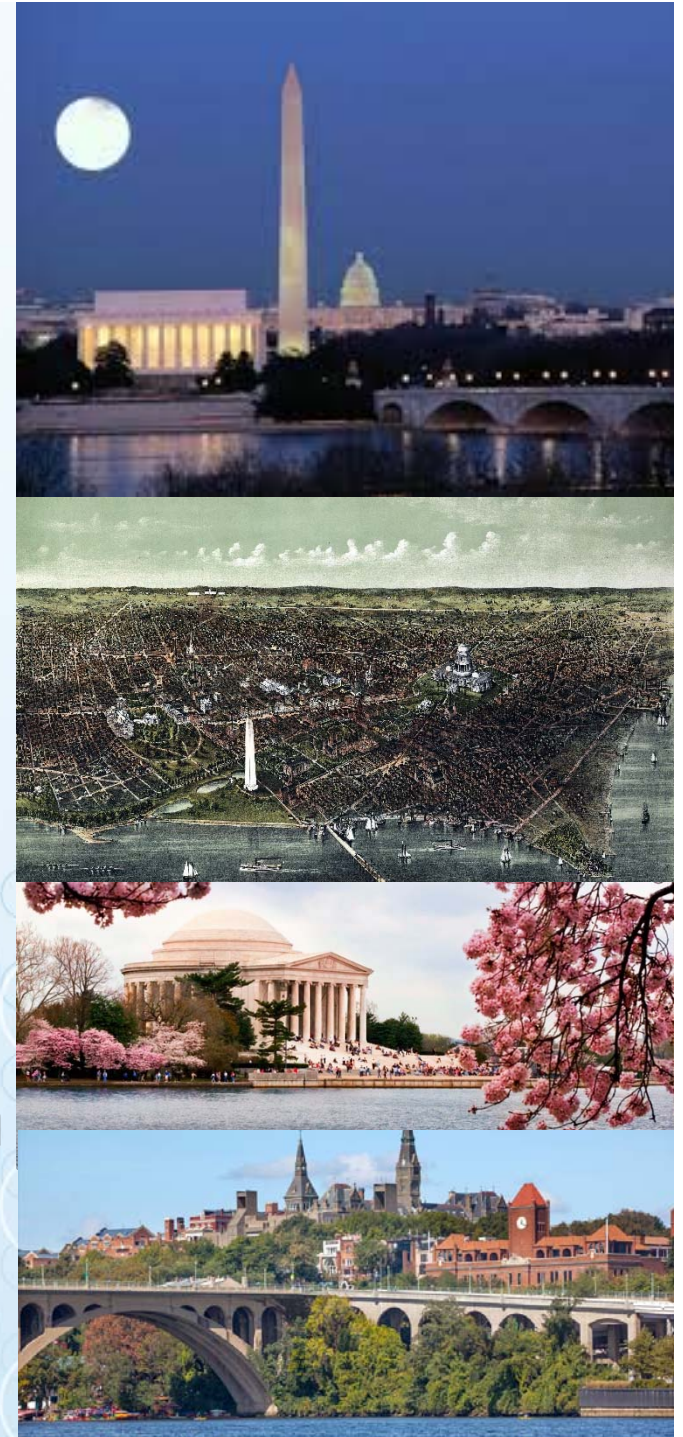




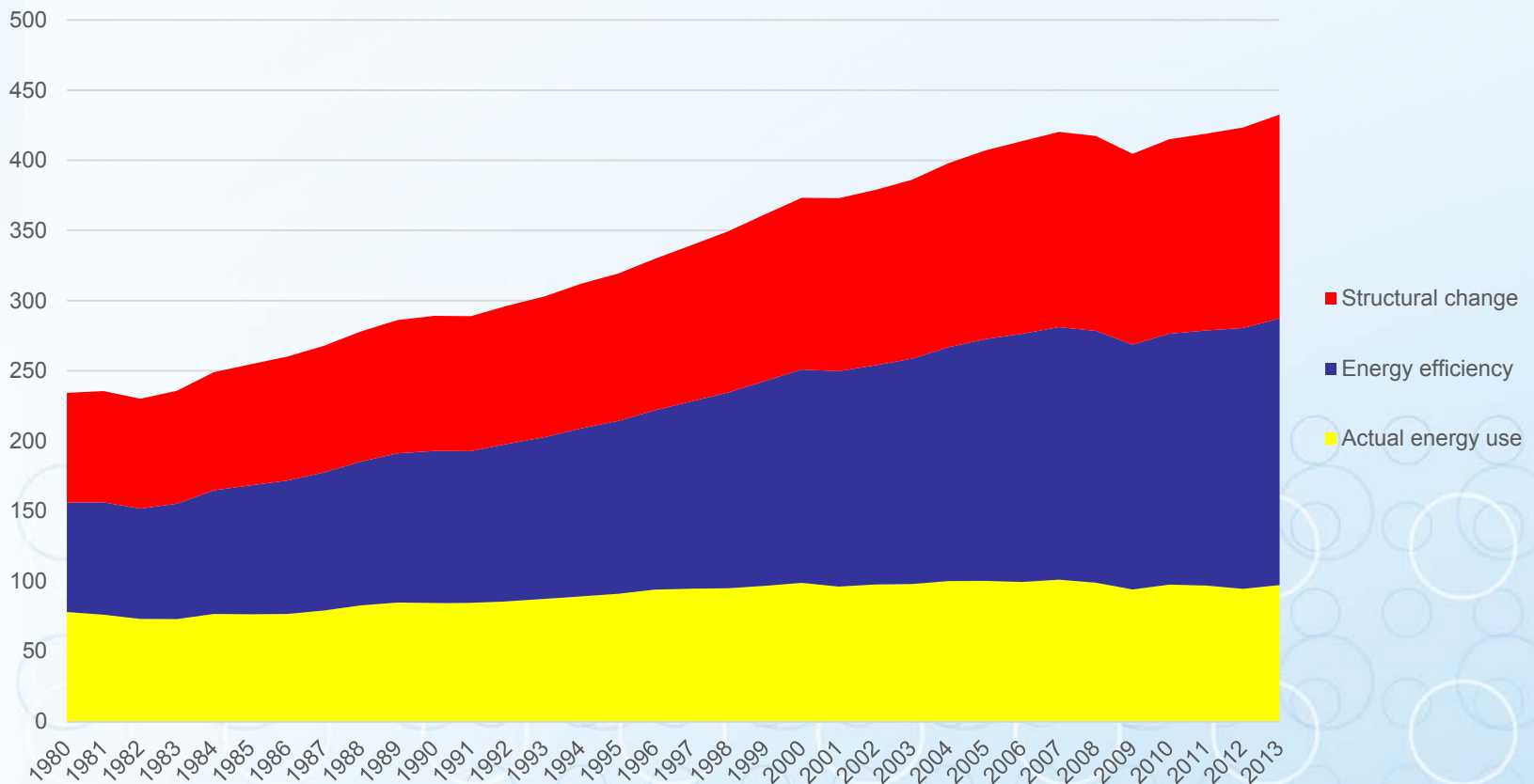
Large-Scale Transformation

Steven Nadel, ACEEE
2015 Market Transformation Symposium

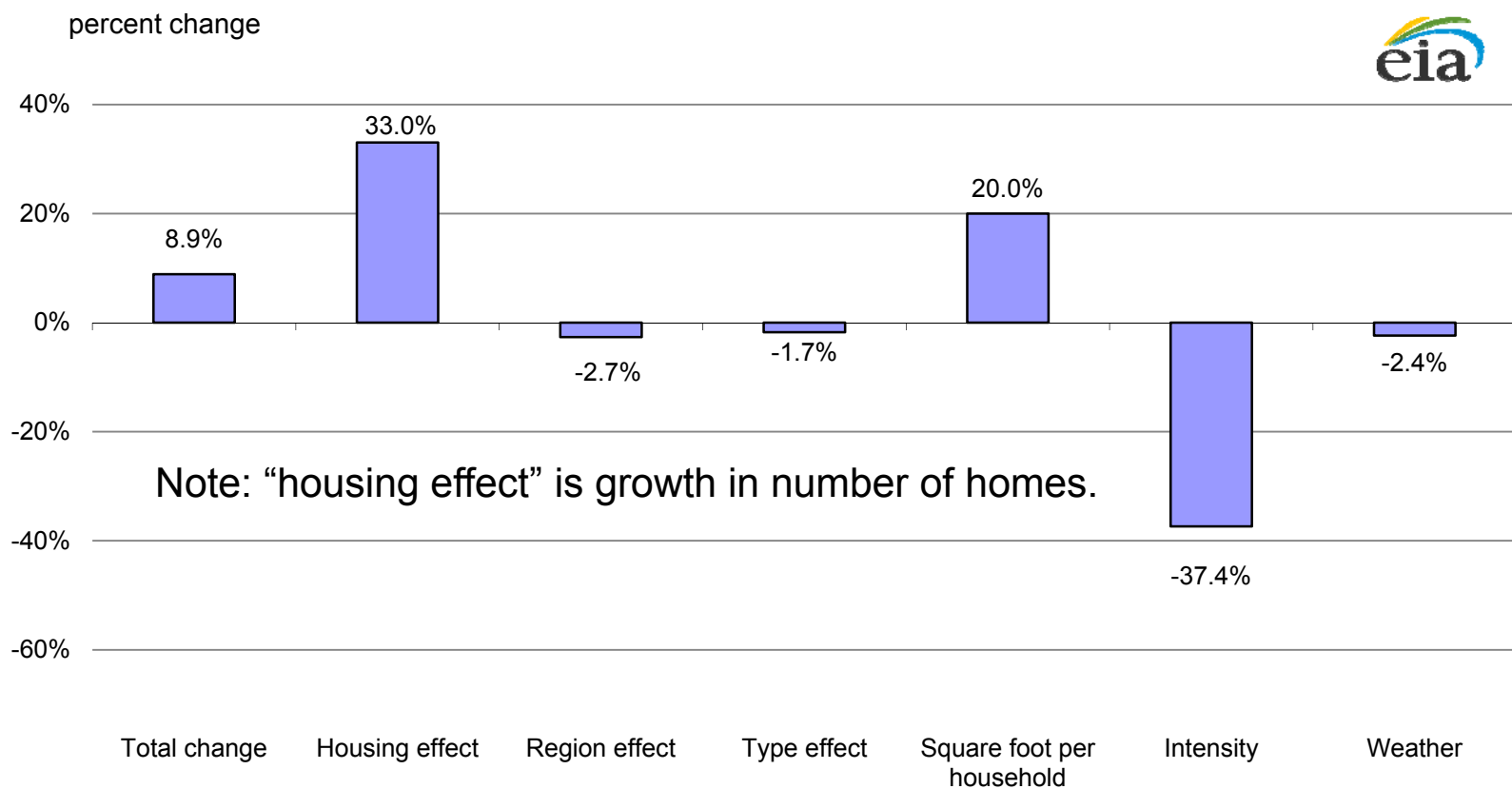




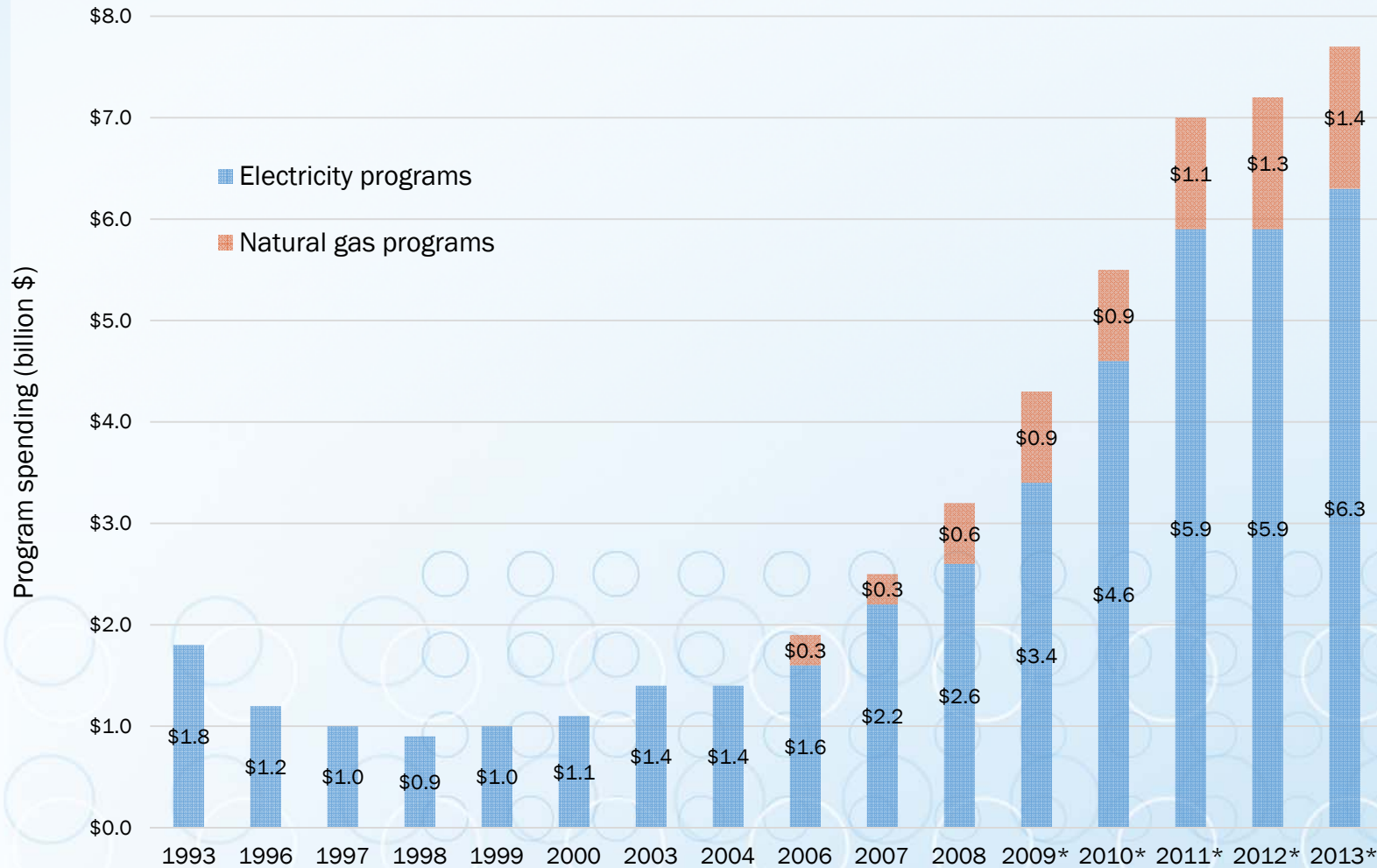
Changes in US Energy Use, 1980-2013



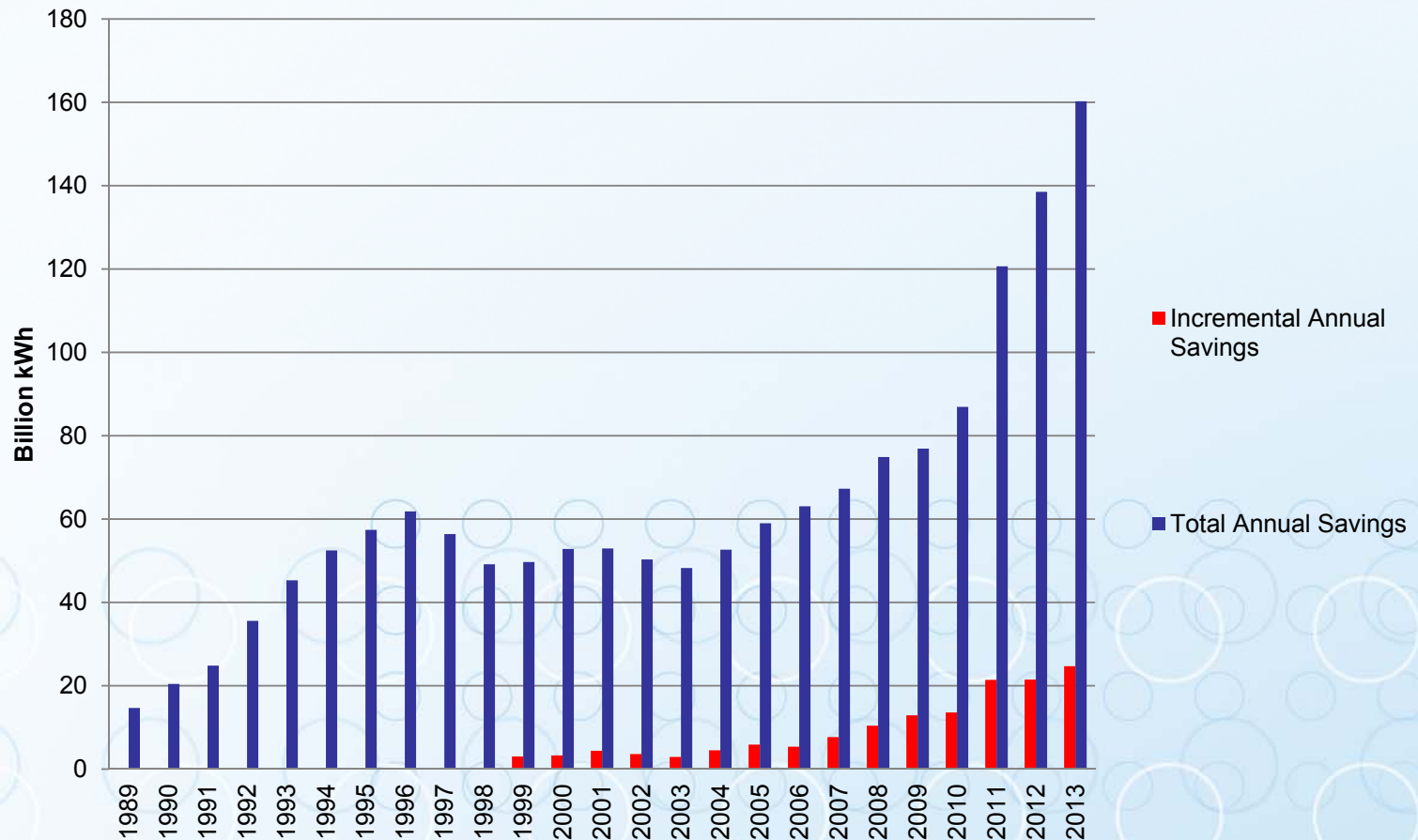
Decomposition of Residential Energy Consumption, 1980-2009



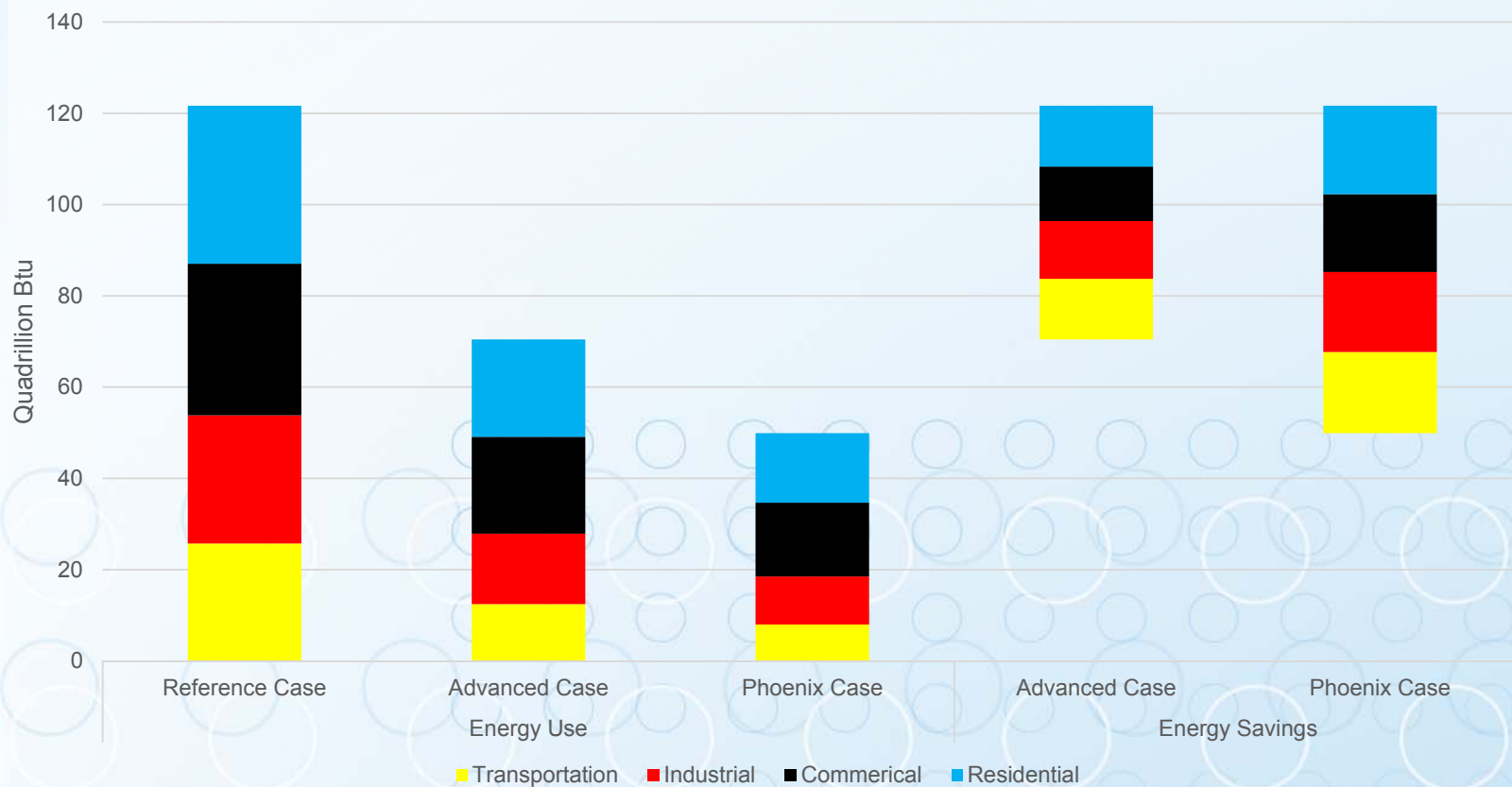
Utility Sector Energy Efficiency Spending



Savings from Utility EE Programs



Energy Efficiency Scenarios for 2050

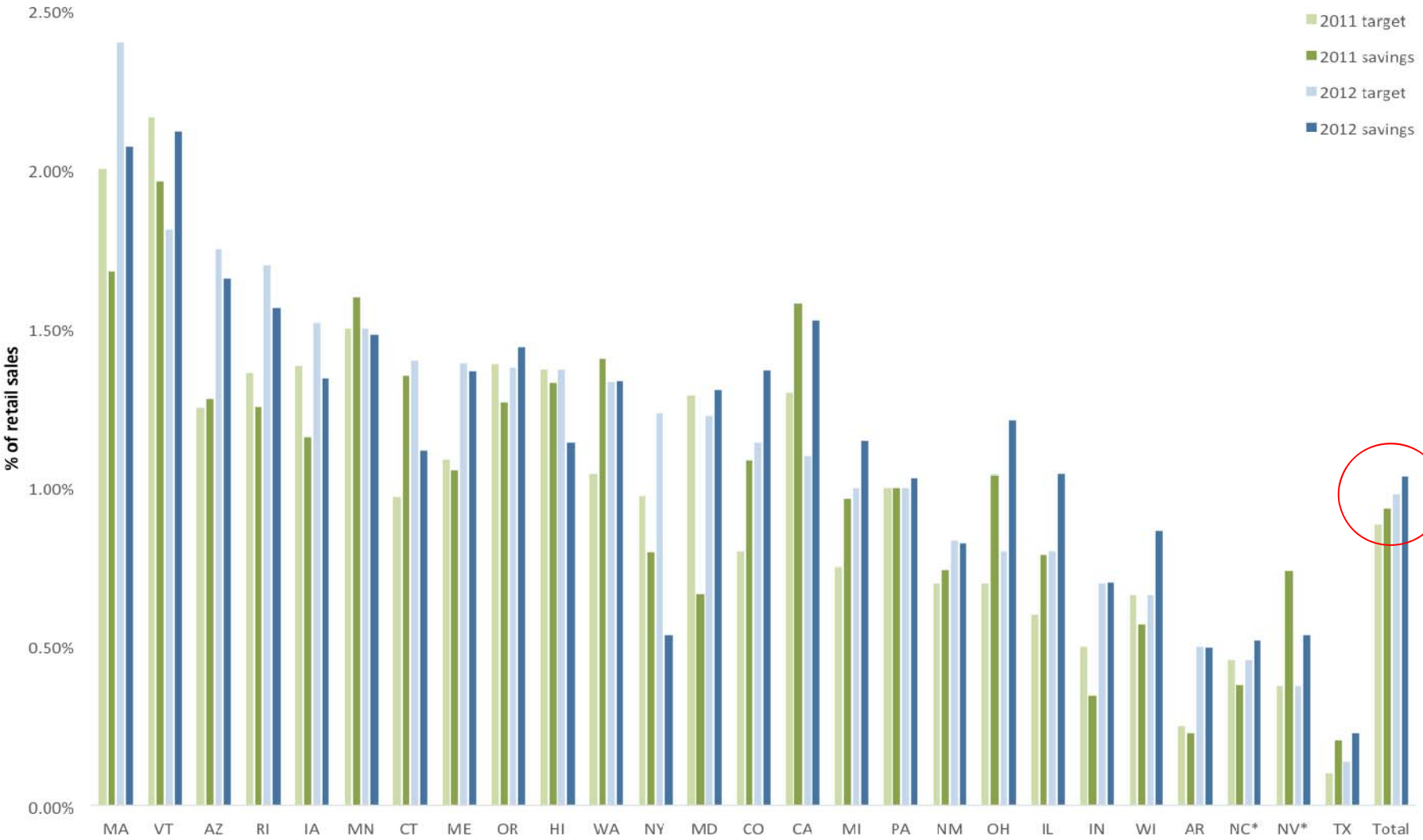


Electric Savings of Leading States

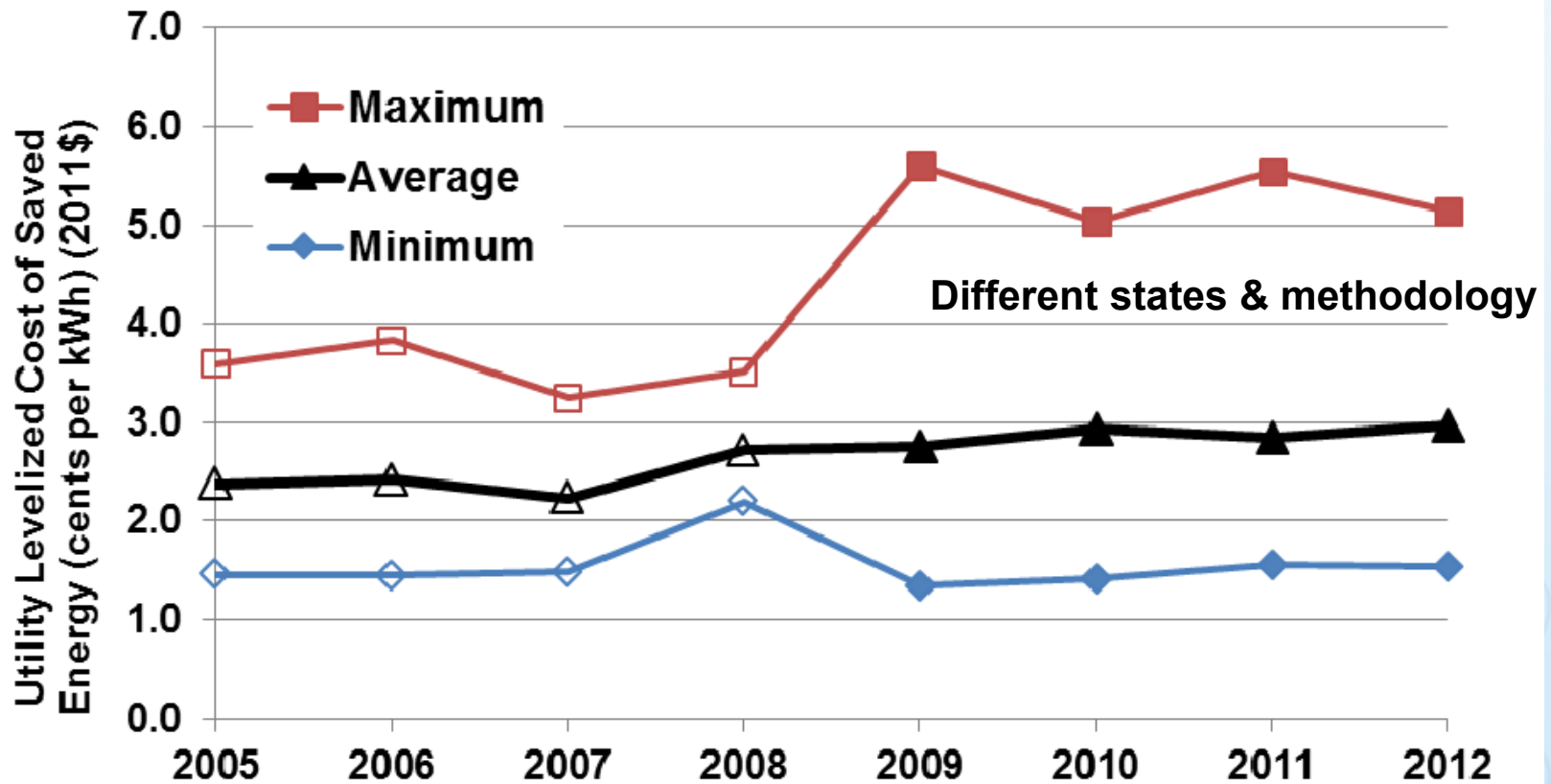
State	2013 net incremental savings (MWh)	% of retail sales
Rhode Island	161,831	2.09%
Massachusetts	1,116,442	2.05%
Vermont	99,074	1.78%
Arizona	1,317,329	1.74%
Hawaii	159,056	1.67%
Michigan	1,284,863	1.51%
Oregon	676,046	1.43%
Washington	990,143	1.35%
California	3,223,733*	1.25%

* 2012 data; 2013 data wasn't available yet

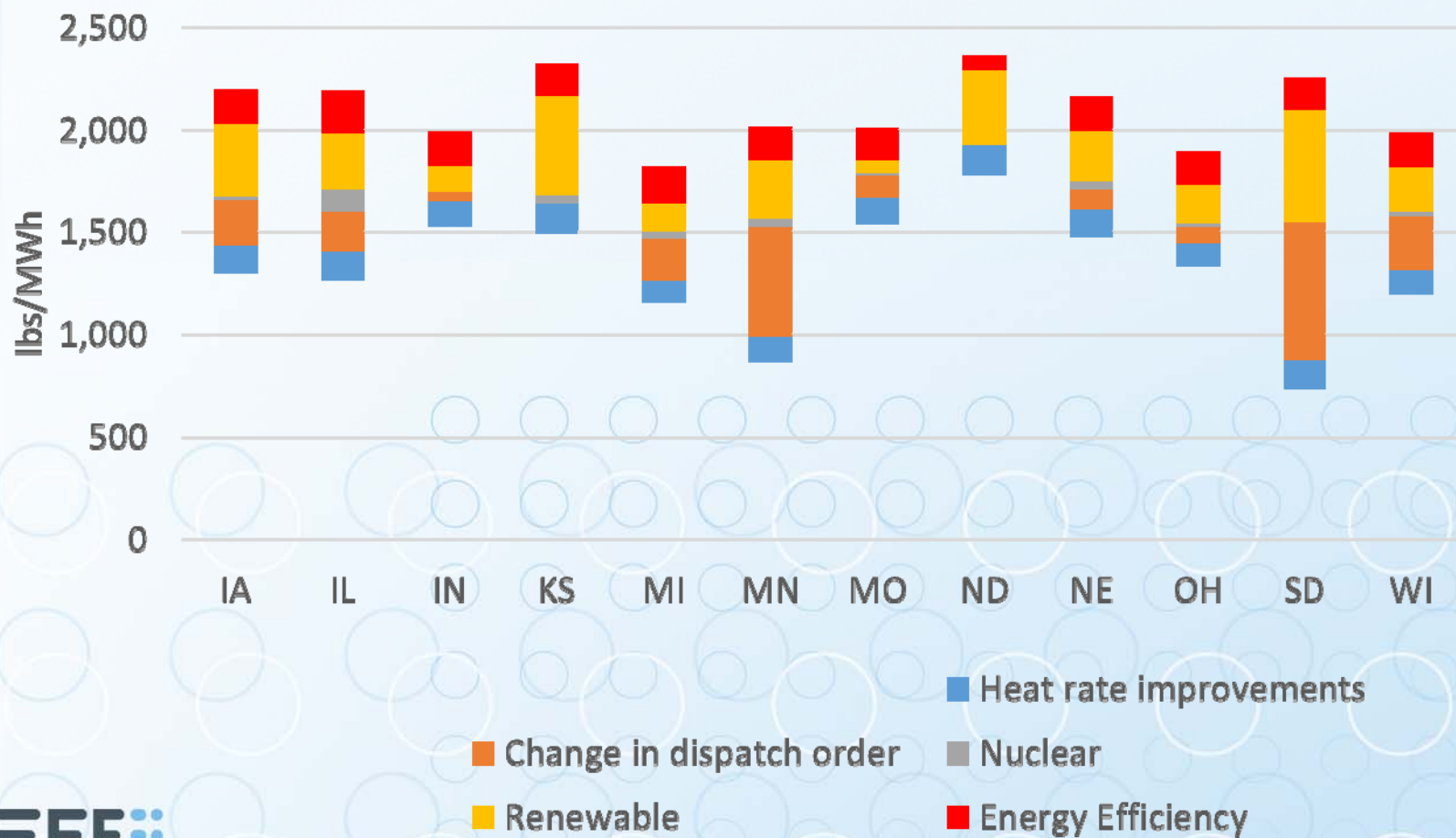
Electric Savings & Targets, 2011-2012



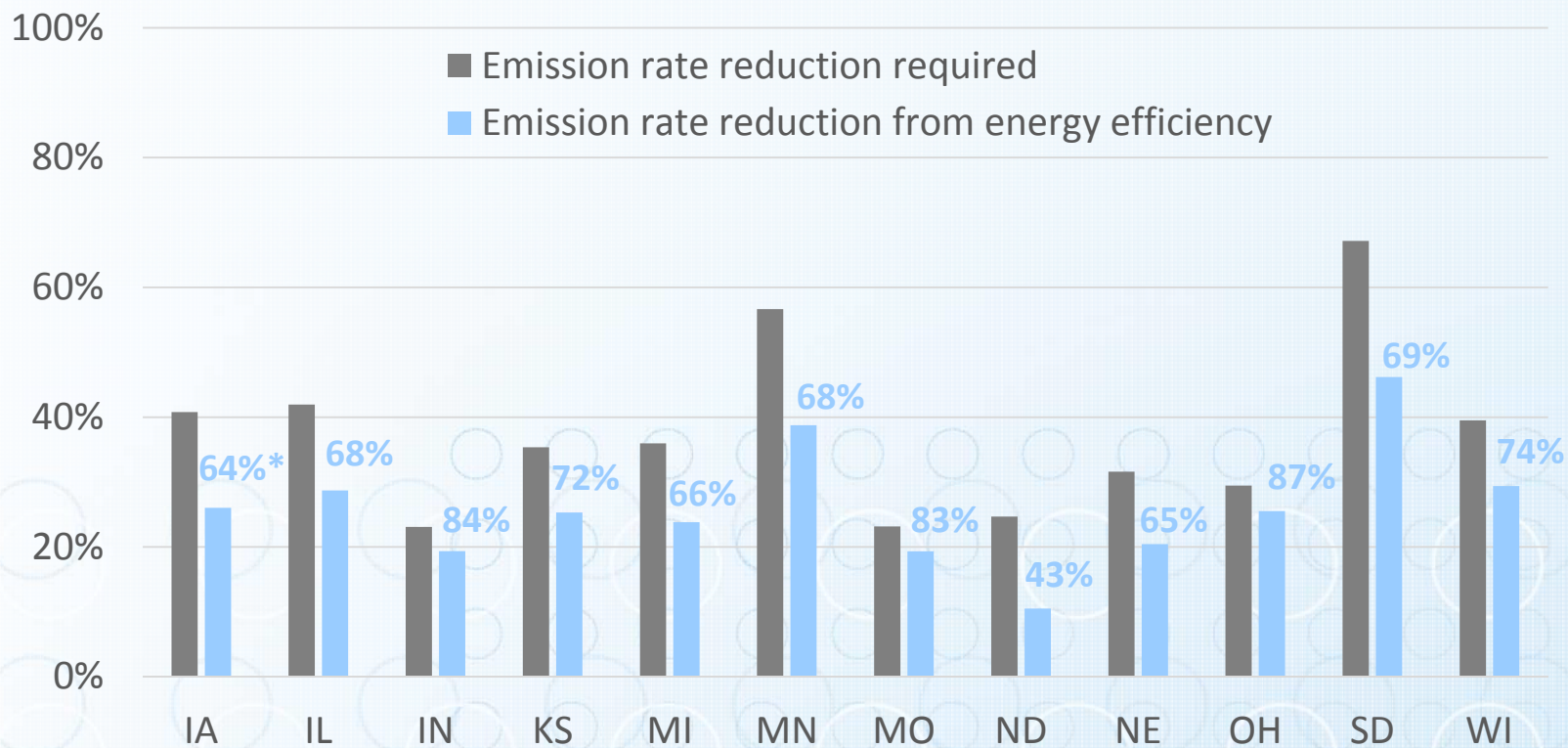
Cost Trends by Year



Proposed Emissions Standards in the Midwest



How far can energy efficiency go in the Midwest?



* Percent of total goal met with energy efficiency

Maximizing Participation

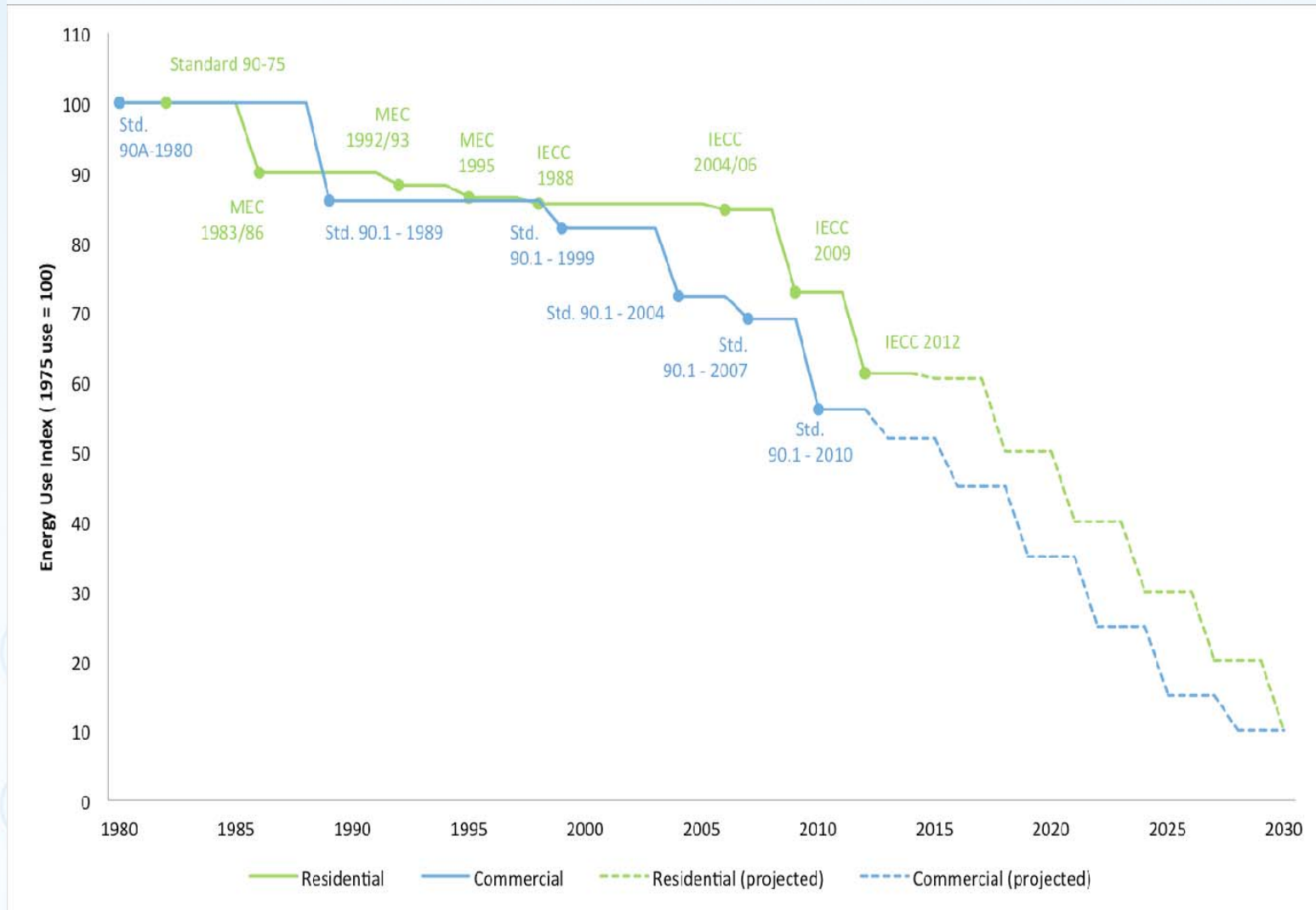
Program Type	Maximum Participation
Residential appliances & products	65-90% of sales
Residential lighting	30-50% of sockets
Whole-home retrofits	25% over 20+ years for broad programs; 80% in highly targeted geographies
Residential new construction	20-40% with current Energy Star
Multifamily housing	49% for rebates; 93% when backed by mandatory retrofit ordinance
Small business	60-80% for direct installation
Commercial retrocommissioning	Up to 10% for large buildings
Commercial new construction	50-60% of new floor area
Commercial prescriptive incentives	1-3% of customers/year; 25-35% of sales for high-e equipment
C&I custom incentives	50-90% for large customers; lower for smaller customers

ACEEE Next Big Things Study

1. Appliances & standards (RF, CW, CD)
2. New construction programs & codes
3. Advanced lighting design & controls
4. Very efficient packaged AC for residential & commercial
5. Smart manufacturing and buildings
6. Strategic energy mgmnt for large C&I
7. Reduce key plug loads
8. Real-time feedback & advanced thermostats
9. Whole building retrofits
10. Combined heat & power
11. Conservation voltage reduction
12. Advanced water heaters
13. Residential LEDs
14. Industrial fans, pumps & compressors



Building Code Revisions in the U.S.



Intelligent Efficiency

INTEGRATED, RELIABLE, and SMART.

People-Centered Efficiency

Providing real-time information and management tools that enable users to lower energy consumption in response to changing information

Technology-Centered Efficiency

Using sensors, controls, and software to automate and optimize energy use

Service-Oriented Efficiency

Shifting behavior and organizational structures to reduce energy-intensive activities

FUEL ECONOMY DISPLAY

HOME ENERGY MONITOR

BUS ARRIVAL APPS

GPS FLEET MANAGEMENT

BUILDING CONTROL SYSTEMS

POWER GRID CONTROLS

INTELLIGENT TRANSPORT SYSTEMS

FUEL-SAVING SYSTEMS

TELECOMMUTING

VIDEO CONFERENCING

EBOOKS & DIGITAL MUSIC

E-COMMERCE

Intelligent Efficiency in Buildings

- Use data and sensors to identify problems, then solve them
- NRDC study of 3 ~Energy Star offices using OnSite achieved 13% average savings. Other vendors report similar results



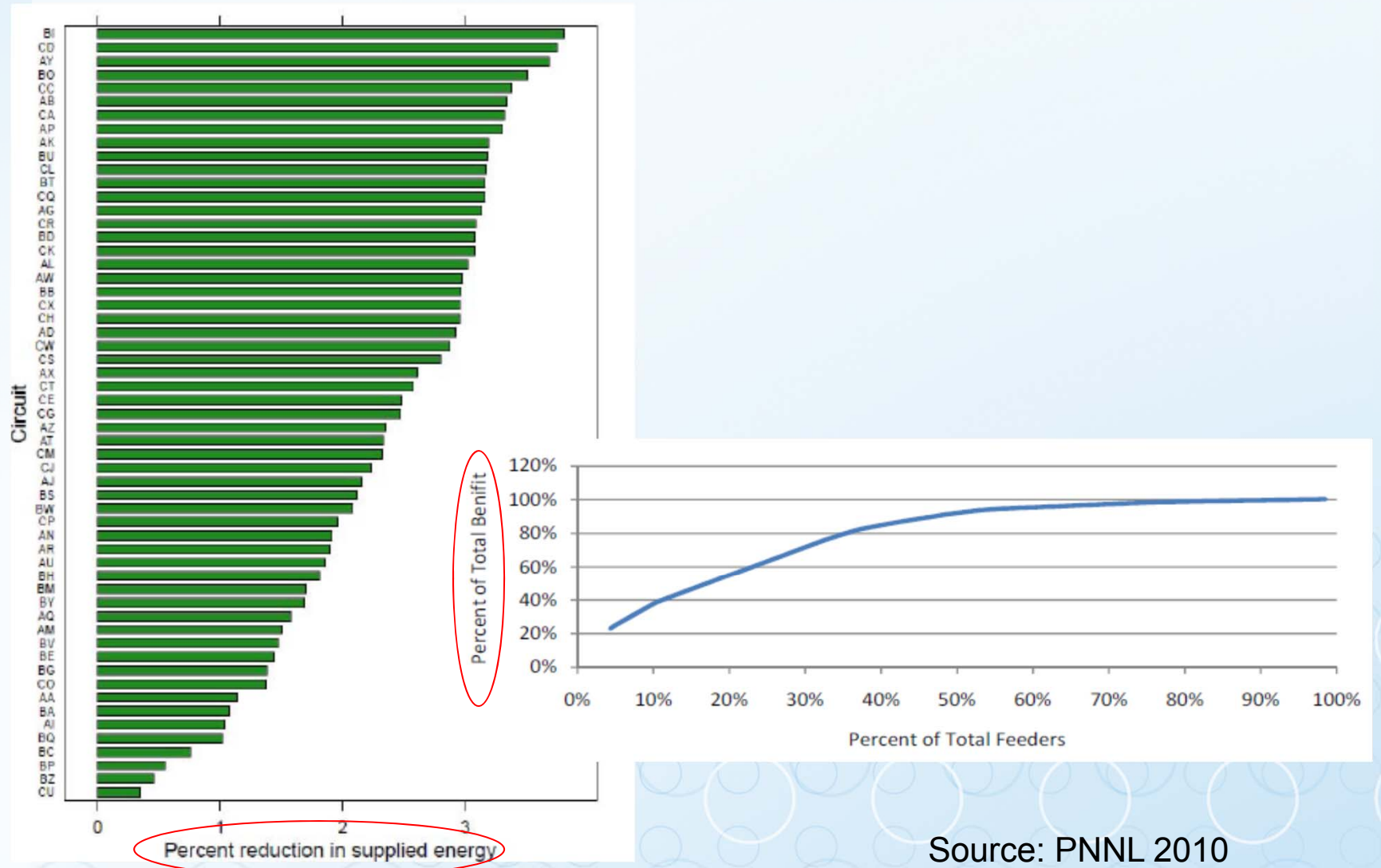
	Square Feet	2012 Occupancy	KWH Used		Study Period Savings	
			2011	2012	%	\$
1707	109,926	302	1,965,135	1,516,274	23%	\$ 58,352
1828	332,928	928	5,590,937	5,227,183	7%	\$ 47,288
1909	239,128	462	5,197,305	4,327,589	17%	\$ 113,063
Total			12,753,377	11,071,046	13.2%	\$ 218,703

Smart Thermostats: Preliminary Results



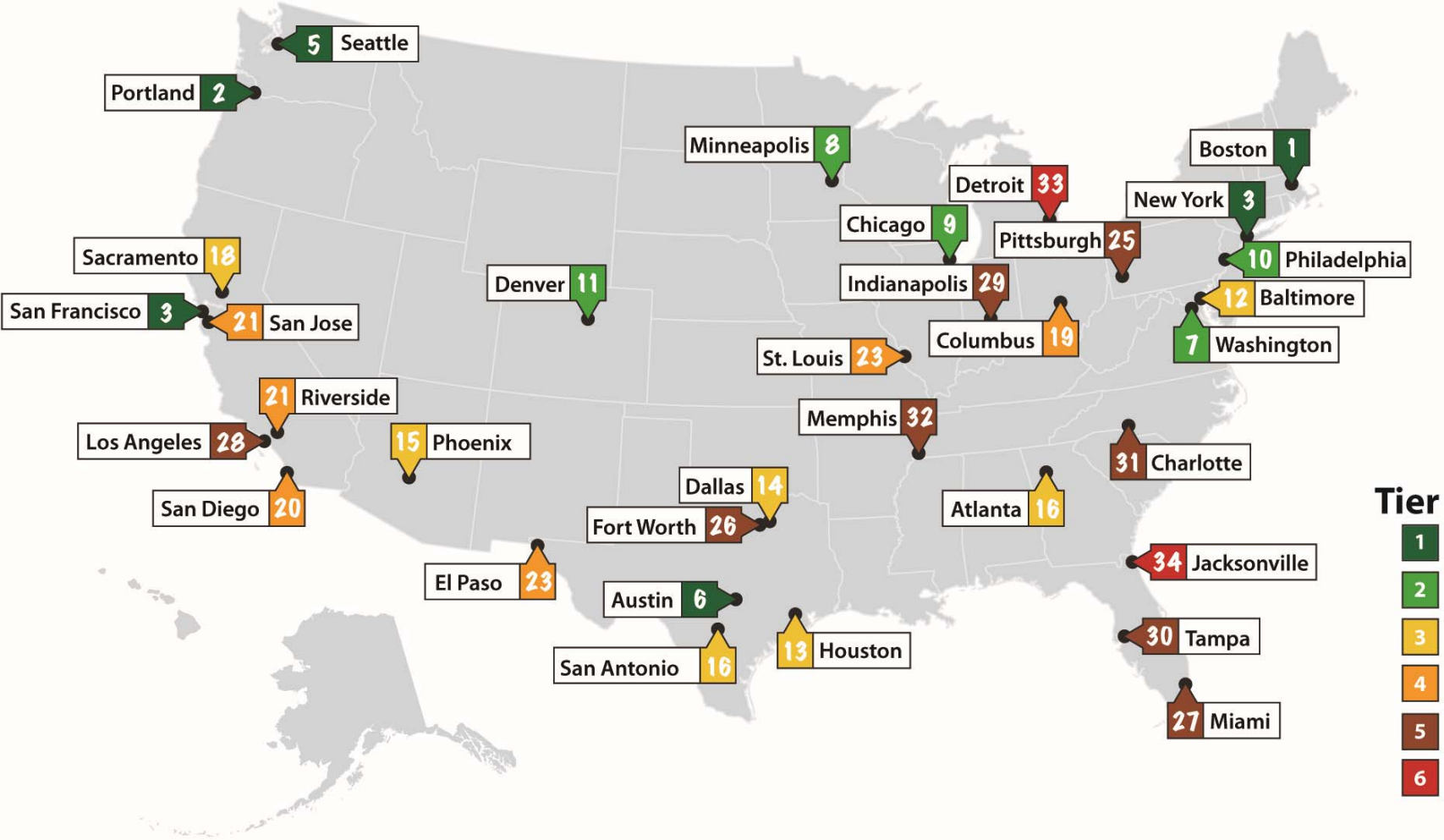
	Percent Savings				
	Heat	Cool	Space Condi- tioning	All Elec.	Elec. kW
ETO heat pumps	12%			4.7% winter	
PG&E HAN					5.6%
Cadmus (U.S.)	4.5%	19.5%	6.6%		
Vassar (So. CA)				6% summer	highest 2-6pm
Vectren	12.5%	13.9%			
Nest/MyEnergy	9.6%	17.5%			

Conservation Voltage Reduction



Source: PNNL 2010

2013 City Energy Efficiency Scorecard Results



2015 ACEEE Conferences

- Energy Efficiency Finance Forum, May 31-June 2, San Francisco
- Industrial Summer Study, August 4-6, Buffalo, NY
- Energy Efficiency as a Resource, Sept. 20-22, Little Rock, AR
- Behavior, Energy and Climate Change, Oct. 18-21, Sacramento
- Intelligent Efficiency – Dec. 6-8, Boston



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