National Association of State Energy Officials

NASEO 111(d) Webinar: Crediting Energy Efficiency

David Terry, NASEO Executive Director

July 23, 2014

About NASEO

A national non-profit representing the 56 governor-designated energy officials from each state, territory, and the District of Columbia.

State Energy Offices invest $4 billion annually in a variety of priority areas, including:

- Efficiency in residential, multifamily, commercial and industrial buildings;
- Renewable energy;
- Oil, gas, electricity production and distribution;
- New and emerging technologies and services;
- Energy emergency preparedness and resiliency; and
- Advanced transportation technologies, fuels, and infrastructure, among others.

Committees


Buildings


Government Affairs


Industrial and Advanced Manufacturing


Energy Security


Financing


Transportation


Fuels and Grid Integration

NASEO's Affiliates

A robust and engaged network of +60 private-sector partners, including representatives from business, trade associations, nonprofit organizations, educational institutions, and national laboratories.

NASEO 111(d) Activities

- Exchanges between State Energy Offices and EPA ahead of and following the release of the proposed rule
- Ongoing "3N" cooperation with the National Association of Clean Air Agencies (NACAA) and the National Association of Regulatory Utility Commissioners (NARUC) to coordinate member education and assistance efforts
  - Hosted "3N" joint meeting and developed consensus "Energy Efficiency Principles for 111(d)": http://www.naseo.org/Data/Sites/1/principles_3n_2014.pdf
- 111(d) sessions, including Regional EPA presenters, at NASEO Regional Meetings in spring 2014
- State 111(d) Resource Hub: www.111d.naseo.org/
- State Energy Office and Energy Advisor 111(d) Task Force to foster peer-exchange on topics of interest

NASEO Annual Meeting: Savannah, Georgia: September 8-11, 2014

- Meeting will be focused on the evolving nature of electricity policies, markets, technologies, and regulations
- 111(d) breakfast discussion for states, hosted by Cadmus, on September 10, 2014
  - In-depth look at the 111(d) ruling
  - Implications for states
  - Resources for states
- More information: http://annualmeeting.naseo.org/

CADMUS

Webinar Logistics

- All participants will remain muted during the presentations.
- We will have a Q&A period at the end of the webinar.
- If you have a question for the presenters or are having difficulty with the webinar software, please submit your question via the sidebar chat anytime during the webinar.
- The slides and a webinar recording will be available on NASEO's website. A link will be emailed to all webinar registrants.

Webinar Presenters

- Kyle Danish
  - Partner, Van Ness Feldman
- Rodney Sobin
  - Director of Research and Regulatory Affairs, Alliance to Save Energy
- Sara Hayes
  - Senior Manager and Researcher, Policy and Utilities, American Council for an Energy-Efficient Economy (ACEEE)
- Elizabeth Beardsley, P.E.
  - Senior Policy Counsel, U.S. Green Building Council (USGBC)

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Overview of EPA's "Clean Power Plan" Proposed Rule

National Association of State Energy Officials
Webinar
July 23, 2014

Clean Power Plan Proposed Rule

- Legal authority: Section 111(d) of Clean Air Act
  - Requires federal-state approach
- Proposed rule: “Clean Power Plan”
  - EPA sets state-specific emission rate goals
  - States submit “compliance plans” for EPA approval
- Projected result of state plans
  - Reduce power sector CO2 emissions by 30% by 2030 from 2005 levels
  - Corresponds to approximately 17% reduction from 2013 levels

Timeline


Proposed Rule (June 2, 2014)
Final Rule (June 2015)
State Plans Due (2016-2018)
Compliance with Initial Goal (2020-2029)
Compliance with Final Goal (starting in 2030)

Architecture of the Proposed Rule

State-specific emission rate goals

State compliance plans

EPA Sets State-Specific Goal

Start

2012 fossil $\frac{lb\ CO_2}{MWh}$ ⇒

Block 1

Reduce coal CO_2 by 6% heat rate improvement

⇒

Block 2

Reduce by increasing utilization of existing and under-construction NGCC plants and decreasing coal plant use

⇒

Block 3

A) Add MWh for under-construction and at-risk nuclear

B) Add MWh of renewable generation. Increase from 2012 level to the 2020 regional average of state RPSs in 2029.

⇒

Block 4

Add MWh saved by end-use energy efficiency

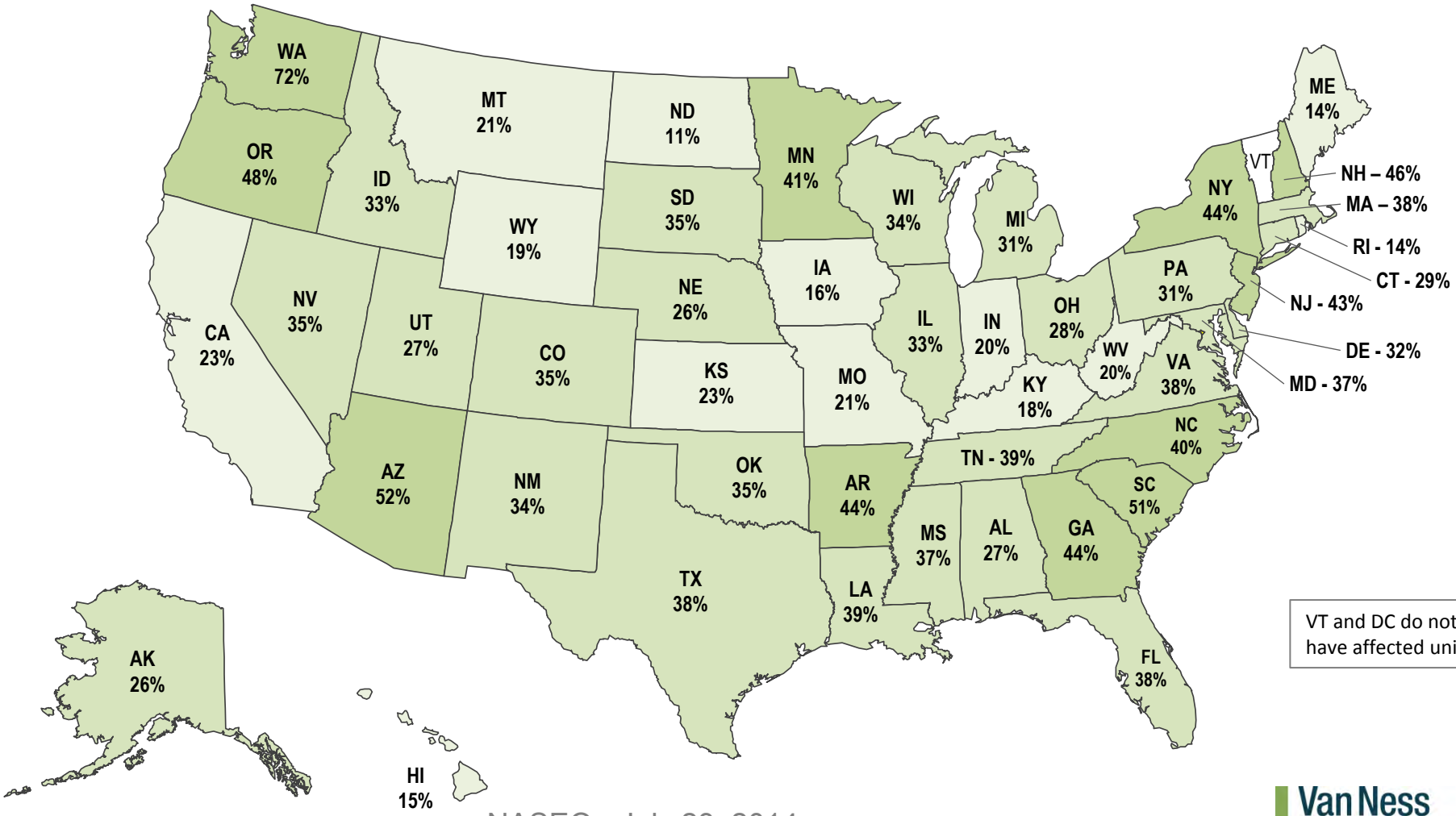
Increase from 2012 level to reach 1.5% annual increase through 2029

⇒

Result

$$State\ Goal = \frac{lbs.CO_2\ fossil}{MWh_{\ coal\ +\ OG} + MWh_{\ NGCC} + MWh_{\ ARN} + MWh_{\ UCN} + MWh_{\ RE} + MWh_{\ EE}}$$

2030 Goals as Percent Reductions from 2012 CO_2 Emission Rates



VT and DC do not have affected units.

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State Compliance Plans

- States submit plans for meeting goal
  - Plans due in 2016
  - Possible extensions to 2018 for states considering multi-state approaches
- EPA must approve plan
  - Approved plan becomes federally enforceable
- States have discretion in designing plans
  - Not required to use “building block” policies
  - Can have rate limit converted to “mass” limit on emissions
  - Can adopt multi-state plans
- EPA rule provides guidance on design of plans
- If state fails to submit approvable plan, EPA may impose its own plan

Compliance and Enforcement

- Approved state plan becomes *federally* enforceable
- Options provided in proposed rule:
  - Impose all compliance obligations on affected power plants
  - Impose some or all compliance obligations on *other* entities ("portfolio approach")
- Portfolio approach
  - Utilities
  - Renewables providers
  - Efficiency providers
  - State agencies ("state commitment approach")
- Legal/implementation questions, including:
  - Permissible reading of 111(d)?
  - Citizen suit enforcement?

Other Important Issues

- Treatment of activities before 2012-2020
- Interstate issues
- Unit retirements
- Methodology for converting a rate-based target to a mass-based target – projected BAU generation
- Treatment of hydro, biomass, nuclear
- Treatment of new natural gas units
- Crediting of energy efficiency actions outside state/utility programs (e.g., ESPCs)

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ALLIANCE TO SAVE ENERGY

Using less. Doing more.

Including Energy Efficiency in State 111(d) Plans

Rodney Sobin

Director of Research & Regulatory Affairs

Alliance to Save Energy

NASEO In-Depth 111(d) Webinar: Crediting Energy Efficiency

July 23, 2014

Incorporating EE in 111(d) Plans

- Introduction
- State Plan Components
- State Plan Pathways
- Enforceability Considerations
- EE Incorporation Under Rate-based Approach
- Evaluation, Measurement & Verification (EM&V)
- Emissions Quantification
- Interstate Considerations
- Resources

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Introduction

- Proposal offers much state flexibility
  - Many possible options, scenarios
- Recognizes and encourages end-use EE
- Complicated issues, many new to air regulators
- Preamble asks for comment on many issues

So, many questions will be with us for some time.

State Plan Components

1. Affected entities (not only electrical generating units--EGUs)
2. Plan approach and geographic scope
3. State emission performance level, rate- or mass-based
4. Plan projected to meet required emissions goals
5. Milestones
6. Corrective actions for shortfalls
7. Identify emissions standards and other measures
8. Quantifiable, non-duplicative, permanent, verifiable, enforceable measures
9. Monitoring, recordkeeping and reporting
10. State reporting
11. State hearing
12. Supporting materials

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State Plan Pathways

Four pathways—all can include EE

- Rate-based emissions limit applied to EGUs
  - EE credited to EGUs as emission rate adjustment
  - Tradable credits or state assigns credit
  - EE measures need to enforceable & need EM&V

- Mass-based emissions limit applied to EGUs
  - CO_2 mass limit or budget on individual or group of EGUs
  - EE helps cost-effectively meet CO_2 limit but not "credited" per se
  - EE as "complementary" to enforceable state plan
- Portfolio approaches
  - Can include direct EGU limit and (enforceable) indirect measures
  - **State-driven:** multiple entities may have enforceable obligations
  - **Utility-driven:** suite of measures enforceable on utilities
    - More suitable in states with vertically integrated utilities
  - Rate- or mass-basis can be used

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Enforceability Considerations

- State plan must
  - Identify entities responsible for compliance & other obligations
  - Include mechanisms for showing compliance; obligations met
  - Show legal mechanisms to address non-compliance

- Could have multiple compliance entities
  - EGU owners (utility, non-utility)
  - Local distribution utilities
  - Third party program administrators (e.g., Energy Trust of OR)
  - State agencies and authorities
- Issues
  - Differing regulation of investor-owned, co-op, public power utilities
  - Alternative compliance payments, $ penalties don't assure lower emissions
  - Privately-contracted EE --Non-ratepayer programs
    - Multistate plan complications

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EE Under Rate-based Approach

- EE can be used to "adjust" emission rates (lb/MWh)
  - Add MWh saved to denominator
  - Or subtract avoided CO_2 from numerator

- Can be applied to individual or group of EGUs
- Can be tradable credit or state-apportioned adjustment
- NRDC approach to credit savings at target rate
  - E.g., MWh saved in state with 1500 lb/MWh target credited as 1500 lb CO_2 avoided
- Considerations
  - Rate-based approach needs more EM&V, emission quantification
  - Some CO_2 avoided may be from non-affected units
    - Simple-cycle gas peakers, new EGUs under 111(b) NSPS

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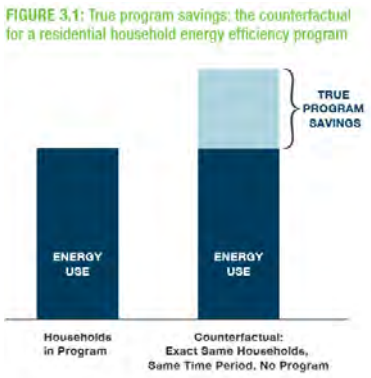
Evaluation, Measurement and Verification

- Estimate energy savings
- EM&V plan in state plan
- Varied approaches
  - Meters, bill analysis, surveys, models, deemed savings
- Almost every state has some EM&V in place
- Considerations
  - Time-of-use/savings (affects emissions quantification)
  - Balancing cost and accuracy
  - Variations in assumptions, methodologies, bases
    - Measure life, net vs. gross savings, baselines
  - Some EE easier to measure than others
- Methods and technologies improving
- Models, protocols, resources available



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Evaluation, Measurement and Verification

- EM&V role may vary by state 111(d) approach
  - Rate-based: important to quantify savings & translate to emissions rate
  - Mass-based: compliance measured by CO_2 at stacks
  - **But** EM&V may be important for EE resource standards (EERS) or other policy to attribute savings, credits

- Example 1: Rate-based with broad EE market participation.
  - Industry, energy service companies, utilities, others sell EE credits for compliance; need EM&V to show credible 0 lb/MWh EE supplied.*
    * May be non-zero for some CHP or other options.

- Example 2: Mass-based cap program (e.g., RGGI).
  - Generators need allowances to cover emissions; no EE credit for CO_2 per se
  - But may use EM&V to credit under EERS, etc.; needed to achieve reductions

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Emissions Quantification

- Translate energy savings to avoided emissions
- Average vs. marginal emissions rates (marginal better)
- AVoided Emissions and geneRation Tool (AVERT)
  - Good tool for near-term; easy to use; some limitations
- Dispatch modeling
  - More sophisticated; cost, expertise required
- Operational vs. build margin
  - Large amounts of EE, RE can affect EGU construction, retirement
  - Operational marginal models may not capture this

↔

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Interstate Considerations

- Power flows across state lines; energy savings in one state can affect generation and emissions in another
  - AVERT, dispatch models useful
- EPA discusses (and asks for comment) several approaches
  - State that implements measure counts only in-state EGU CO_2 reductions or
  - State that implements measure counts avoided emissions anywhere
  - Several multi-state/regional options
    - Regional market; attribution by formula; joint demonstration of compliance

So, many questions remain.

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Resources

- Clean Power Plan Proposed Rule (Sec. VIII State Plans)
  http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule
- Technical Support Documents: State Plan Considerations & Projecting EGU CO_2 Emission Performance in State Plans
  http://www2.epa.gov/carbon-pollution-standards/clean-power-plan-proposed-rule-technical-documents
- Clean Power Plan Toolbox for States
  http://www2.epa.gov/cleanpowerplantoolbox
- EPA Roadmap for Incorporating EE/RE Policies and Programs in State Implementation Plans
  http://www.epa.gov/statelocalclimate/documents/pdf/overview_paper_4-28-2011.pdf
- SEE Action Network EM&V Resource Portal
  http://www1.eere.energy.gov/seeaction/emv_resource_portal.html
- NASEO State 111(d) Resource Hub
  http://www.111d.naseo.org/

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American Council for an Energy-Efficient Economy

How much can I get for that? Getting the most from end-use energy efficiency in 111(d)

Sara Hayes
Senior Manager and Researcher
July 23, 2014

The American Council for an Energy-Efficient Economy (ACEEE)

- ACEEE is a nonprofit 501(c)(3) that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments & behaviors
- Nearly 50 staff based in Washington, D.C.
- Focus on end-use efficiency in industry, buildings, utilities & transportation
- Other research in economic analysis; behavior; national, state, & local policy
- Funding:
  - Foundation Grants (52%)
  - Contract Work & Gov. Grants (20%)
  - Conferences and Publications (20%)
  - Contributions and Other (8%)

Why is EE the preferred path?

- Low cost
  - See: *The Best Value for America's Energy Dollar: A National Review of the Cost of Utility Energy Efficiency Programs*, Maggie Molina
- Lots of it
  - See: *Change Is in the Air: How States Can Harness Energy Efficiency to Strengthen the Economy and Reduce Pollution,* Hayes, et. al
- Can be deployed in the rule's timeframe
  - See: *Energy Efficiency Resource Standards: A New Progress Report on State Experience,* Annie Downs and Celia Cui
- Multiple pollutants, T&D benefits, the list goes on.
  - See: *Recognizing the Full Value of Energy Efficiency*, Jim Lazar and Ken Colburn

EE in the proposal

1.5% Energy Efficiency Resource Standard (EERS) is assumed and used to set individual state targets.

- Starts at 2012 levels and increases 0.2% per year

Status of State EERS Targets

Approximate annual savings target in 2013	Number of states	States
2% or greater	5	Massachusetts, Arizona, Rhode Island, New York, Vermont
1.5% - 1.99%	6	Illinois, Maryland, Maine, Minnesota, Colorado, Indiana*
1.0% - 1.49%	8	Connecticut, Iowa, Oregon, Washington, Hawaii, Ohio*, New Mexico, Michigan
0.5% - 0.99%	5	California, Wisconsin, Pennsylvania, North Carolina, Arkansas

Notes: Nevada has a savings target of 0.2% and Texas has a target of 0.1%.
*Indiana and Ohio have taken recent action to threaten or eliminate their EERSs
Source: http://www.aceee.org/sites/default/files/publications/researchreports/e13k.pdf

Our analysis

- 1.5% annual energy savings goal
- Combined heat and power
- Building energy codes
- Appliance standards

Starts in 2016, ends in 2030....

What happens?

A SNAPSHOT OF THE U.S. IN 2030

Following the current energy path will have devastating economic, environmental, and health impacts. Enacting energy efficiency policies would avoid 600 million tons of carbon dioxide emissions.

CURRENT ENERGY PATH

An additional 494 power plants would be maintained

NOx

527,000 tons* of additional nitrogen oxide pollution

SO_2

980,000 tons* of additional sulfur dioxide pollution

CO_2

600 million tons* of additional carbon dioxide pollution

Transmission and distribution cost increases

Erosion of energy grid reliability

$95 billion in electricity generation costs

*i.e., the amount of pollution that would be avoided by choosing the energy efficiency scenario

ENERGY EFFICIENCY SCENARIO

Energy efficiency policies would save 925 million MWh of electricity

Environmental impacts:

26% reduction in carbon emissions relative to 2012

25% reduction in power demand relative to 2012

Economic impacts:

611,000 new jobs created

$17.2 billion increase in GDP in 2030

$47 billion in energy efficiency investments

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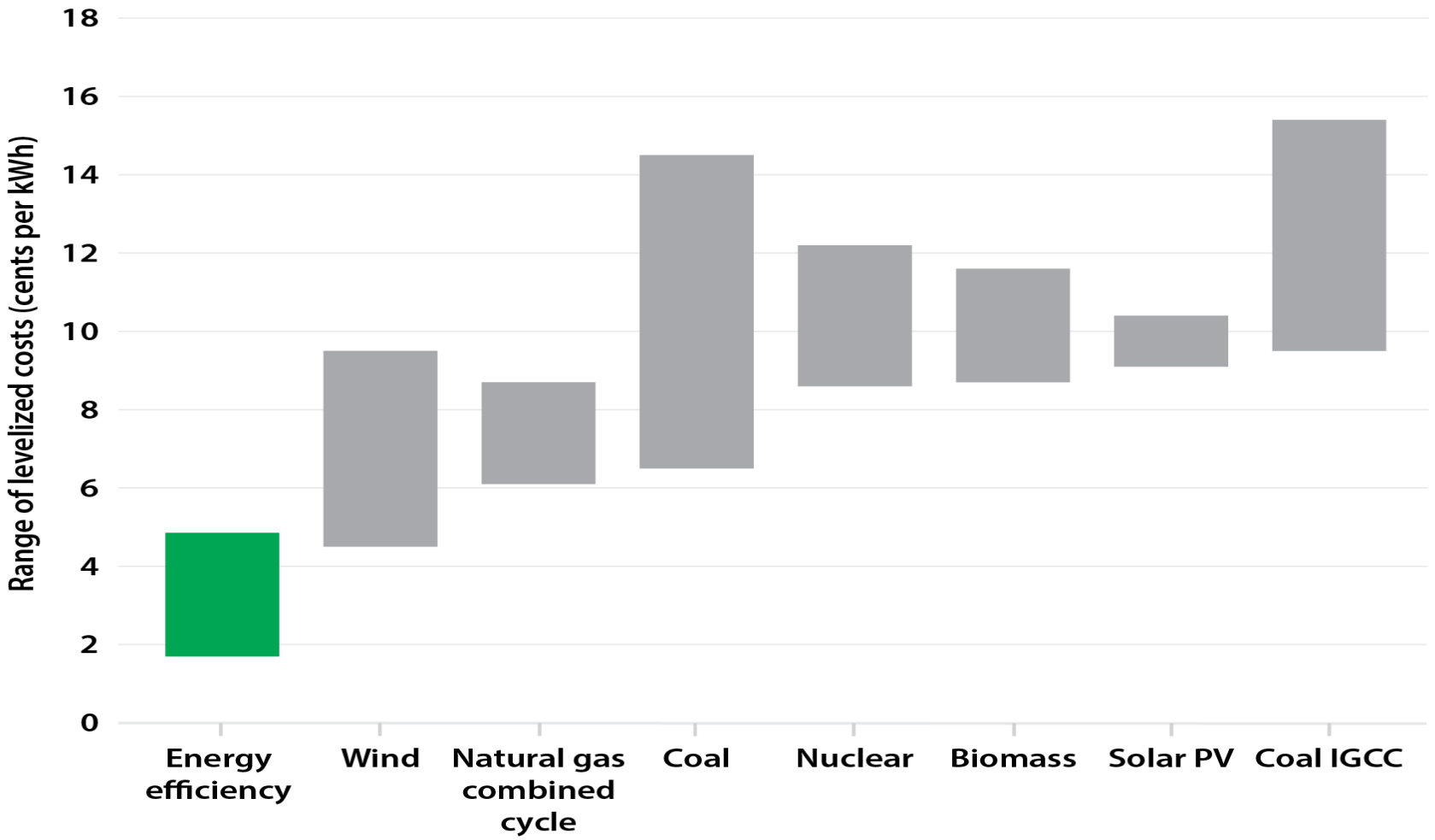
American Council for an Energy-Efficient Economy

Every region has substantial savings potential

Percentage of electricity savings relative to 2012 consumption, by census region

Region	Total (all four policies)
New England	30%
Middle Atlantic	28%
South Atlantic	24%
East South Central	23%
West South Central	24%
East North Central	22%
West North Central	22%
Mountain	30%
Pacific	27%

Levelized electricity resource costs



Source: Energy efficiency data represent the results from Molina 2014 for utility program costs (range of four-year averages for 2009-2012); supply costs are from Lazard 2013.

What do states need for low-cost compliance under 111(d)?

1. Bring EE off the bench
   - Take the best advantage of your EE assets

2. Make sure you score when you get a hit!
   - Take credit for your EE “wins”

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Areas for comment

Additional clarity from EPA on how to count your “hits” could be helpful in the near-term

- Clear guidance on the role of a variety of EE measures
  - Building codes, CHP
- Clear guidance on acceptable EM&V
  - Deference to states vs clarity – How do we get both?

Additional areas of potential importance to states

(questions I’ve been hearing that I don’t have a clear answer for)

- How do you convert your rate to a tonnage cap?
- Enforceability – How does this work? What about third parties?
- How do you calculate a regional emission rate if you want to act cooperatively?
- Measure life – 10 years? through 2030?
- Industrial sources that might be regulated later – “double jeopardy”
- Offsets? Reductions in CO2 outside the electric sector
- Can a state count any new EE measures?
  - ESCO/third party EE?
  - Federal appliance standards?

Acting Now

It may be intimidating, but acting early can have big benefits!

What can states do right now?

Possible next steps for states

Import/export of electricity - EE savings potentially lost

- States probably need to solve this with some cross-state agreements to get 100% of EE credit.
- Affects states differently – Delaware and Idaho

Acting in spite of uncertainty

- States should look at identifying the EE potential within their borders
- Choose EE investments with long-term savings and adopt a “balanced portfolio”
- Choose EE that fits with past EPA guidance
- An EERS looks like a solid way to go
  - Could be a vehicle to fold in CHP, third party EE, etc.

States need a way to compare the cost of different compliance options

- Tools being developed? Tell people what you need!

Contact Info

Questions? Comments?

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ACEEE
American Council for an Energy-Efficient Economy

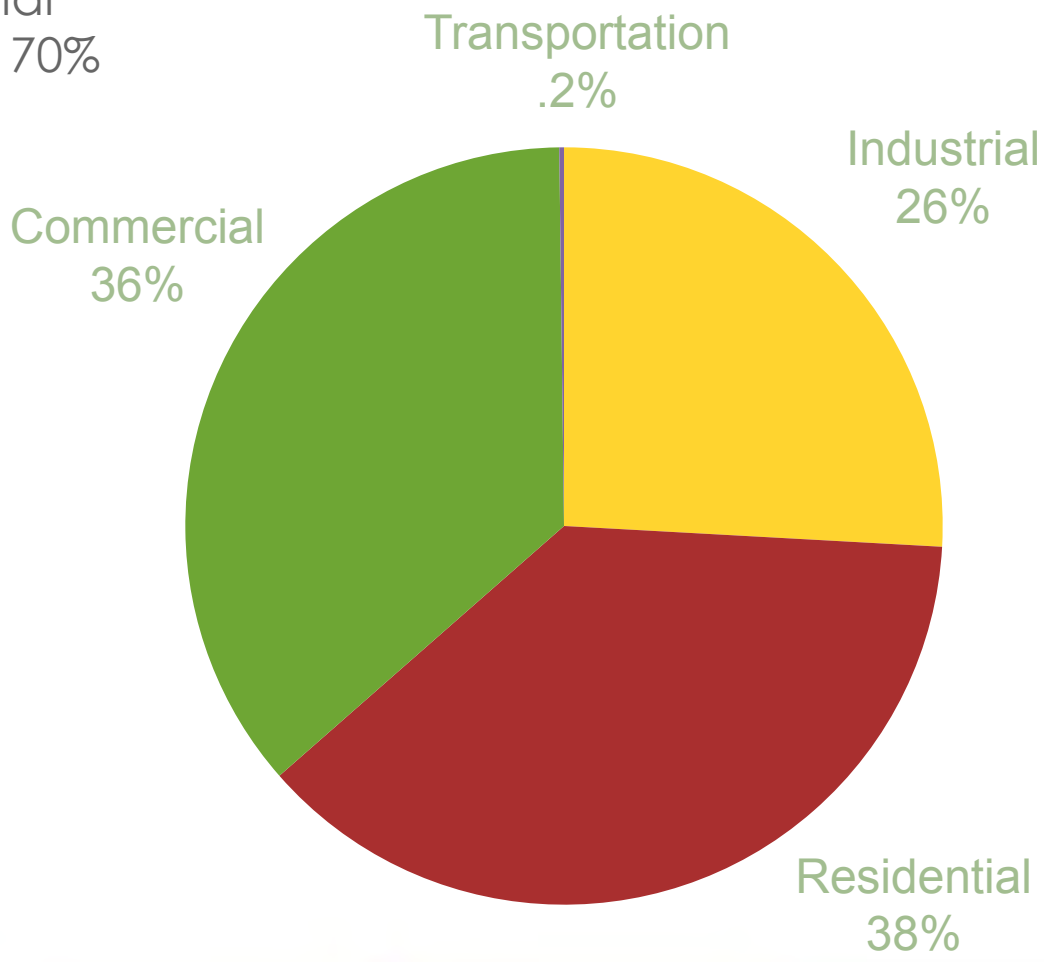
Using Building Efficiency to Meet State 111(d) Goals

Elizabeth Beardsley, P.E.
Senior Policy Counsel

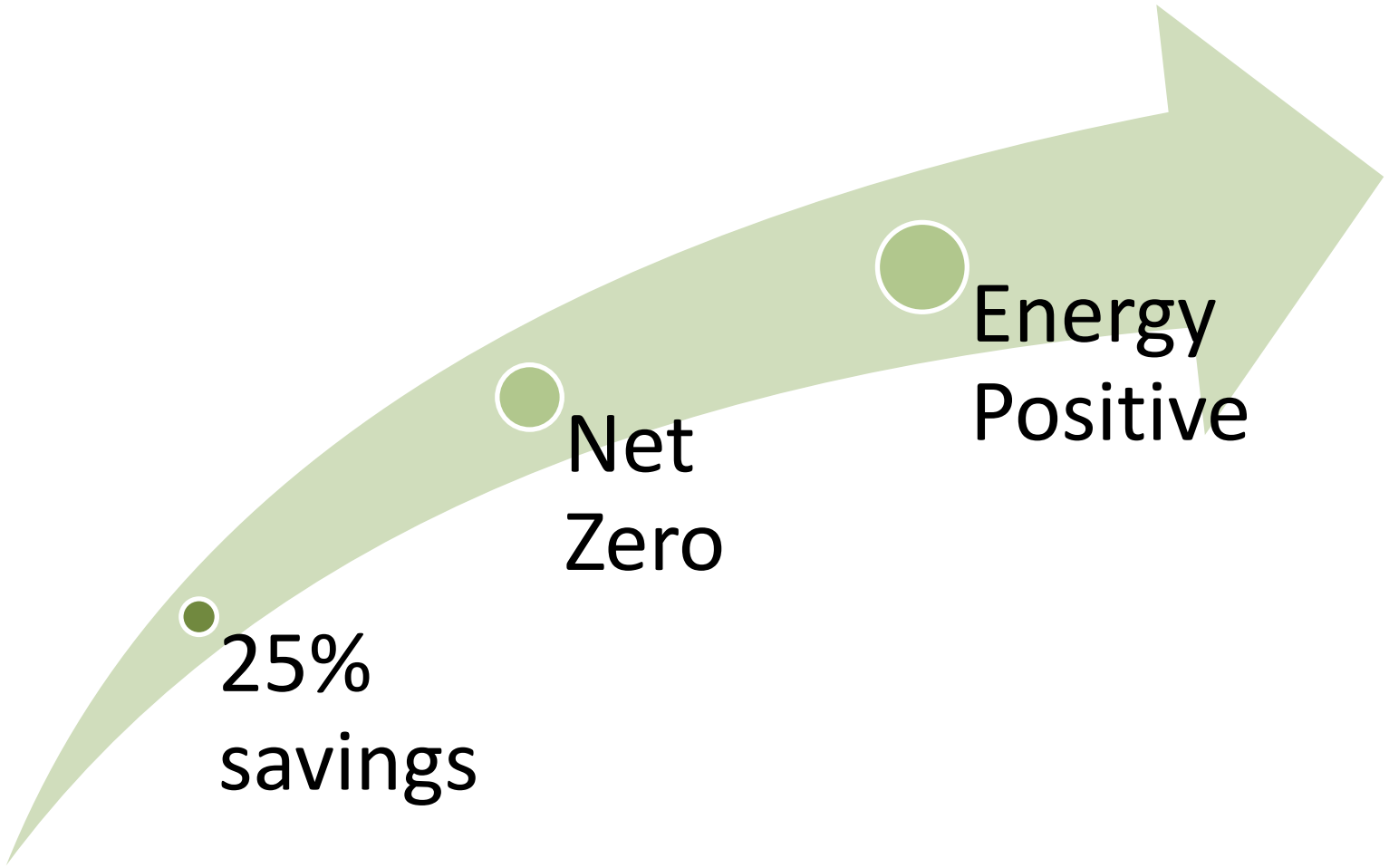
IMPORTANCE OF BUILDING EFFICIENCY

Residential and Commercial Buildings account for over 70% of retail electricity use.

Source: EIA 2014



WHY FOCUS ON BUILDING EFFICIENCY?



BUILDING EFFICIENCY MEASURES (THE WHAT)

Installation of individual lighting, appliances, HVAC, motors ("equipment")

Whole building approaches

→ Building certification systems (ENERGY STAR, LEED)

→ New construction to better codes

→ Other whole building retrofits

→ Commissioning and retrocommissioning

DELIVERY OF BUILDING EFFICIENCY (THE HOW)

Ratepayer-funded utility programs

State agency programs (state or utility funds)

Privately-funded

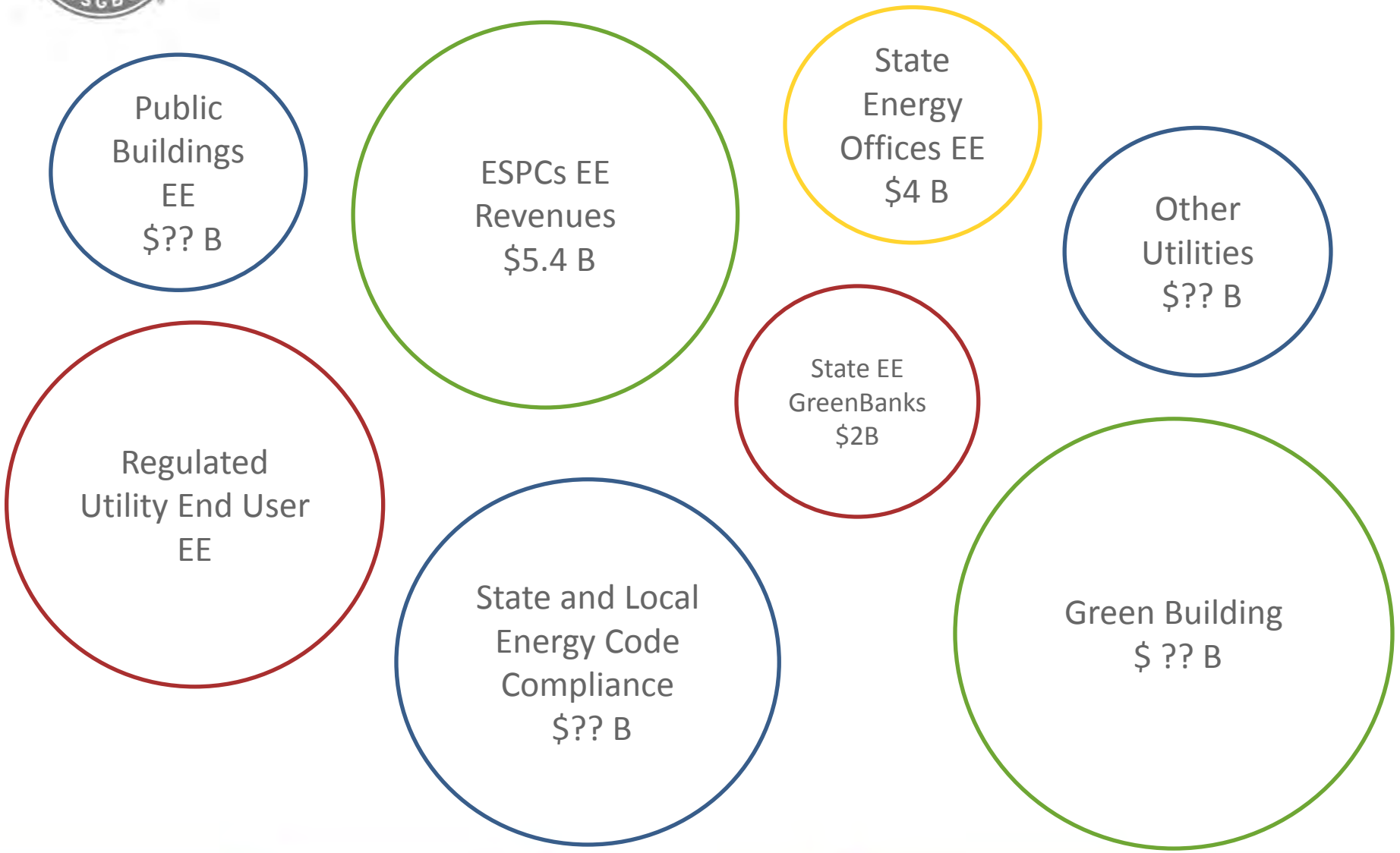
→ Building developers & owners

→ ESCOs

DRIVERS
(THE WHY)

Lever	Who Controls the Lever	Target Sectors	Why it Works
Laws, executive orders, agency goals, etc.	State	Public	Required or expected
Tax incentive	State	Private	Cost-effective
Building energy code	State and local	All	Required
Direct or midstream incentive or rebate, direct install incentive	Utility	Private	Cost savings
Building Certification Systems	Market-driven ; state or utility incentive	All	Cost-effective, asset value, others
ESPC model	Market-driven ; state or utility incentive	All	Cost-effective, removes barriers

INVESTING IN ENERGY EFFICIENCY



Proposal does not fully develop how states can capitalize on key opportunities for building efficiency.

ISN'T IT ALREADY INCLUDED?

Building blocks include EE generally

EPA Technical Support Document (TSD) "State Plan Considerations" acknowledges building efficiency but lacks clarity

TSD suggests EPA view that EMV of some forms of building efficiency is not "well established"

EPA PROPOSAL ON EM&V

Well Established	Moderately Well Established	Less Well Established
• *Direct install incentive programs for building equipment (retrofits and new construction), including lighting, HVAC, refrigeration, motors* • *Consumer-direct and mid-stream rebates for ENERGY STAR-certified lighting, appliances, and HVAC equipment* • Building commissioning, retro-commissioning • *Incentives for certified energy-efficient residential new construction, such as ENERGY STAR Homes* *	• Building energy codes (requirements and incentive programs for new construction, remodels) • State government building/operations programs (procurement, design standards, etc.) • Product-specific upstream market transformation programs directed at manufacturers • Industrial energy efficiency new construction or retrofits	• General education programs for consumers, contractors, distributers, suppliers • Targeted training programs • Building labeling and disclosure programs • Targeted consumer behavior programs

BUILDING EFFICIENCY GAPS IN EPA PROPOSAL

Details on EM&V that EPA will approve

→ Criteria must be articulated
→ Specific systems should be presumptively approved

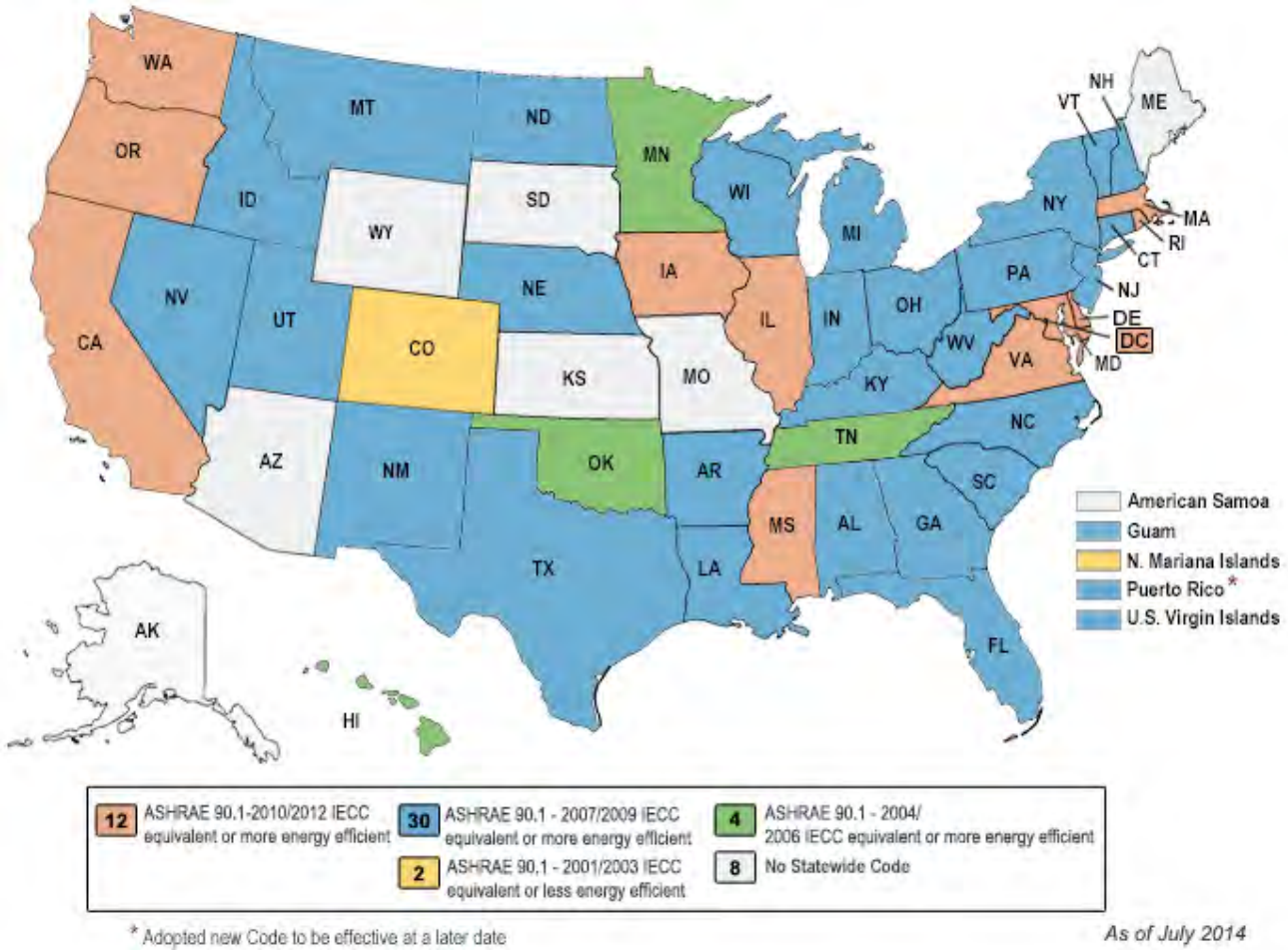
Crediting privately funded EE

→ To create value, fund any added EM&V costs
→ To incent deeper and broader efficiency

What does “enforceable” mean?

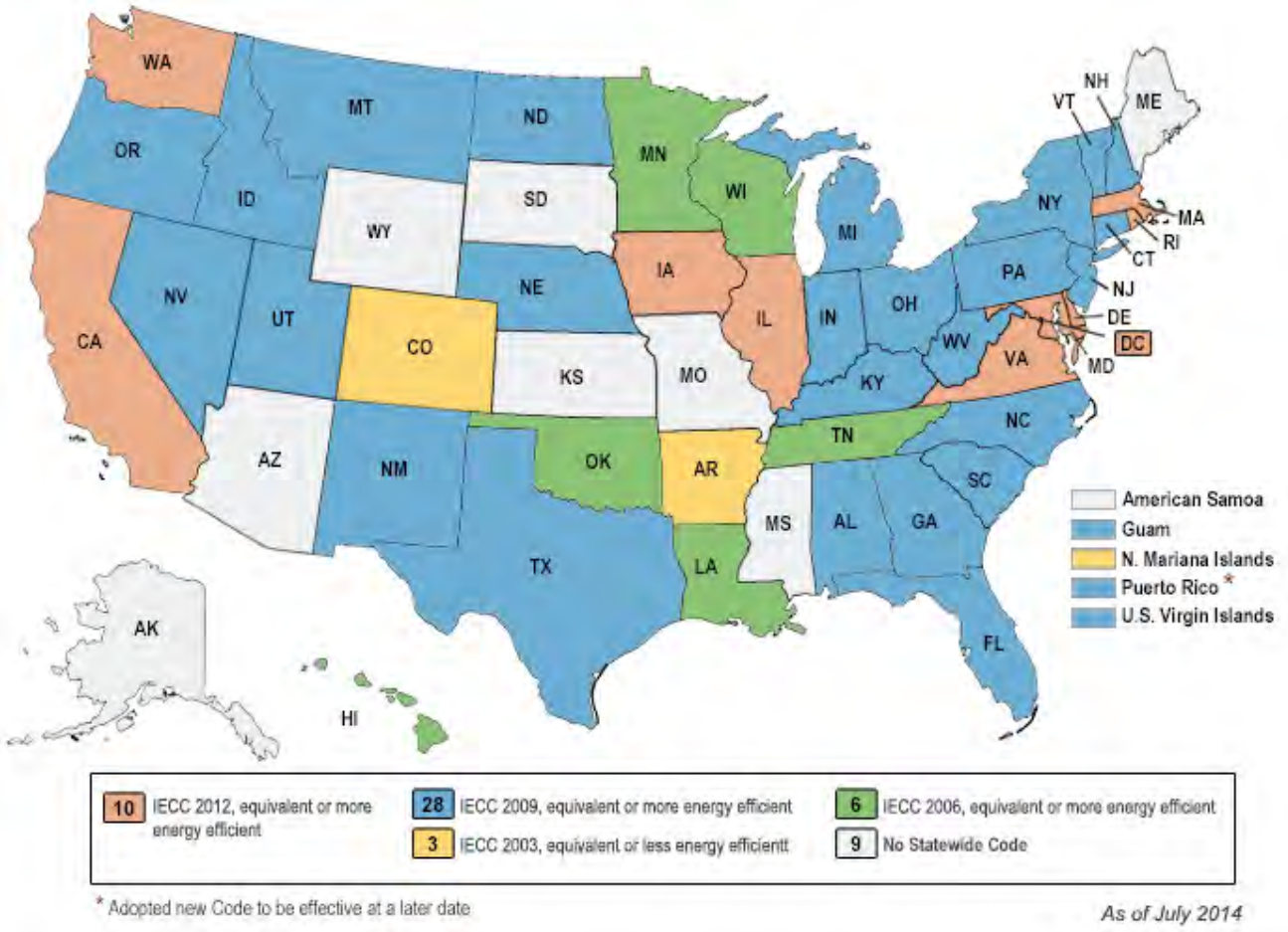
1. EM&V.

COMMERCIAL ENERGY CODES



Source: Dept. of Energy, Building Energy Codes Program

RESIDENTIAL ENERGY CODES



Source: Dept. of Energy, Building Energy Codes Program

BUILDING ENERGY CODES

Measure	Building Energy Code – Adoption of More Stringent Code and/or improved Enforcement
Lever	State (legislative or administrative action), local
Sector	Public and private
Implementer	Builders/contractors
Why it Works	Requirement (but compliance a challenge)
E - prediction	See ACEEE (2014); DOE project underway
M&V	See, e.g., NEEP Attributing Building Energy Code Savings to Energy Efficiency Programs (2013)
E - quantification	Building Occupancy Permits
Challenges	Compliance rates; depends on municipal building inspectors, resources, other factors
Potential solutions	• Audits of sample set (e.g., by state or TP) • LBNL 2013 (TP inspection, performance testing, HERS, commissioning, licensing, training tools)
Models	Texas SIP

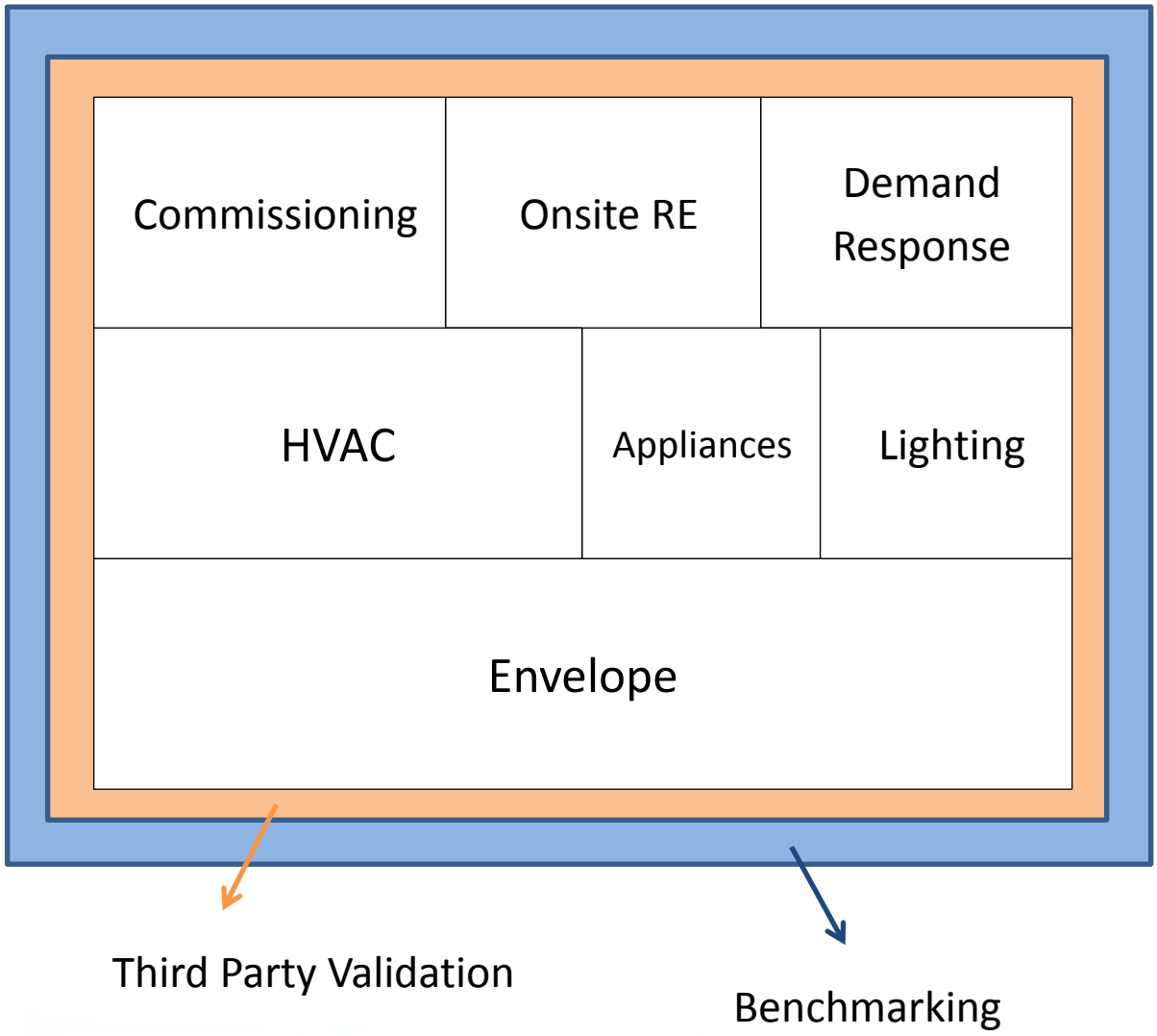
ENERGY SERVICE PERFORMANCE CONTRACTS (ESPCs)

Measure	ESPCs
Lever	Market-driven; Incentives; Public buildings program
Sector	Public and private
Implementer	ESCOs
Why it Works	Cost-effective, asset value
E - prediction	Potentially market studies, models
M&V	IMPVP; UMP; Energy Management Systems (EnMS); future methods
E - quantification	Addressed with crediting
Challenges	Cost of additional M&V
Potential solutions	Crediting mechanism; bundling of contract savings
Models	Some state EERS

BUILDING CERTIFICATION SYSTEMS

Measure	Building Certification System such as ENERGY STAR, LEED
Lever	Market-driven; Incentives; Public buildings program
Sector	Public and private
Implementer	Building developers/owners
Why it Works	Cost-effective, leadership value, asset value
E - prediction	Gap; market data/model
M&V	IPMVP, UMP (Whole Buildings), ENERGY STAR systems
E - quantification	Certification records
Challenges	Predictability; Permanence (new); cost of additional M&V
Potential solutions	Market data; move new construction into existing building certification systems using ongoing benchmarking; crediting mechanism
Models	DC COG SIP; Pay for Performance Program (NJ, NH); PacificCorp Energy FinAnswer, Utah

CERTIFICATION SYSTEMS



RESOLVING EM&V QUESTIONS

Argument for a tailored approach to "E":

→ Use for projection in plan

→ Use for program level effect (if needed; depends on crediting)

Significant work on EM&V

→ SEE Action

→ DOE Uniform Methods Project

→ others

NEXT STEPS ON EM&V

Ask for clarify in EPA's forthcoming EM&V guidance

→ Criteria

→ Presumed approvals

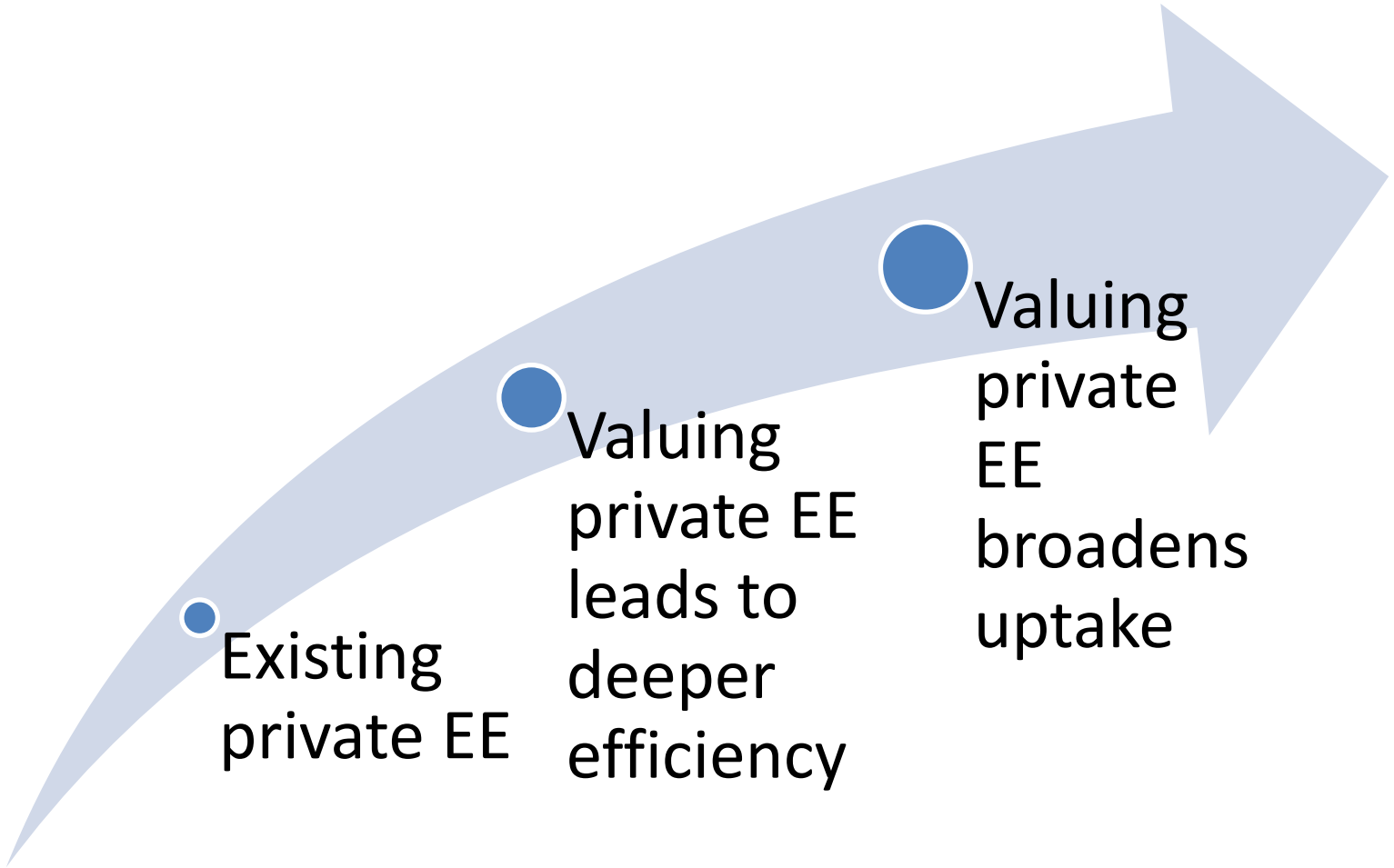
State Technical Reference Manuals

→ Updating, gap-filling

→ Consider desirability of harmonizing (e.g. interstate plans)

2. Crediting Privately Funded and Delivered Building EE.

WITH A VALUE MECHANISM, PRIVATE EE CAN BE EVEN GREATER



CREDITING CONCEPTS

Potential Approaches

→ Existing: State EERS Utility, State or Nonprofit EE Entity

→ New: National Registry, State or multistate clearinghouse

Role

→ Track and audit EMV

→ Buy/sell credits, or merely connect buyers/sellers

3. What Does “Enforceable” Mean?

ENFORCEMENT OF STATE PLAN

How can state ensure standards will be met if rely in part on programs, incentives, and third party activity?

Possible solutions

→ Structure with utilities responsible (credit or EERS system)

→ State assumes risk, with interim targets and corrective actions

"ENFORCEMENT" OF MEASURES

How can state demonstrate:

→ Validity of assumed uptake for incentive-based systems

→ Privately-funded EE will occur

→ Any measures credited are real and sustained

Possible solutions

→ EM&V design

→ Crediting structure (e.g., EE utility, clearinghouse) has role in enforcement of false credits against credited party

Takeaways