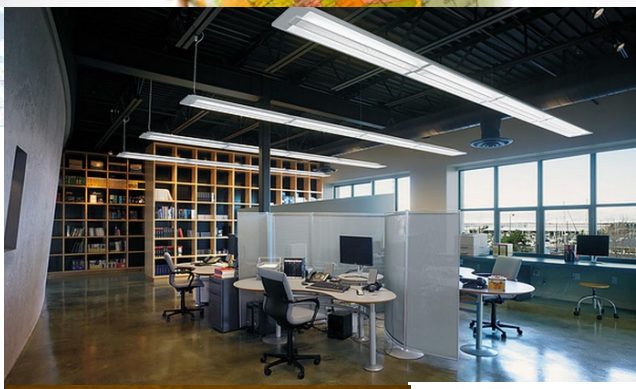

Energy Saving Obligations Across Three Continents

Steven Nadel, Executive Director

ACEEE International Symposium

June 2018

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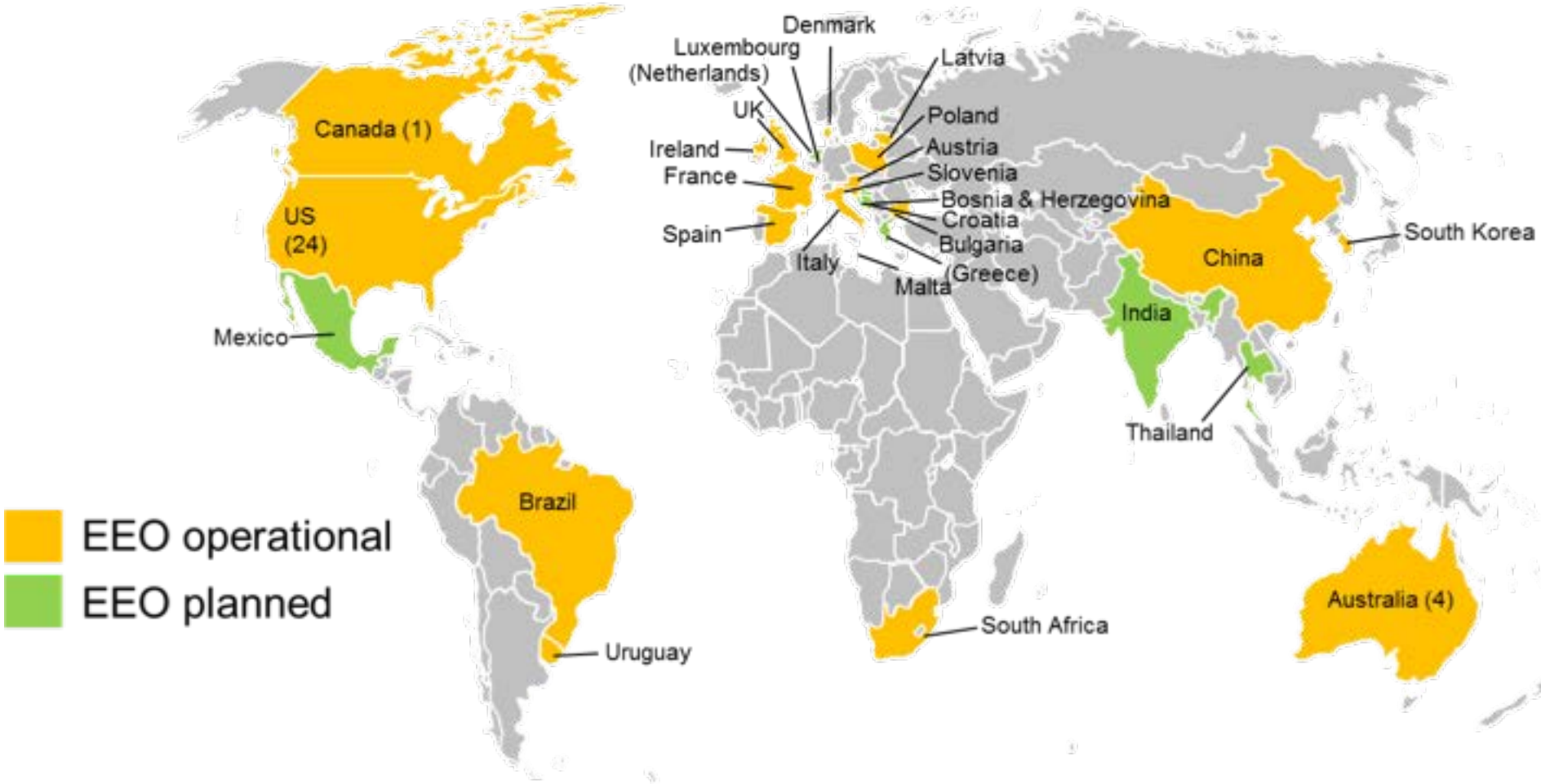
RAP
Regulatory Assistance Project

Energy Savings Obligations

- Mandatory energy savings obligations placed on energy companies (generation or distribution)
- 16 EU member states (MS) have or plan
- 3 Australian states + ACT have
- 27 US states have



Global snapshot of ESOs: 48 operational and 6 planned



Source: RAP analysis for IEA

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ESO's in Three Regions

EU:

- Incremental annual savings ~0.5% of covered energy;
- 0.5-1 Euro cent/kWh

Australia:

- Incremental annual savings 0.2-0.3%/year
- 2.7-3.6 US cents/kWh

US:

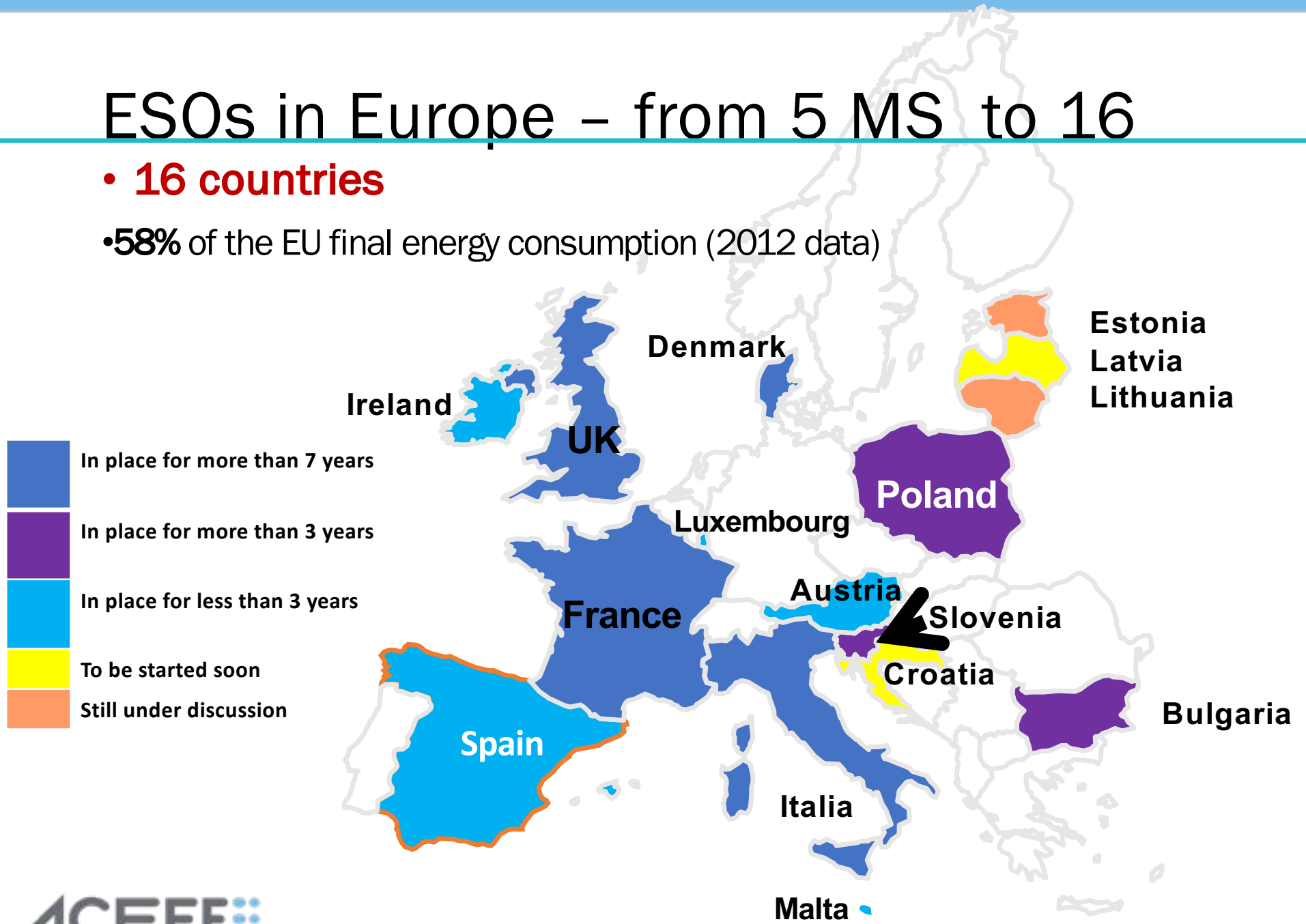
- Incremental annual savings >1%/year for electricity, 0.5%/year for natural gas *for covered states*;
- Average ~3 US cents/kWh

Business Opportunities with ESOs

- Accelerates adoption of energy-saving technologies and practices, increasing sales for companies working in these areas
- Utilities and other obligated entities often contract with energy efficiency service providers to deliver savings
- In Australia and some European countries, energy efficiency service providers procure efficiency savings and sell them in markets or via bilateral contracts

ESOs in Europe – from 5 MS to 16

- **16 countries**
- **58%** of the EU final energy consumption (2012 data)



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EU Experience with ESOs

(Up to 2011 – before the EE Directive – note variety in coverage)

Country	Obligated Company	Eligible Customers	Administrator
Belgium - Flanders	Electricity **distributors**	Residential and non energy intensive industry and service	Flemish Government
France	**Retailers** of non-transport energy + **importers** of road transport fuel	All (including transport) except EU ETS	Government
Italy	Electricity & gas **distributors**	All including transport	Regulator (AEEG)
GB	Electricity & gas **retailers**	Residential only	Regulator (Ofgem)
Denmark	Electricity, gas, fuel oil & heat **distributors**	All except transport	Danish Energy Authority

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Selected Energy Savings Rates

	Time period	Energy Savings per Year (ktoe)	Incremental Annual Svgs as % of Total Consumption	Sector
United Kingdom	2008-2012	237	0.5%	Household sector
Denmark	2015	291	3.0%	All sectors excluding transport
France	2011-2013	377	0.4%	All sectors
Italy	2015	500	0.4%	All sectors

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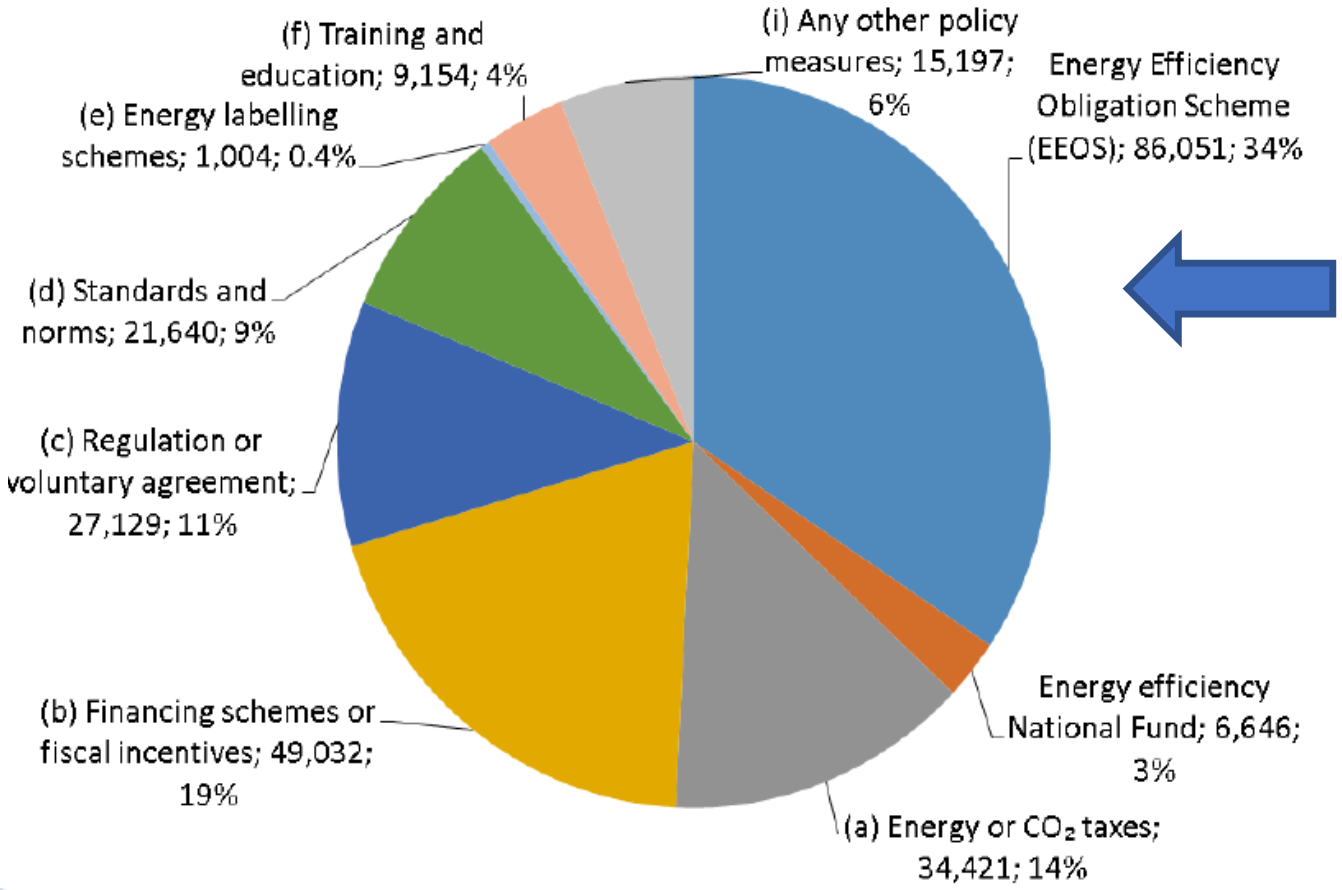
Source: Rosenow and Bayer (2016); modified incremental annual savings in percent for Denmark based on Bach (2017)

EESs under Europe's EE Directive

EEOs deliver 1/3 of savings from all measures under Article 7 of the EU Energy Efficiency Directive



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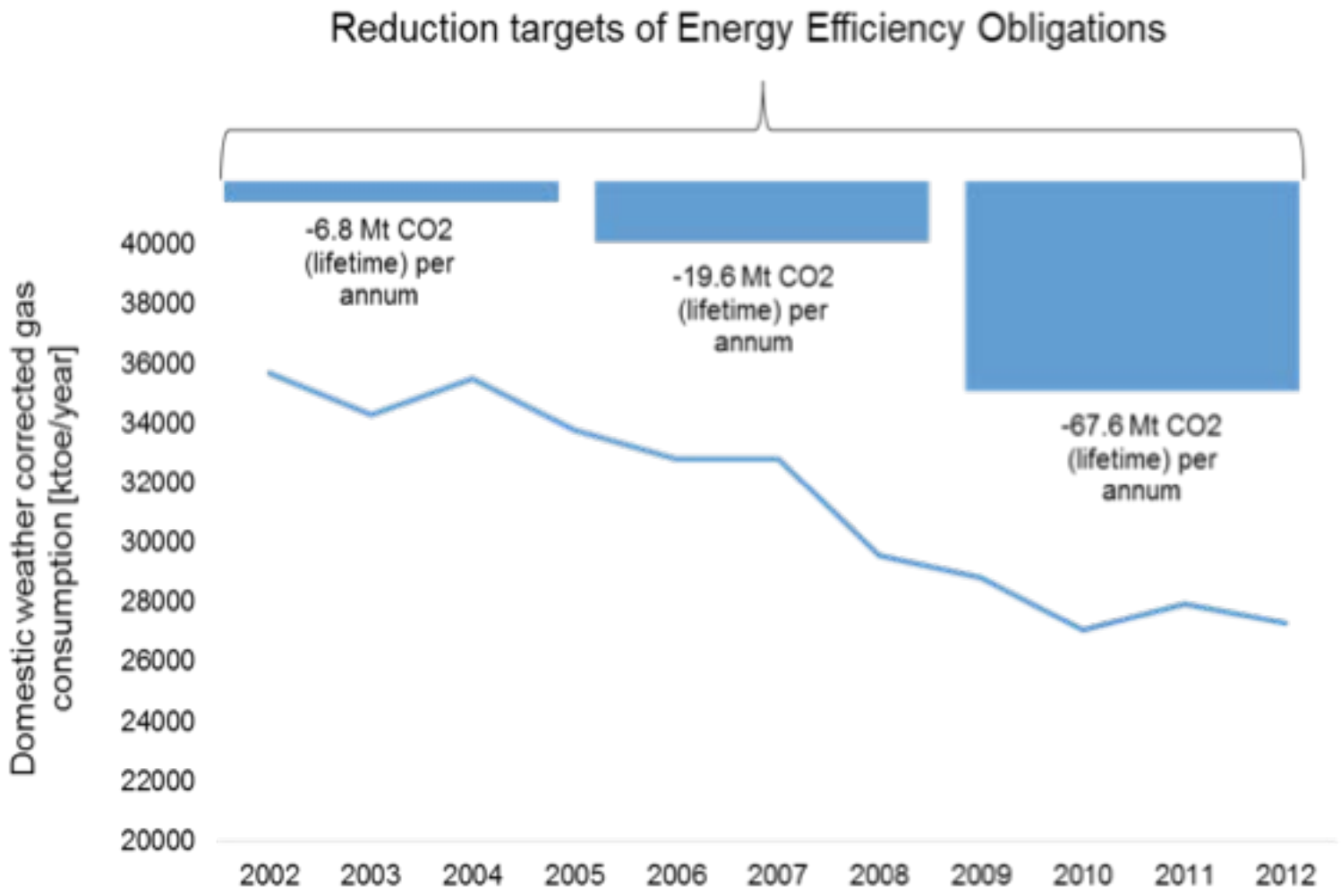
EEO savings cost 4-5 times less than energy supply

Source: based on Rosenow and Bayer (2016)

High effectiveness: UK example shows 23% reduction in domestic gas consumption



Source: based on Rosenow and Bayer (2016)

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Leverage ratios: Private investment ~0.4-2 times public investment

Country	Private investment compared to public costs
US	141% of programme costs
UK	87% of programme costs in 2002 to 2005 and 44% in 2005 to 2008 (residential sector only, ~50% low-income households)
France	37% of programme costs (EEOs operate together with tax rebates)
Denmark	200% of programme costs (industry sector only)

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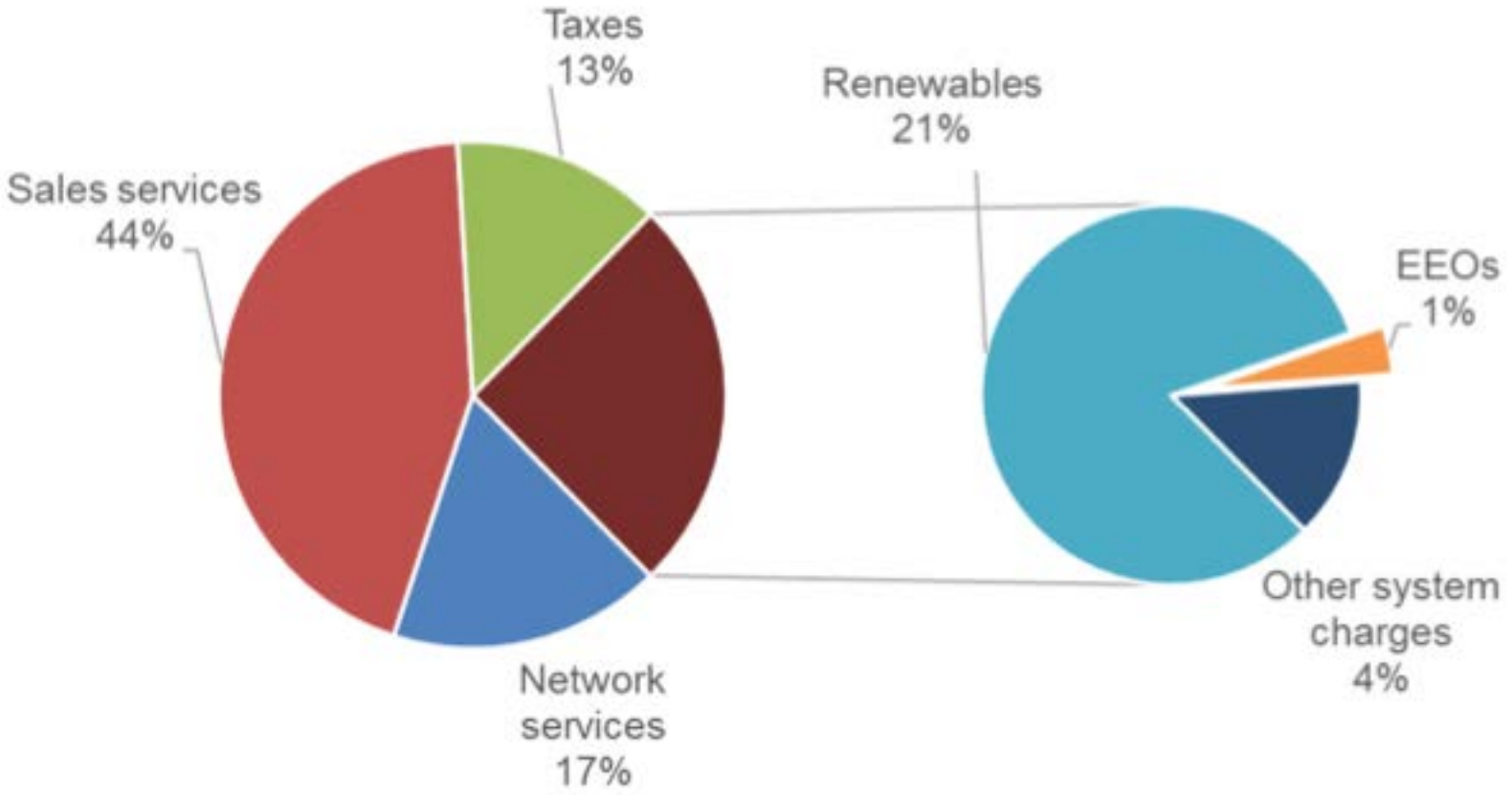
Source: RAP

Costs of EEOs are small to customers
Example: Italy



Source: based on http://www.autorita.energia.it

EU Lessons Learned

- ESOs are a valuable option even in reformed energy markets such as the UK
- Greater ambition is feasible, cost-effective
- MS have a wide range of choices on obliged entities, fuel coverage, delivery techniques
- Trading, “white certificate” schemes don’t add a lot to effectiveness
- “Continuous learning” and EM&V needed - transparent, open review process

EEOs in Australia

- 4 EEO schemes today
- New South Wales, Victoria, South Australia & AUS Capital Territory
- 66% of AUS population
- Began 2009 & 2013 (NSW had an early version 2003)
- Main goal: reduce GHG emissions
- Savings goals are in emissions avoided

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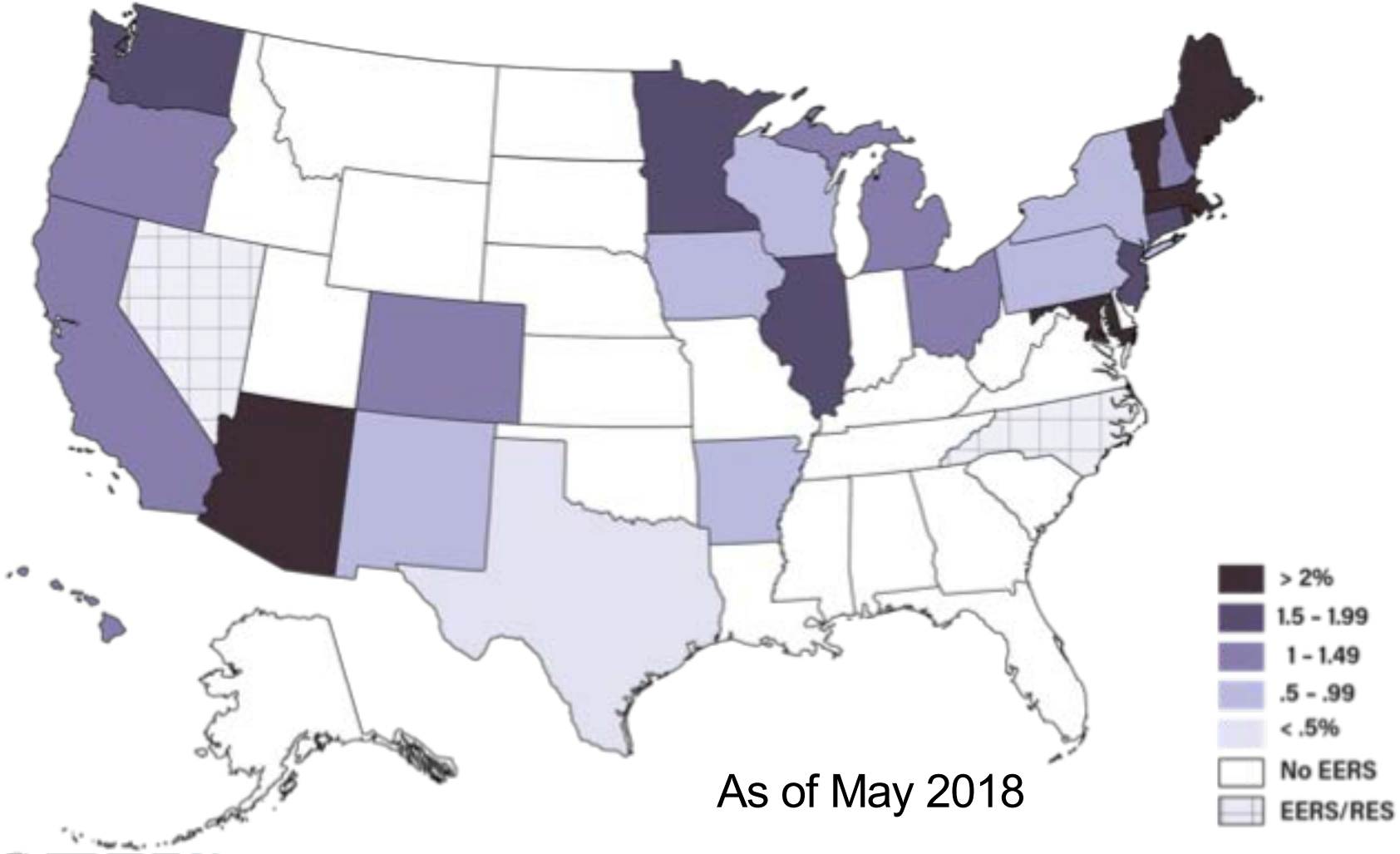
Special aspects of the AUS schemes

- Savings obligations in terms of lifetime CO2-equivalents (tCO2-e)
- CO2-e credits vary: gas vs. power; power mixes are different; change over time
- NSW is power only; others include gas
- Most savings are done by Accredited third parties who earn white certificates and sell them to obliged parties

Lessons from Australia

- **Certified delivery agents** – can build a competitive EE delivery industry
- **Private OTC trading** – no need for an official "white certificates market"
- **Deemed savings** – an efficient way to count savings where technology and savings are known
- **Cream skimming** – can be a big problem with competitive delivery, unless bonuses are given for deeper retrofits and longer-lived measures.

Utility Savings Targets (electric) (27 states)



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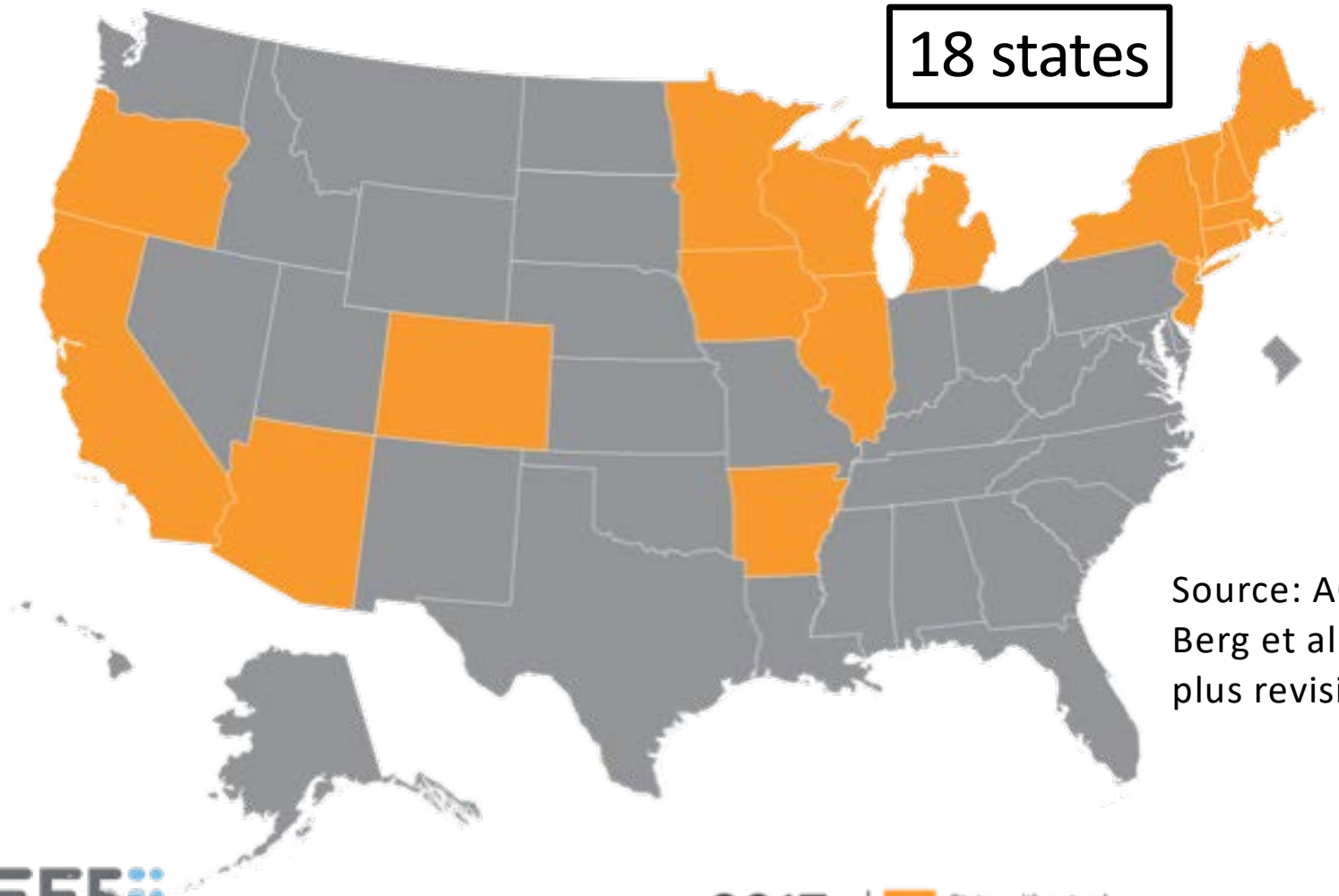
States with Natural Gas Savings Targets



Source: ACEEE, Berg et al. 2017 plus revisions

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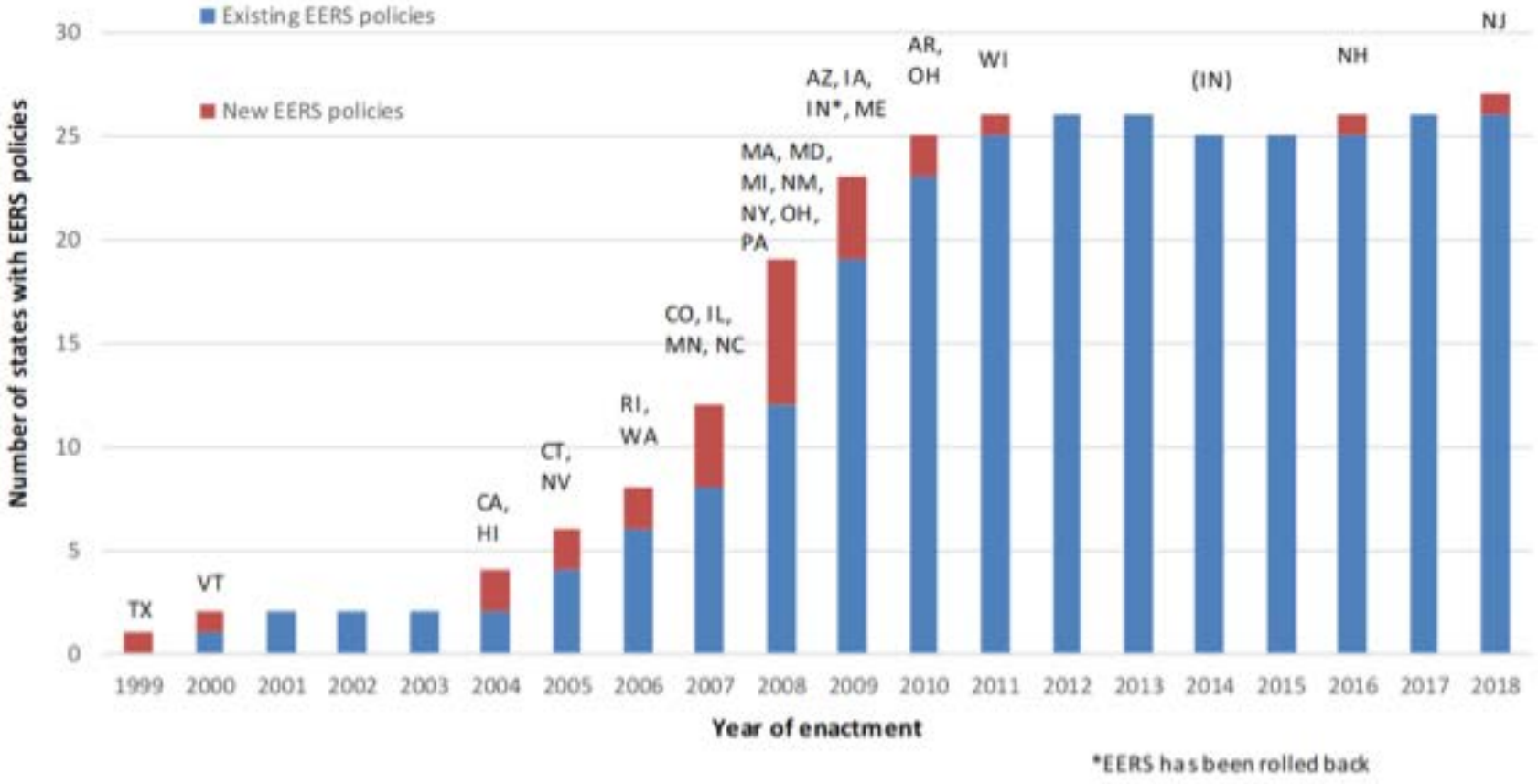
State Targets by Year of Enactment



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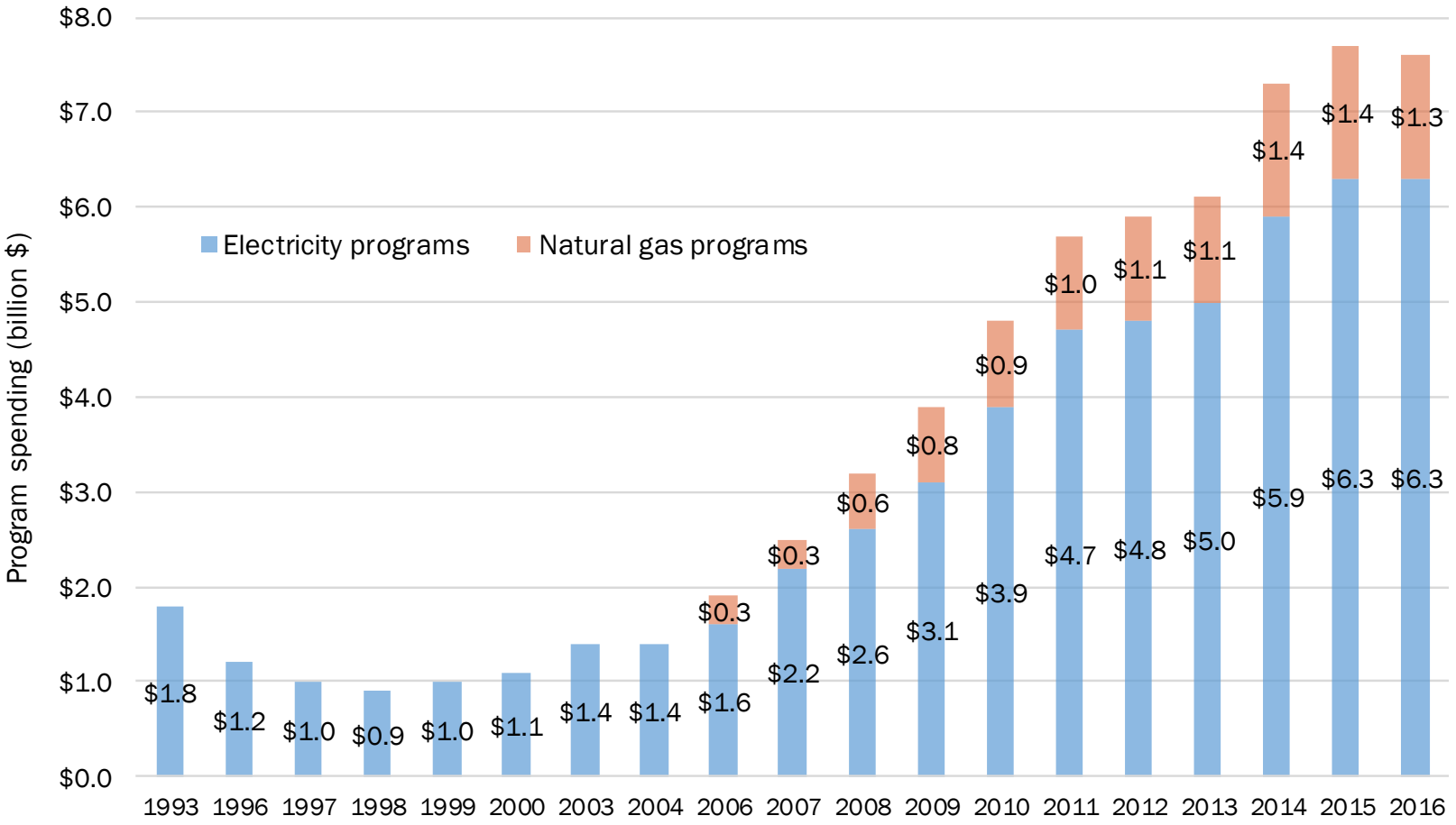
Utility Spending on Energy Efficiency



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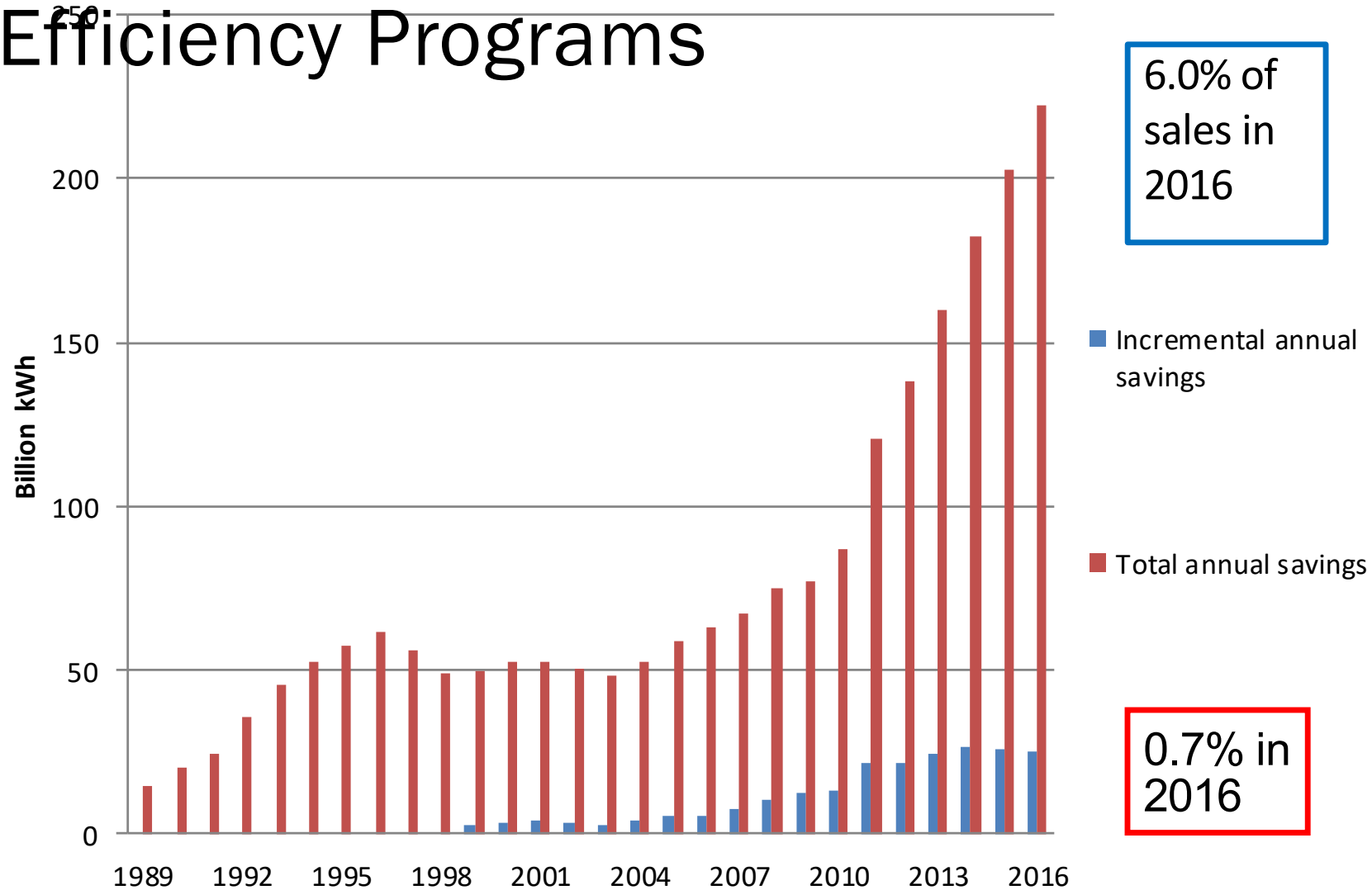
Savings from Utility-Sector Energy Efficiency Programs



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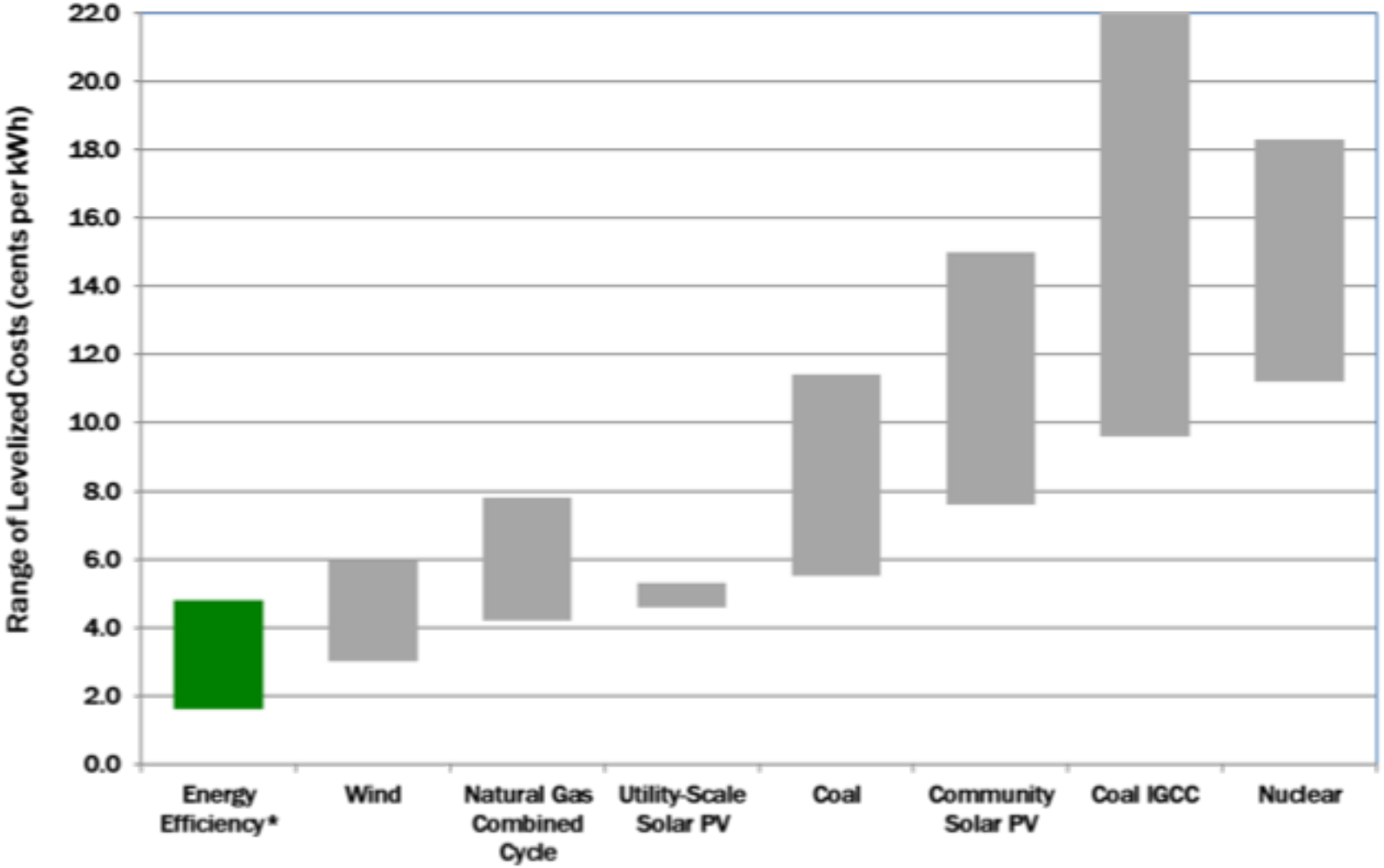
Levelized Electricity Resource Costs



*Notes: Energy efficiency program portfolio data from Molina 2014; All other data from Lazard 2017. High-end range of coal includes 90% carbon capture and compression.

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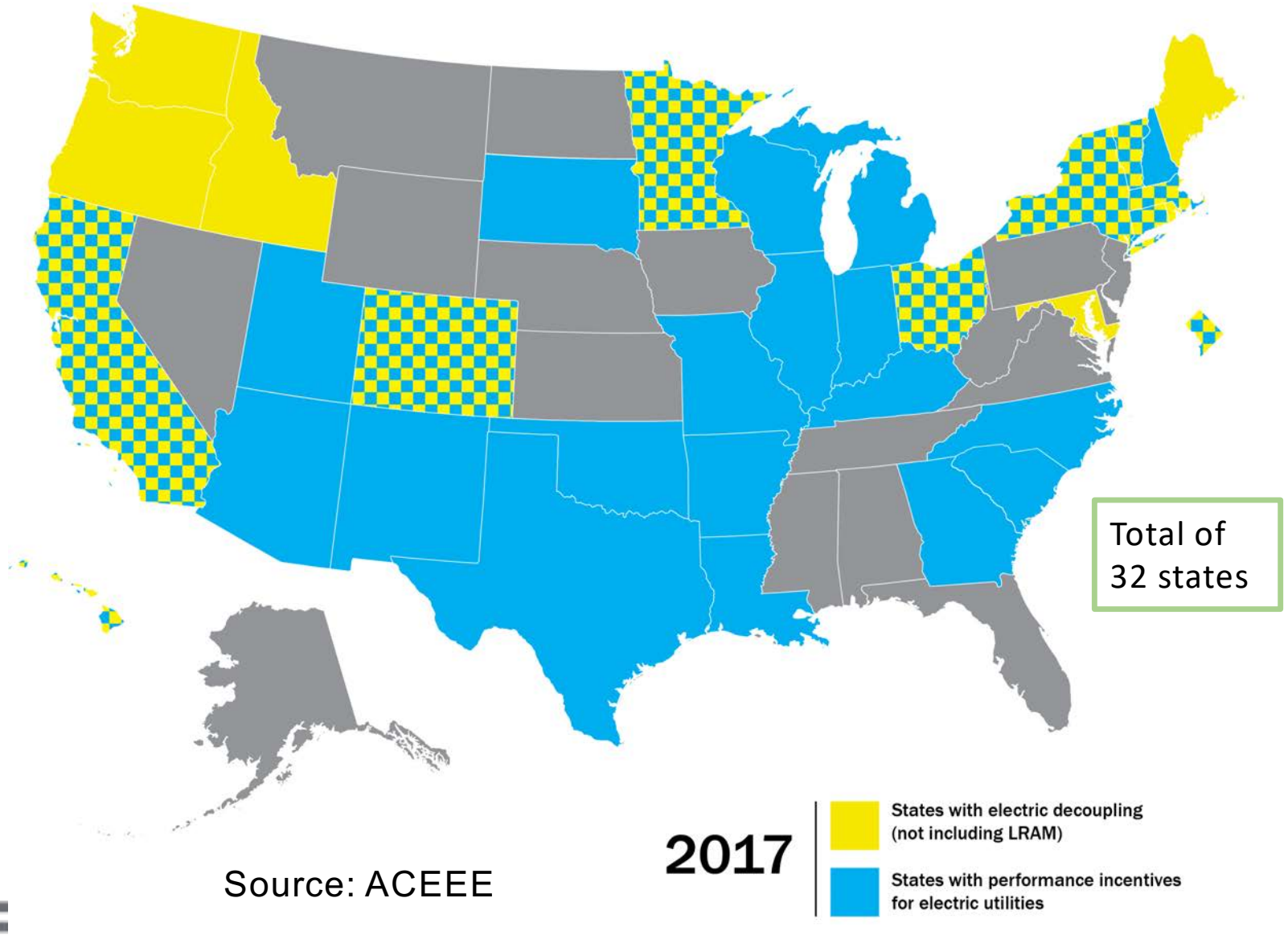
Other Motivations in US

- Regulators often encourage EE to benefit consumers
- Greenhouse gas reductions and other emissions reductions (important in some states, not others)
- Less exposure/risk

Business Model for Electric Utilities



Source: ACEEE

Impact of Electric EERS
(2016 data)

Policy	No. of states	Average EE investments as % of revenues*	Average EE savings as % of sales*
No EERS	24	0.75	0.30
Yes EERS	26	2.59	1.20

Source: ACEEE.

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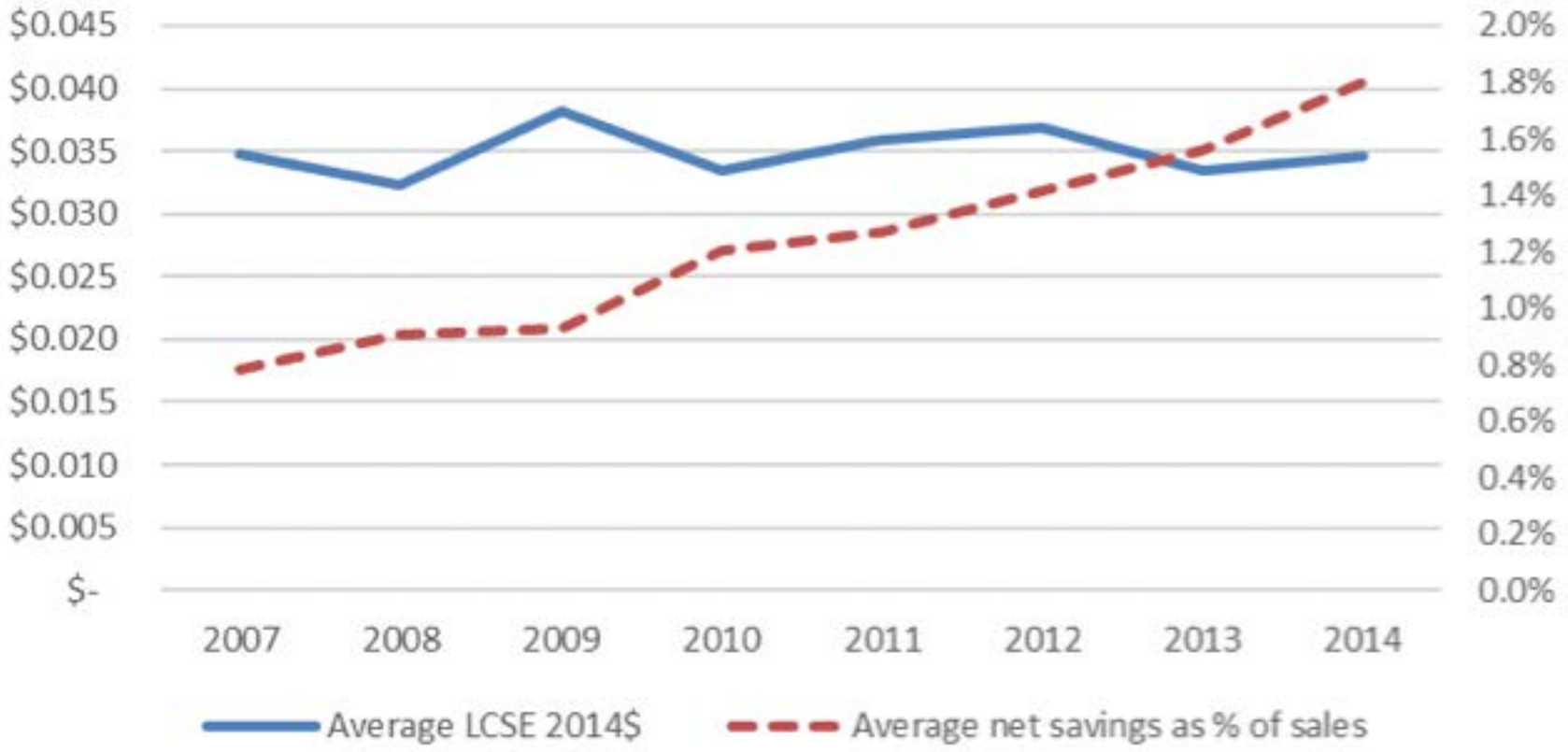
Average Cost of Saved Energy and Energy Savings as a % of Retail Sales for Major Utility Programs



Source: ACEEE, *Big Savers*, 2016.
http://aceee.org/research-report/u1601

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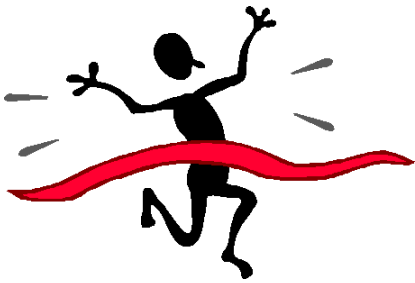
US Lessons Learned

- Plan for ramp-up periods
- Complement targets with other policies: “decoupling” & performance incentives
- Set challenging targets and allow a range of eligible efficiency measures; serve all customer classes
- Involve stakeholders in efficiency planning; use clear, transparent and consistent tests for planning resource portfolios

Conclusions



1. EEOs generally been successful in all three regions -- save a substantial amount of energy (more than 20% in a few cases)
2. Savings generally cost-effective -- costs generally less than half those of supply-side resources
3. Provide opportunities for EE businesses
4. Steady political support, stable funding, outreach on benefits and high-quality EM&V are important

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