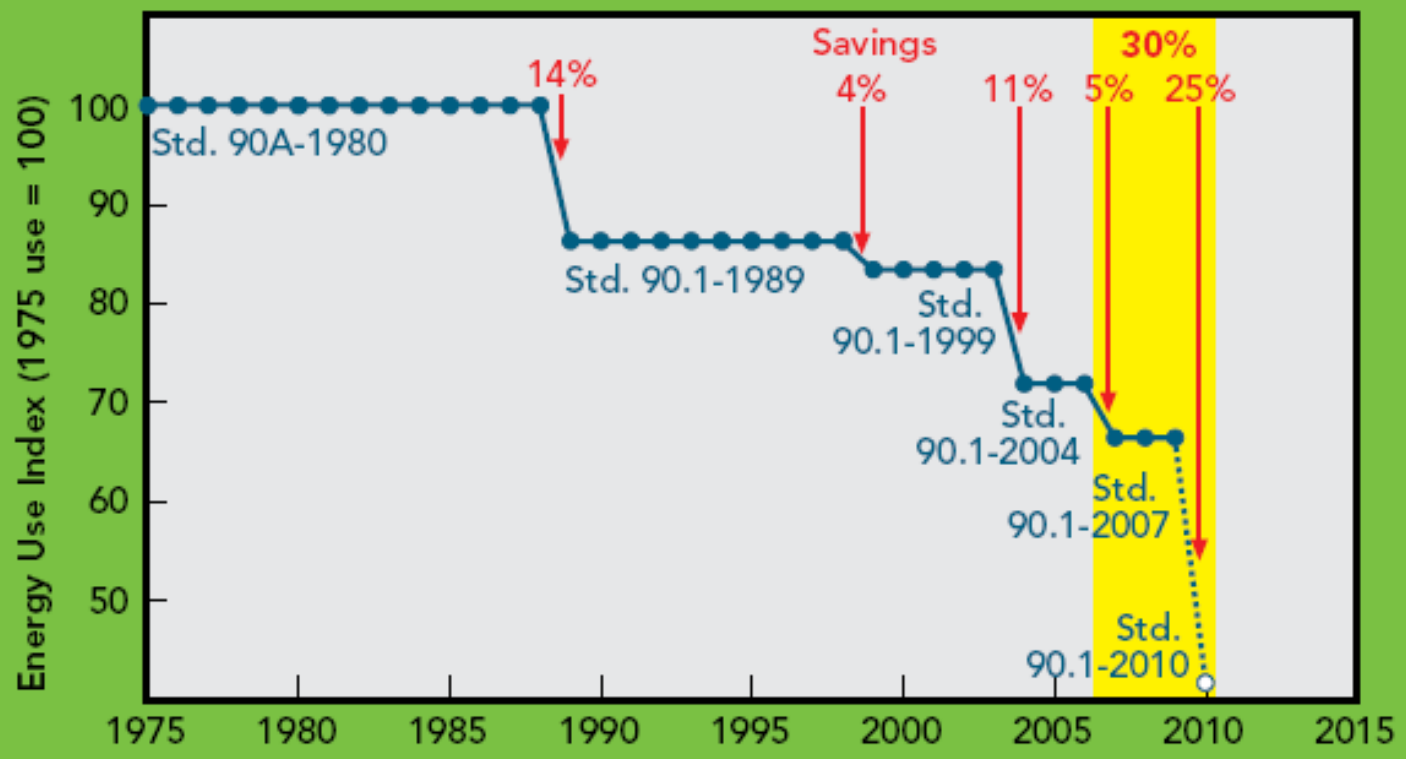


Source: Neubauer et al., 2009, ACEEE


A Brief History of Residential Codes
Energy Use Index (1975 use = 100)
100
90
80
70
60
50
1975
1980
1985
1990
1995
2000
2005
2010
2015
Standard 90-75
MEC 1983/86
MEC 1992/93
MEC 1995
IECC 1998
IECC 2004/06
IECC 2009
IECC 2012
10%
2%
Savings
2%
1%
2%
30%
15%
15%

Source: DOE.

A Brief History of Commercial Codes



Source: DOE.

Conclusions

- Large cost-effective savings available – 20%+
  - U.S. needs these savings to stay competitive
- Many policy approaches for capturing these savings
  - IRP and EERS both common
  - Codes and standards add substantial savings
  - May be options at wholesale level
- Utility business case for EE important

Contact Information

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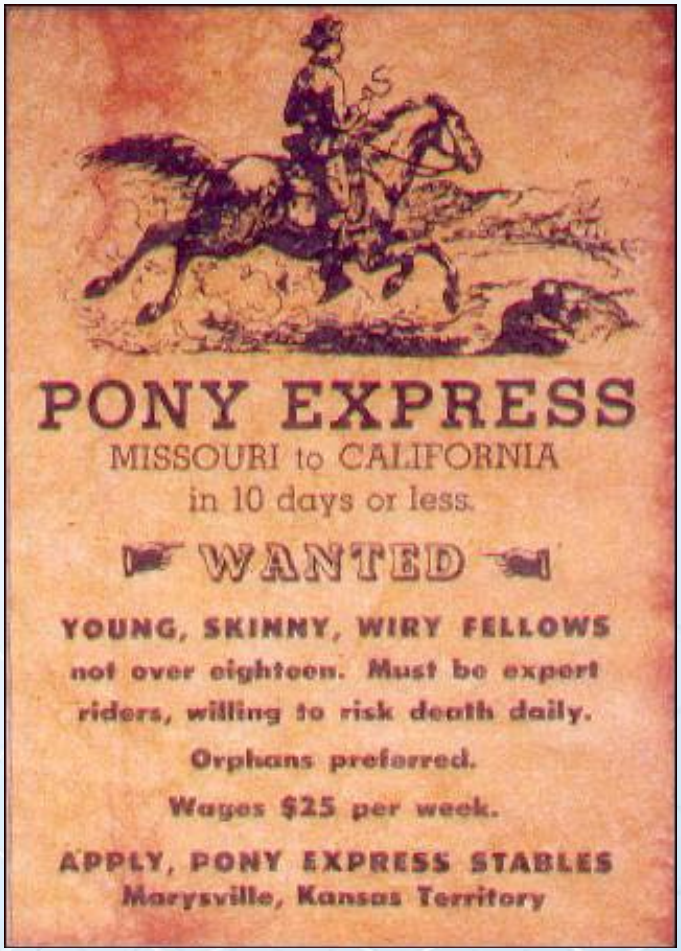

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