WORLD RESOURCES INSTITUTE

Anchoring Costs

The Role of Industry Programs in Ratepayer-Funded Energy Efficiency

eceee Industrial Summer Study

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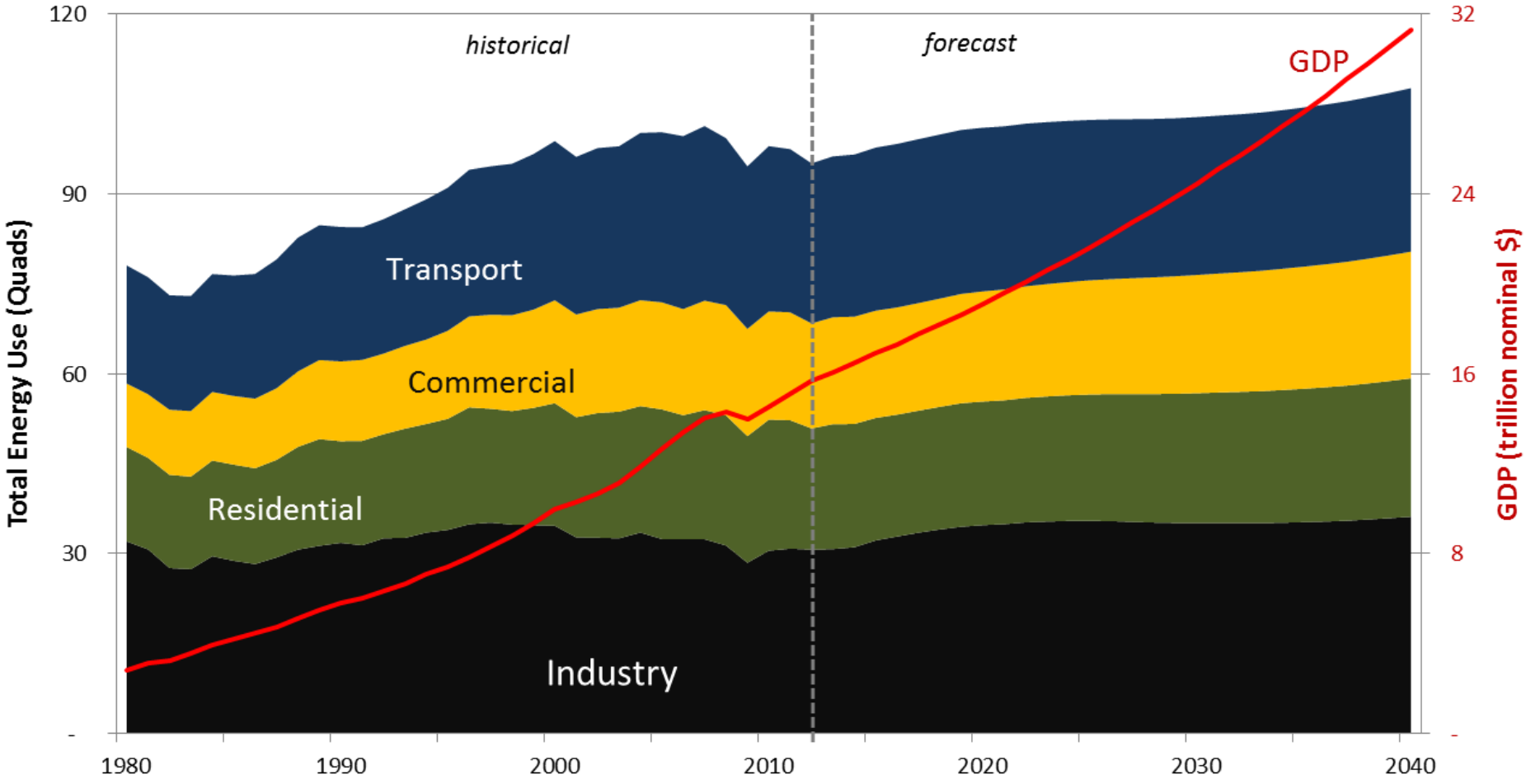
Today's Presentation

1. Questions and background
2. Industrial Sector Energy Efficiency Programs
3. Study Scope, Methods, and Data
4. Program Findings
5. New Policy Opportunities

This project seeks to answer 4 questions

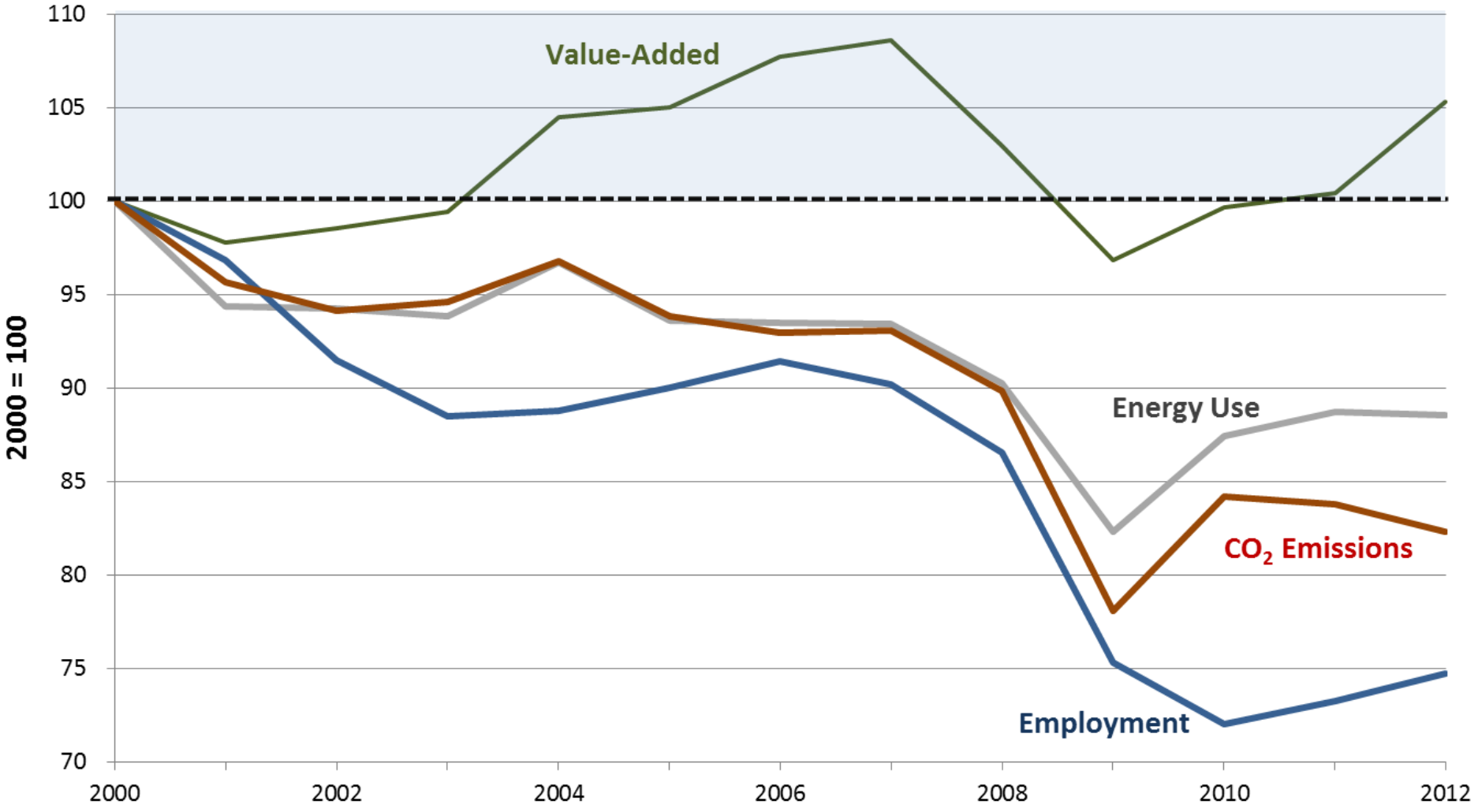
- How do industrial energy efficiency programs compare with residential and commercial sector programs?
- Which types of programs are proving to be more successful than others?
- To what extent do industrial energy efficiency programs contribute to meeting state and utility energy savings targets and goals?
- What's the impact of industrial programs on overall state energy efficiency portfolios?

U.S. energy use is becoming more efficient



Source: EIA, 2013. *Monthly Energy Review*; EIA, 2013. *Annual Energy Outlook 2013*; BEA, 2013.

…and U.S. industry is growing more lean.



Source: EIA, 2013; BEA, 2013; BLS, 2013.

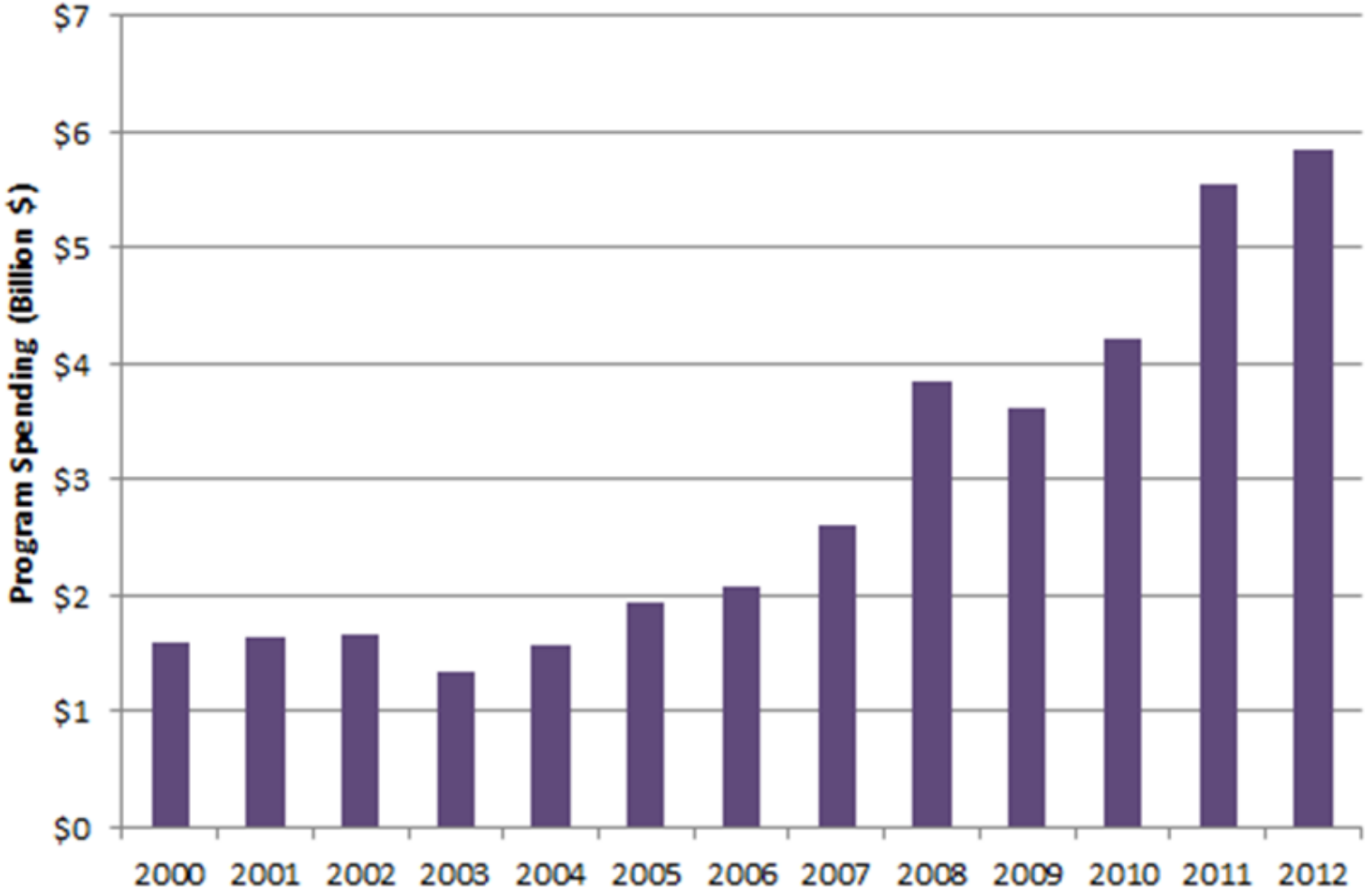
Selected energy efficiency policies and estimated impacts

Sector and policy	Policy/legislation	2011 annual site energy savings (TWh)*	Forecast annual site energy savings in 2020 (TWh)*
Light and heavy-duty vehicle fuel economy standards	US EPA/NHTSA Joint Rulemakings for 2012-16 and 2017-25.	n/a	962
Appliance and equipment standards programme	National Appliance Energy Conservation Acts of 1987 and 1988 (NAECA); Energy Policy Act of 1992 (EPAct); Energy Policy Act of 2005 (EPAct 2005); Energy Independence and Security Act 2007 (EISA).	398 (242 electric, 156 gas).	695 (610 from standards in place today; 85 from new standards).
Ratepayer-funded energy efficiency	State-level legislation and regulation establishing Energy Efficiency Resource Standards and savings obligations.	117 (81 electric, 36 gas).	Medium: 210 High: 255
ESCO industry	EISA, Section 432.	270	770
Building energy codes	EPAct plus IECC and ASHRAE model building energy codes.	63 (37 electric, 26 gas).	239

* Annual energy savings are the cumulative contributions in a given year of all energy savings measures still within their stipulated service-lives, including the savings from new efficiency measures added in that year. Site energy savings are the direct savings to consumers.

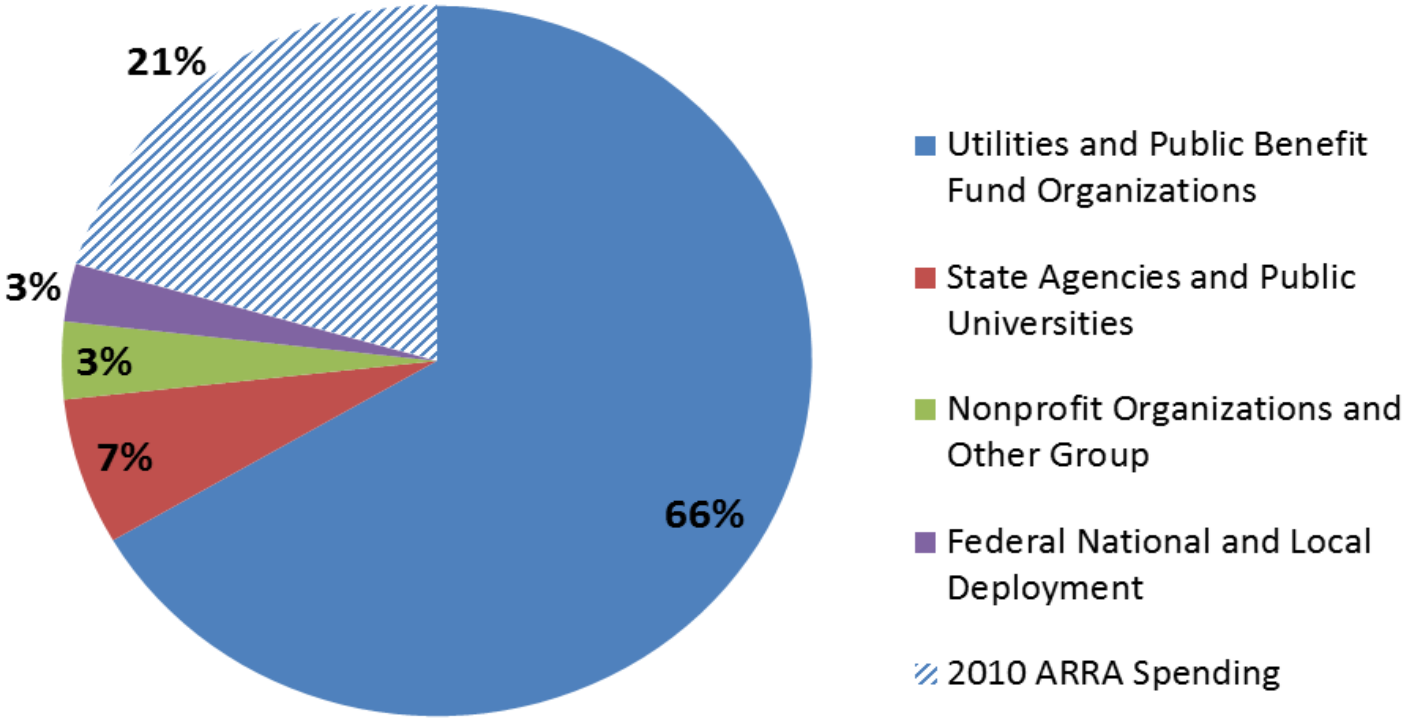
Source: IEA, 2013.

Total energy efficiency program budgets grew 18% per year from 2003-2012



Source: DOE, 2013.

Ratepayers support the majority of industrial energy efficiency programs



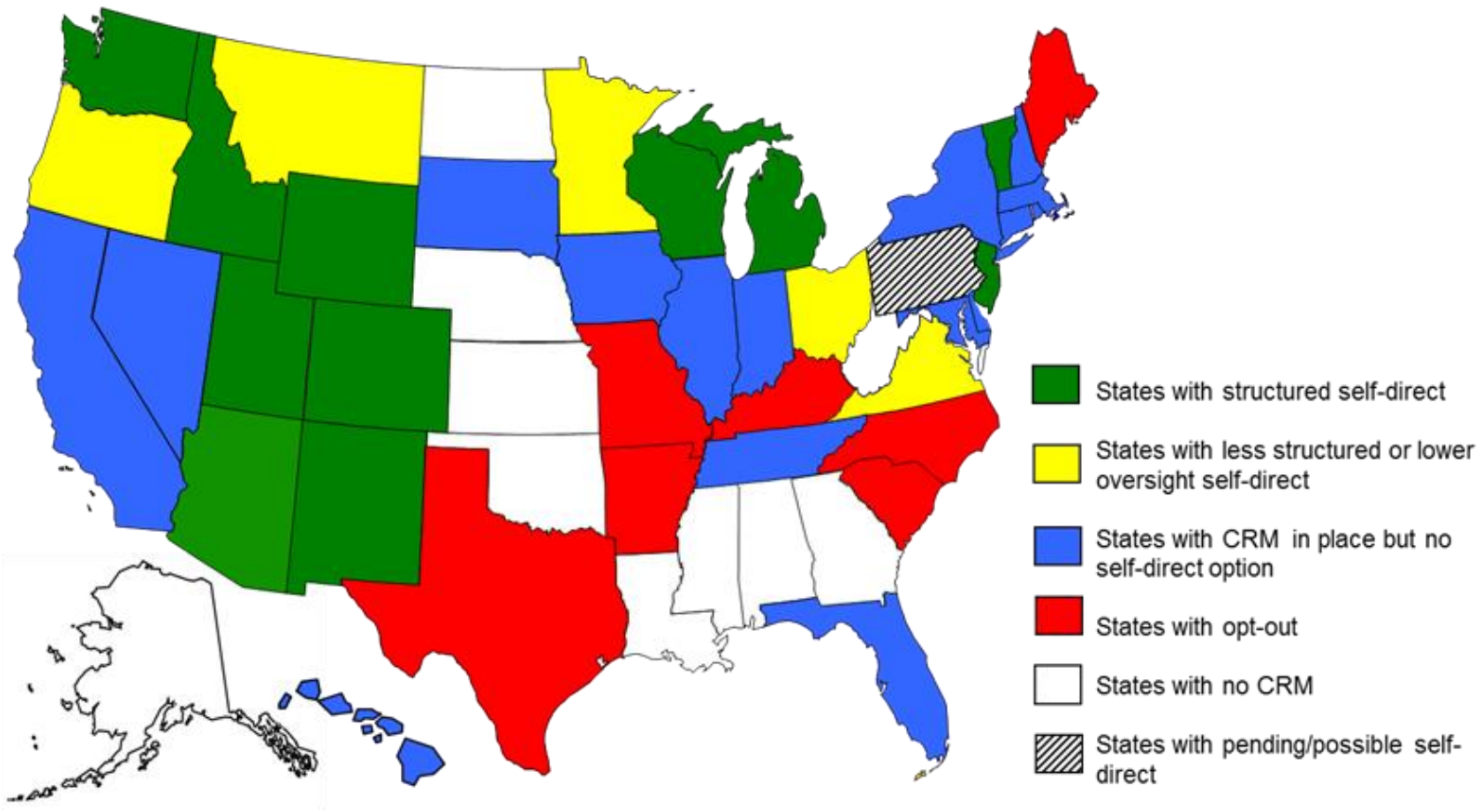
Source: Chittum and Nowak, 2012.

Ratepayer-funded industrial energy efficiency programs range in program type

	Program Type	Example	Strengths	Weaknesses
1	Prescriptive Improvement Program	Xcel Energy (MN)	Technology specific (e.g., motor rebates)	Limited ambition; not universally applicable
2	Custom Programs	Xcel Energy (MN); NYSERDA Industrial Process Efficiency Program	Facility specific	Inconsistent assessment data
3	Strategic Energy Management (SEM)	Northwest Energy Efficiency Alliance, Continuous Energy Improvement program	Systemic	Long-term, which may not perfectly coincide with program and funding periods
4	Market Transformation, including Behavior Programs	Opower	Supply chain orientation	Small, scattered, and amorphous
5	Self-Direct Programs	Puget Sound Energy	Flexible and low-cost	Lack of consistent MRV

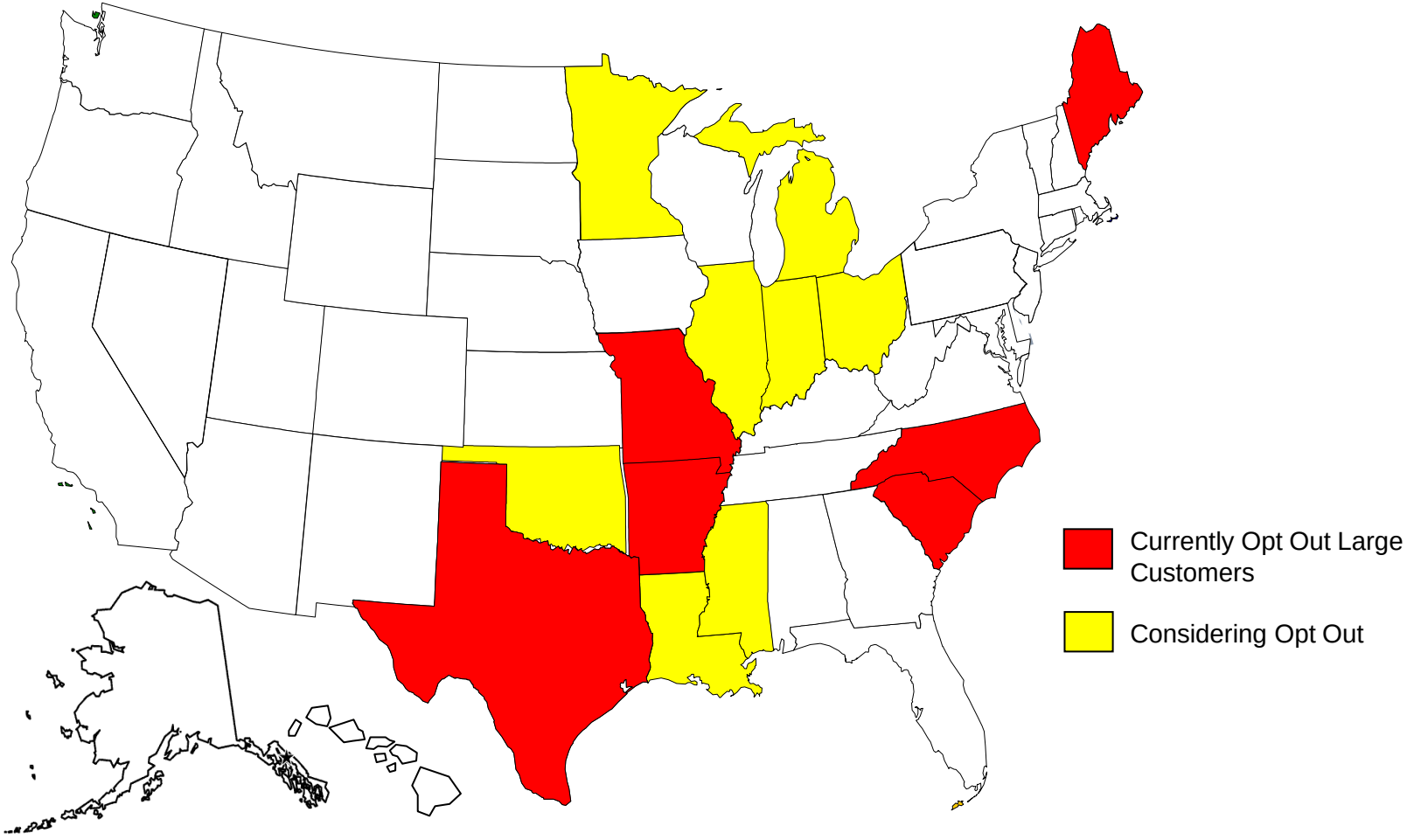
Source: Chittum, 2011; York et al., 2013.

States vary in the structure of their industrial energy efficiency programs…



Source: ACEEE, 2013.

..and a number of states are currently considering opt-out programs.



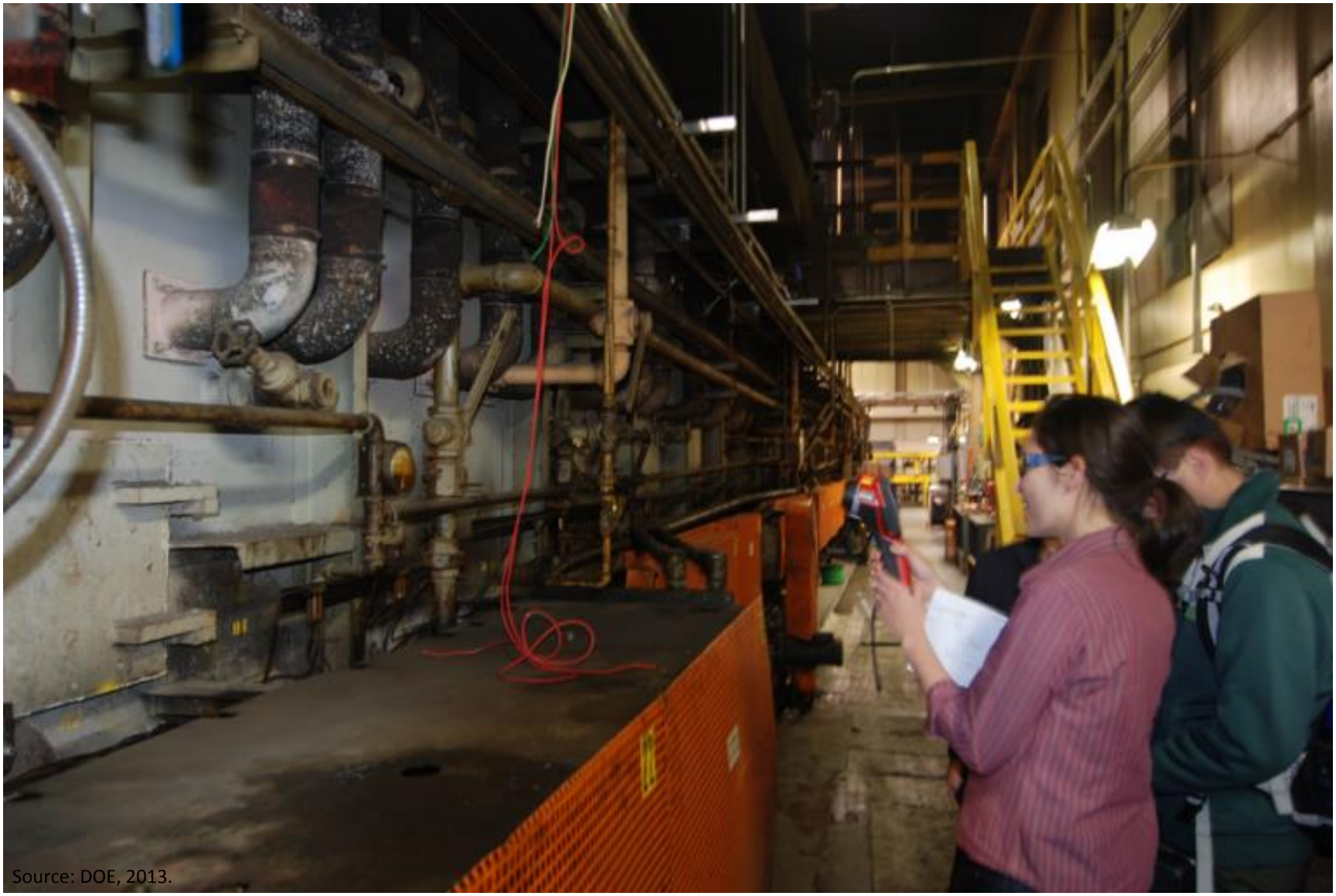
Source: ACEEE, 2013.

There's a continuum of self-direct and opt-out programs

Program Type	CRM Payment	M&V of Savings	Use of Funds	Follow Up	Examples
Opt-out	None	None	Co. uses retained cash for EE	None	NC, KY
Less structured self-direct	None	Minimal; self-reported	Co. uses retained cash for EE	None to minimal	MN, OH
More structured, lower oversight self-direct	Fully or partially paid on bill	Minimal; self-reported	Rate credit or project rebate	Minimal	MT, OR
More structured, higher oversight self-direct	Fully or partially paid on bill	Robust; similar to CRM-funded programs	Personal escrow, rate credit or project rebate	Minimal to substantial	WA, CO, UT, NM

Source: ACEEE, 2013.

Study scope, data, and methods



Source: DOE, 2013.

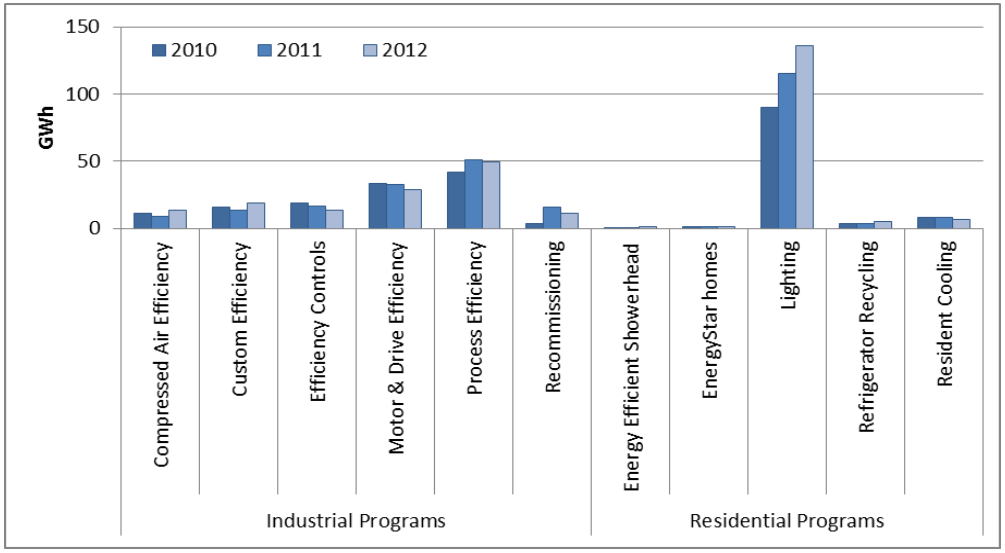
This study looks at 13 programs throughout the U.S.

Utility or Program Name	Parent Company	Location
Bonneville Power Administration	BPA [federal Power Marketing Administration]	OR, WA, ID, MT
Wisconsin Focus on Energy	[statewide utility-funded program]	WI
Northern States Power	Xcel Energy	MN
Public Service of Colorado	Xcel Energy	CO
Puget Sound Energy	Puget Holdings	WA
Pacific Gas & Electric	PG&E	CA
Western Massachusetts Electric	NStar (a Northeast Utilities company)	MA
Massachusetts Electric	National Grid	MA
Ohio Power	AEP	OH
Energy Trust of Oregon	[independent nonprofit organization]	OR
Southern California Edison	Edison International	CA
Rocky Mountain Power	PacifiCorp	UT
NYSERDA	New York State Energy Research and Development Authority [public benefit corporation]	NY

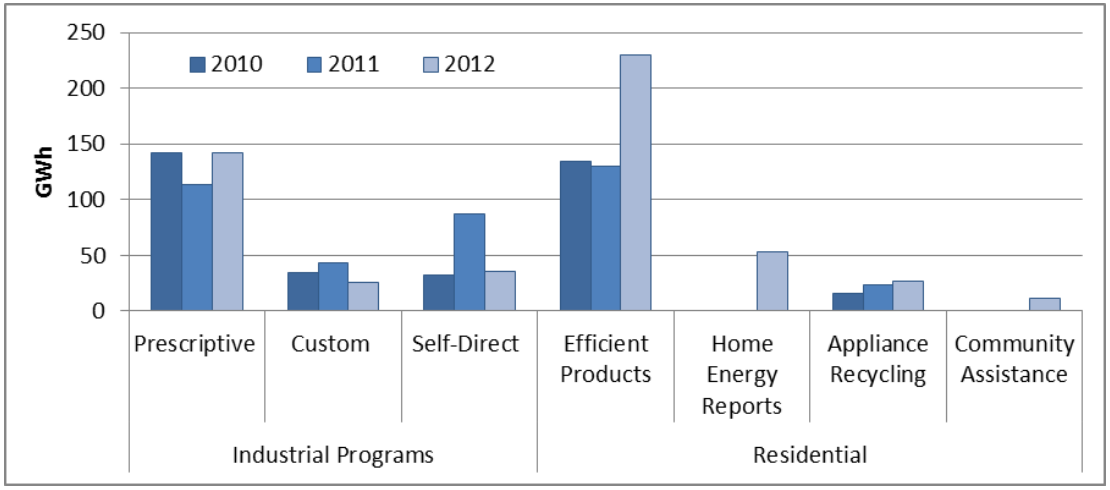
…and uses 4 assessment metrics

- Total saved energy (versus targets and goals)
- Cost of saved energy ($/kWh)
- Benefit-cost ratios (TRC, etc)
- Participation rates

Beyond lighting, industry offers the highest levels of achieved energy savings

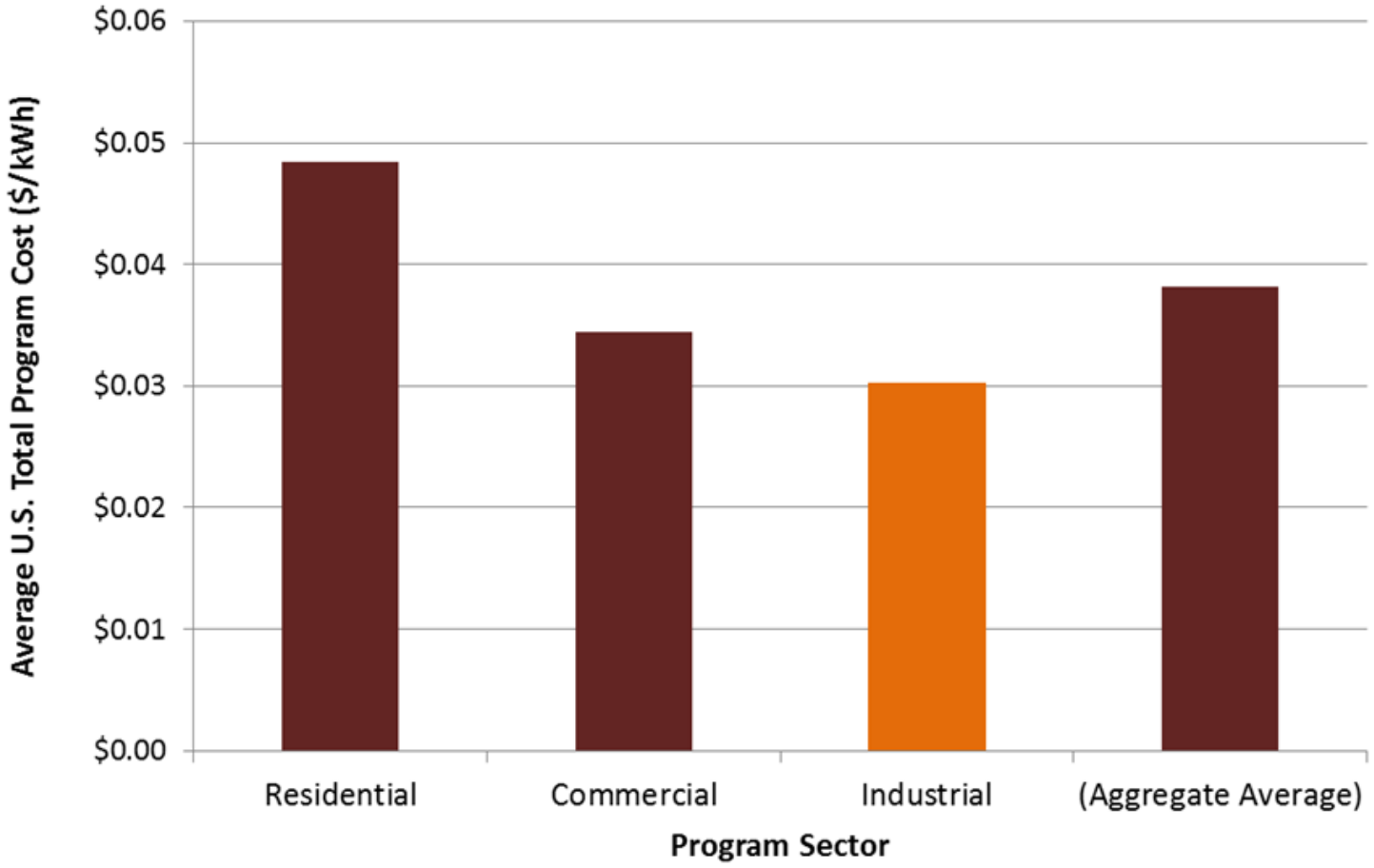


Source: Xcel MN (2010, 2011, 2012)



Source: AEP Ohio 2010 - 2012.

Industry has the lowest cost of saved energy on a national level



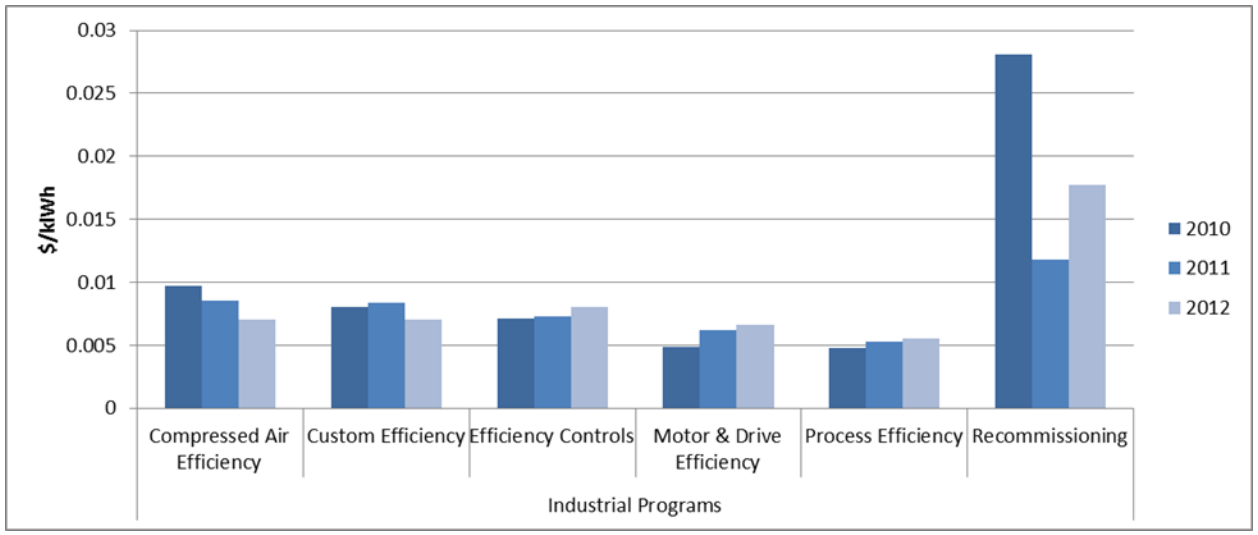
Source: DOE, 2013. Note: to ensure consistency and comparability, this figure only includes the 197 organizations that reported residential, commercial, and industrial savings and expenditure data (as opposed to the majority of programs, which do not over all sectors); transport sector energy efficiency program data are not included in this figure except as a minor component of the aggregate average.

…but cost structures vary by program and sector.

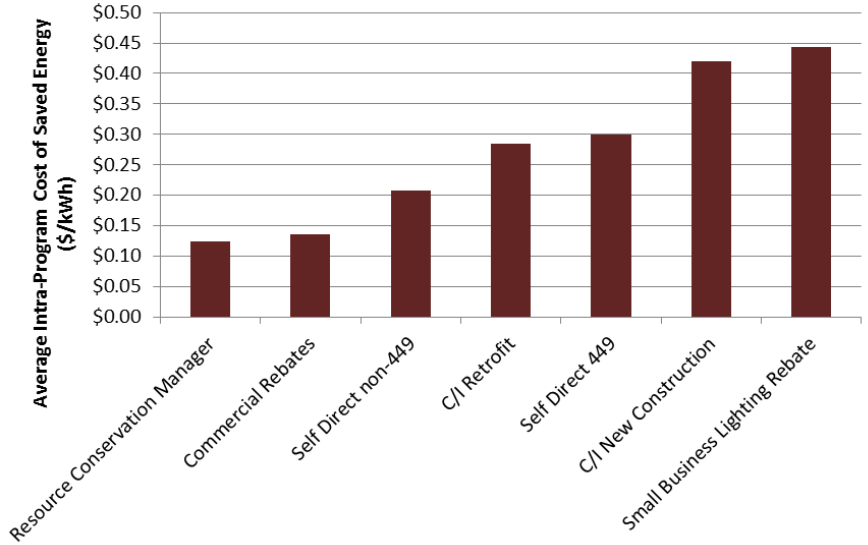
	Average Intra-Program Cost of Saved Energy ($/kWh)			
	Residential	Commercial	Industrial	Total
Wisconsin Focus on Energy	0.040	0.020	0.013	0.022
Rocky Mountain Power	0.035	0.026	0.012	0.024
NYSERDA	0.025	0.027	0.026	0.026
Pacific Gas and Electric (PG&E)	0.015	0.035	0.039	0.027
Xcel Minnesota	0.063	0.025	0.020	0.028
Energy Trust of Oregon	0.032	0.046	0.030	0.036
Southern California Edison	0.128	0.024	0.010	0.037
AEP Ohio	0.046	0.043	0.043	0.044
Xcel Colorado	0.061	0.059	0.019	0.048
National Grid Massachusetts	0.081	0.048	0.048	0.059
Western Massachusetts Electric Co	0.119	0.038	0.056	0.062

Source: DOE, 2013. Note: this table shows select programs for which consistent 2012 data are available.

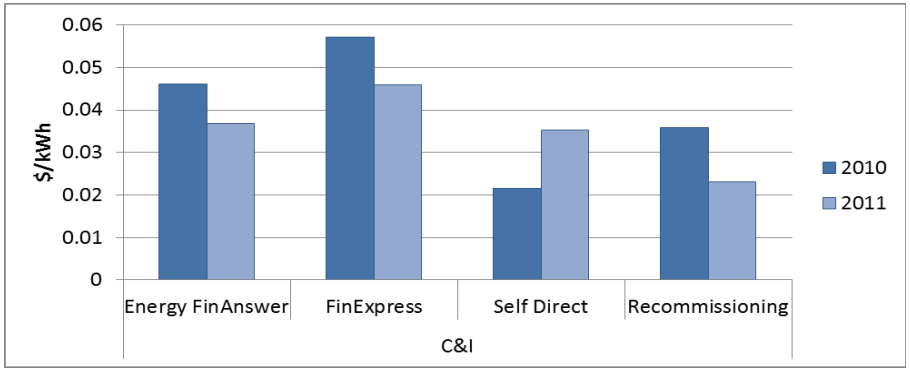
Specific program cost of saved energy data



Source: Xcel MN (2010, 2011, 2012)



Source: Puget Sound Energy (2013)

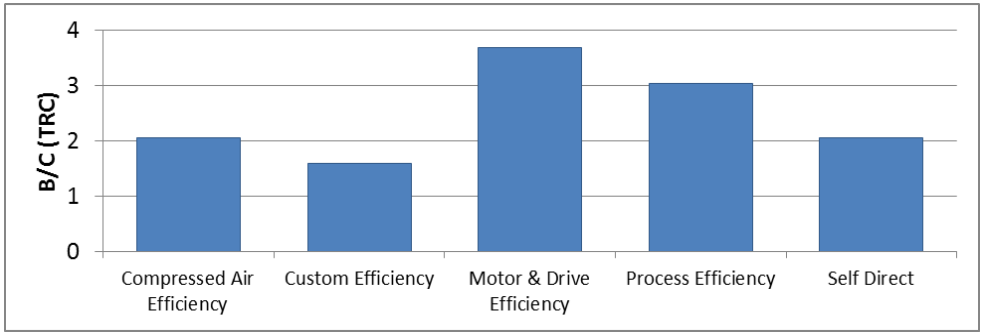


Source: Rocky Mountain Power, 2011

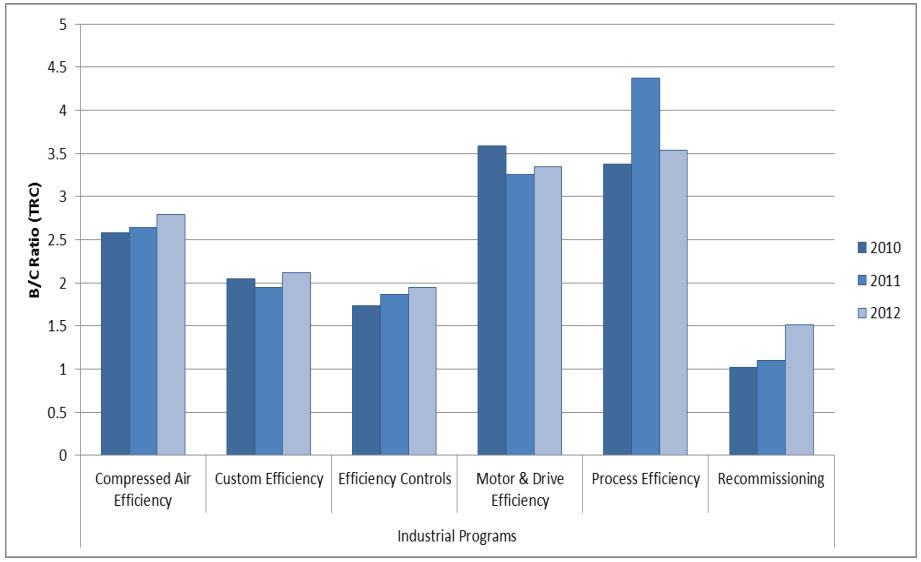
Program-specific benefit-cost ratios vary

Types of benefit-cost test:

- Participant Cost Test (PCT)
- Total Resource Cost (TRC)
- Societal Cost Test (SCT)



Source: Xcel CO, 2011.



Source: Xcel MN (2010, 2011, 2012)

	Non-Residential (mostly industrial)	Residential
Total Costs	$81 million	$42 million
Benefit-cost ratio	2.7	1.5

Source: WI Focus on Energy 2011

Participation is especially limited among industrial customers

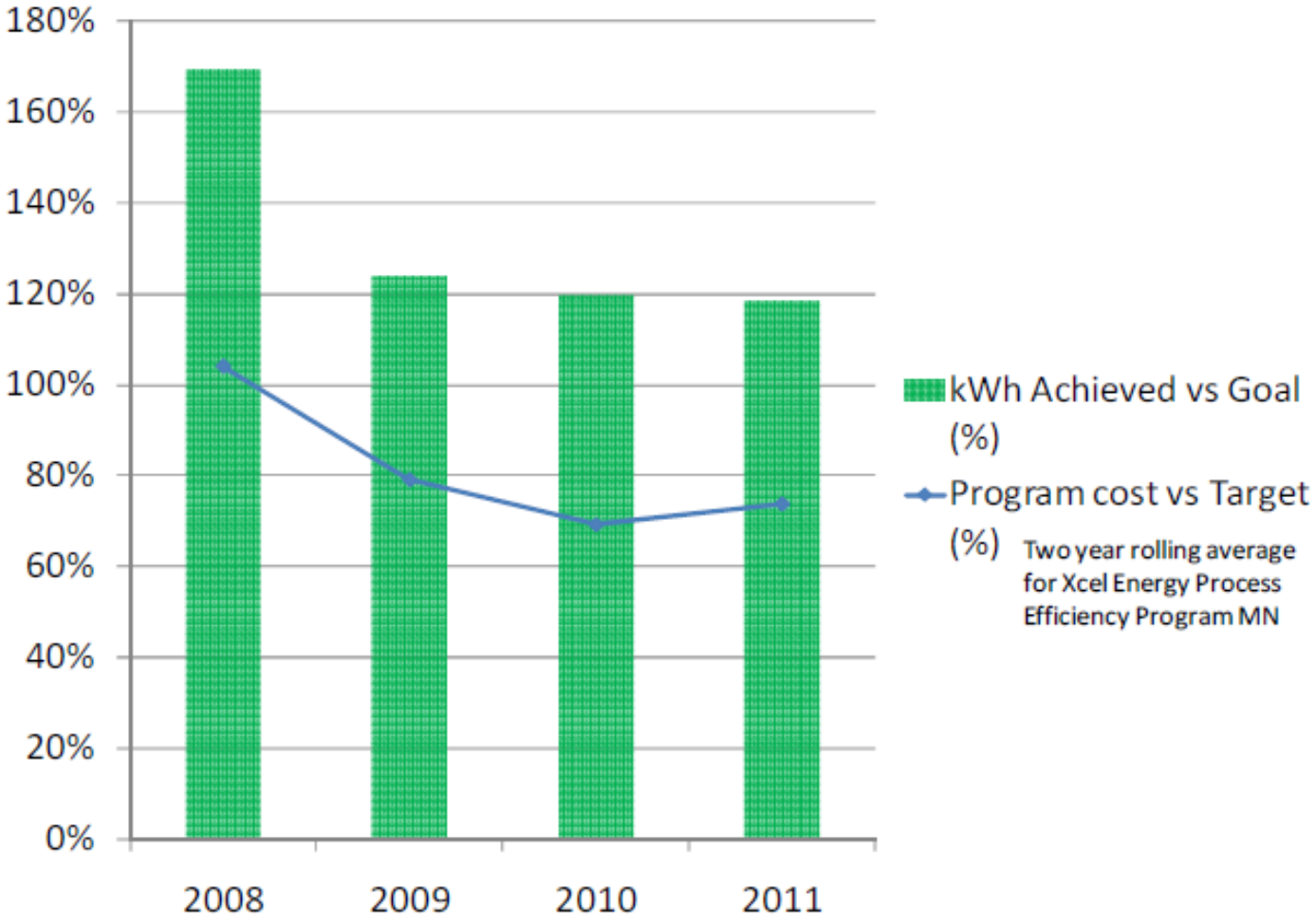
	Total Eligible	Total Participating	% of Eligible
Commercial	827,655	10570	1.28%
Industrial	74,267	600	0.81%
Agricultural	107,085	757	0.71%
Total	1,009,007	11,927	1.18%

Source: PG&E 2012.
Note: these are meter rather than customer data.

90-10 rule for industry

Industrial program achieved energy savings usually exceed goals and targets

Xcel MN exemplifies the trend of industrial programs exceeding their targets at low costs



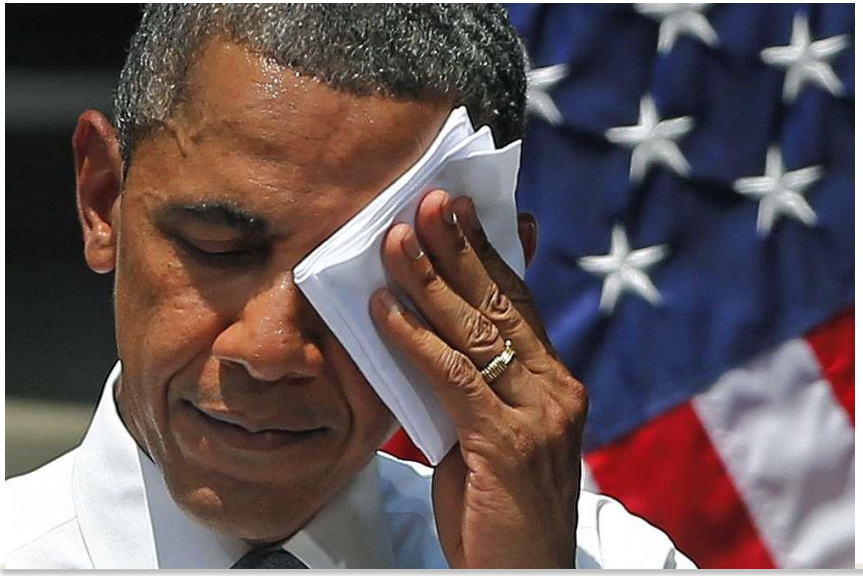
Source: Kennedy D, Nielsen L, Moulder S, 2013.

Qualitative summary of findings

- Industry programs vary more than residential and commercial programs (with unique barriers to EE investment and MRV)
- Lowest cost of saved energy—removal of industry programs would raise aggregate average cost of saved energy by 5%
- Industry programs have comparatively high benefit-cost ratios with higher job-creation impacts
- Low participation rates indicate potential for industry program growth
- By exceeding targets and goals, industry achieved savings bring down costs for all participants

Climate Action Plan brings new opportunities

Rulemaking	Stage	Proposed Deadline
New Sources § 111(b)	Reissue Proposal	September 20, 2013
	Final	"In a timely fashion after considering all public comments"
Existing Sources § 111(d)	Proposed Standards from EPA	June 2, 2014
	Final Standards from EPA	June 1, 2015
	State Implementation Plans submitted to EPA	June 30, 2016



- In addition to the CAA, industry will be affected by Boiler MACT and MATS
- Role of IEE in emerging utility business models

Industrial energy efficiency can reduce costs for new Clean Air Act regulations

CAA § 111(d) = GHG reductions from existing power plants

EE = Key to 111(d) economic, environmental, & political success

EE depends on State Implementation Plans

State Implementation Plans need to quantify EE

Quantifying EE hinges on *EE/RE Roadmap*

EE/RE Roadmap is built on:

- **EMV & Data**
- **Measures -> Emissions**
- **EPA Regional Offices**
- **Success Stories**

Source: RAP, 2013.

Thanks!

Look out for the final WRI publication this year.

Nate Aden

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