The 2015 State Energy Efficiency Scorecard

Annie Gilleo, Seth Nowak, Meegan Kelly, Shruti Vaidyanathan,
Mary Shoemaker, Anna Chittum, and Tyler Bailey

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529 14th Street NW, Suite 600, Washington, DC 20045
Phone: (202) 507-4000 • Twitter: @ACEEEDC
Facebook.com/myACEEE • aceee.org

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About the Authors

Annie Gilleo is the lead author of *The State Energy Efficiency Scorecard.* She manages technical assistance projects for states and conducts research on energy efficiency resource standards, utility regulatory mechanisms, and other state-level policies. Annie joined ACEEE in 2013.

Seth Nowak conducts quantitative analysis and writes reports on energy efficiency programs and policies in the electric and natural gas utility sector. His focus is on state energy efficiency policies, including the administration and delivery of utility-sector programs. His current research is on the expansion of ratepayer-funded energy efficiency policies and programs across states. He joined ACEEE in 2010.

Meegan Kelly conducts research and outreach on the impacts of state and federal energy efficiency programs and policies on energy use in the industrial sector. She is also engaged in research on combined heat and power and intelligent efficiency. She joined ACEEE in 2014.

Shruti Vaidyanathan is the principal analyst for ACEEE's *Green Book Online*, a comprehensive environmental ranking of consumer vehicles. Her recent work has also focused on transportation policy at the state and regional levels, including the analysis of policy options for the states of New Mexico and North Carolina. She joined ACEEE in 2007.

Mary Shoemaker tracks and analyzes state and federal legislation and agency regulations that affect energy efficiency. In particular, Mary explores the role of energy efficiency as a means to comply with air pollution regulations with an emphasis on the Clean Air Act and Section 111(d) obligations for states. Mary also conducts and tracks ACEEE's technical assistance for state energy efficiency policies. She joined ACEEE in 2014.

Anna Chittum researches and develops federal, state, and local industrial-energy policies for ACEEE, particularly those pertaining to combined heat and power (CHP) systems and industrial energy efficiency programs. Anna is currently a visiting fellow at ACEEE, having returned in 2014 from a yearlong Fulbright fellowship in Denmark, where she researched local heat planning and the integration of CHP and intermittent renewable energy sources on the Danish grid. Anna joined ACEEE in 2008.

Tyler Bailey interned for the Utilities, State and Local Policy program at ACEEE in 2015. He focused on compiling and analyzing state utility data and trends in utility data access, and he also contributed to the development of local policy tools.

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Executive Summary

The year 2015 marks a tipping point for energy efficiency. State policies are increasingly encouraging utilities to invest in cost-effective efficiency, prompting them to adopt new business models that align their interests with those of customers and policymakers. Utilities across the United States invested more than $7 billion in energy efficiency over the past year. States are also spurring energy efficiency investments through advancements in building energy codes, transportation planning, and leading by example in their own buildings. These investments in energy efficiency reap huge benefits, giving businesses, governments, and consumers more control over how and when they use energy. Efficiency saves money, drives investment across all sectors of the economy, creates jobs, and reduces the environmental impact of energy use. This summer's release of the Clean Power Plan by the US Environmental Protection Agency (EPA) further motivates states to invest in cost-effective energy efficiency as a compliance option.

Governors, legislators, regulators, and citizens are increasingly recognizing that energy efficiency is a crucially important state resource. As a result, many innovative policies and programs that promote energy efficiency originate at the state level. *The 2015 State Energy Efficiency Scorecard* reflects these successes through a comprehensive analysis of state efforts to support energy efficiency.

In this ninth edition of our *State Energy Efficiency Scorecard*, the American Council for an Energy-Efficient Economy (ACEEE) ranks states on their policy and program efforts and recommends ways that states can improve their energy efficiency performance in various policy areas. The *State Scorecard* provides an annual benchmark of the progress of state energy efficiency policies and programs. It encourages states to continue strengthening their efficiency commitments in order to promote economic growth, secure environmental benefits, and increase their communities' resilience in the face of the uncertain cost and supply of the energy resources on which they depend.

The 2015 State Energy Efficiency Scorecard assesses state policies and programs that improve energy efficiency in our homes, businesses, industries, and transportation systems. It considers the six policy areas in which states typically pursue energy efficiency:

- Utility and public benefits programs and policies
- Transportation policies
- Building energy codes and compliance
- Combined heat and power (CHP) policies
- State government–led initiatives around energy efficiency
- Appliance and equipment standards

KEY FINDINGS

Figure ES1 shows states' rankings in *The 2015 State Energy Efficiency Scorecard*, dividing them into five tiers for ease of comparison. Later in this section, table ES1 provides details of the scores for each state. An identical ranking for two or more states indicates a tie.

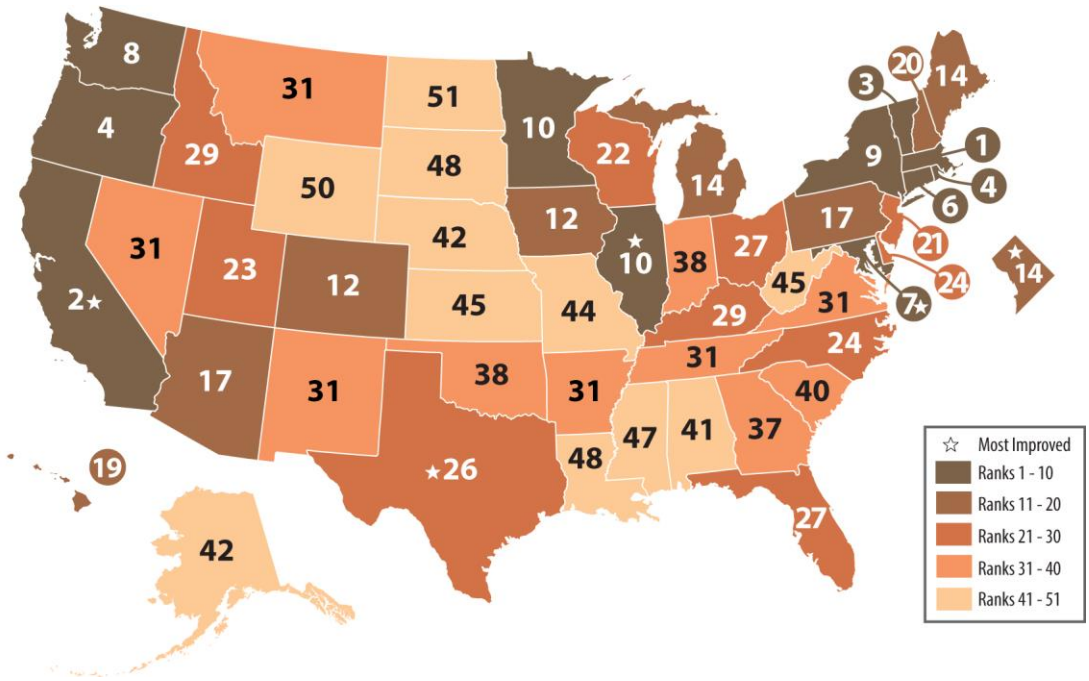

Figure ES1. *2015 State Scorecard* rankings

Massachusetts retained the top spot in the *State Energy Efficiency Scorecard* rankings for the fifth year in a row, having overtaken California in 2011. The state's achievement is based on its continued commitment to energy efficiency under its Green Communities Act of 2008. Among other things, the legislation has spurred greater investment in energy efficiency programs by requiring utilities to save a large and growing percentage of energy every year through efficiency measures. Massachusetts achieved incremental electricity savings of over 2.4% of statewide retail sales in 2014.

Joining Massachusetts in the top five are **California**, **Vermont**, **Rhode Island**, and **Oregon**. All of these states have appeared in the top five in the past, demonstrating the continuing commitment and progress of the states in the top tier.

Connecticut, **Maryland**, **Washington**, **New York**, **Minnesota**, and **Illinois** rounded out the top tier. These states have well-established energy efficiency programs but also continue to push the boundaries by redefining the ways in which policies and regulations can enable energy efficiency.

States Rising and Falling

This year's most improved states were **Maryland**, **Illinois**, **the District of Columbia**, **California**, and **Texas**. Most-improved states showed the largest increases in points over last year's totals. Maryland has been a top-performing state for several years and in 2015 increased its commitment to energy efficiency by establishing new, more aggressive energy savings targets for utilities. Illinois is well along the path toward adoption of the most recent building energy codes, and procurement agreements with the Illinois Power Agency have allowed utilities to achieve energy savings beyond the constraints of a spending cap placed on programs run under the state's energy efficiency resource standard (EERS). The District

of Columbia is among the most improved for the second year in a row, due to its progress across a number of policy areas and the ramping up of DC Sustainable Energy Utility programs. California's major efforts to achieve energy efficiency in schools, in addition to its implementation of a cap-and-trade program, earned the state several more points this year. Texas installed the most new CHP capacity of any state in 2014 and also prioritized building energy code compliance efforts through a partnership with the US Department of Energy.

Other states have also made recent progress in energy efficiency. **Delaware** actively convened stakeholder groups over the past year to develop energy savings targets for utilities and the Delaware Sustainable Energy Utility. **Pennsylvania** established new energy efficiency targets for electric utilities for the next five years.

Sixteen states fell in the rankings this year, and 27 states and two territories lost points because of substantive changes in their performance as well as changes in our methodology. **New Mexico** fell the farthest, losing four points and falling six positions in the rankings. This drop is indicative of the need to consistently update and improve policy. Although New Mexico has energy savings targets in place, other states have ramped up energy savings in recent years and adopted more recent (and more stringent) versions of building energy codes.

Results by Policy Area

The leading states in utility-sector energy efficiency programs and policies (covered in Chapter 2) were **Massachusetts**, **Rhode Island**, and **Vermont**. These are the same three states that topped this category in 2014. With long records of success, all three continued to raise the bar on cost-effective programs and policies. Massachusetts and Rhode Island both earned maximum points in this category for the second year in a row, with Rhode Island achieving incremental electricity savings of well over 3% of retail sales.

Total spending for electricity efficiency programs in 2014 reached $5.9 billion. Adding this to natural gas program spending of $1.4 billion, we estimate total efficiency program spending of more than $7.3 billion in 2014. Reported state budgets were again slightly higher than actual spending. In 2014 budgets totaled $8.2 billion, a significant increase over the $7.7 billion we reported last year.

Savings from electricity efficiency programs in 2014 totaled approximately 25.7million megawatt-hours (MWh), a 5.8% increase over last year. These savings are equivalent to about 0.7% of total retail electricity sales across the nation in 2014. Gas savings for 2014 were reported at 374 million therms (MMTherms), a 35% increase over 2013.

Twenty-five states continue to enforce and adequately fund energy savings targets to drive investments in utility-sector energy efficiency programs. The states with the most aggressive savings targets included **Arizona**, **Massachusetts**, and **Rhode Island**. This year **Maryland** also finalized strong energy savings goals. **New York** is making major changes to its utility regulatory structure as part of the state's ongoing Reforming the Energy Vision (REV) process, but multiyear savings targets remain an important measure of performance. In **Maine,** legislators and regulators made back-and-forth decisions about funding limits, but as of the time of publication Efficiency Maine was fully funded to implement the state's all-cost-effective efficiency mandate. Doubt remains as to the future of energy savings targets in

Ohio, but most utilities in the state continue to meet targets despite a freeze put in place by legislation passed last year.

California, **Massachusetts**, and **New York** led the way in energy-efficient transportation policies (covered in Chapter 3). California's requirements for reductions in greenhouse gas (GHG) emissions have led it to identify several strategies for smart growth, and Massachusetts promoted smart growth development in cities and municipalities through state-delivered financial incentives. New York is one of the few states in the nation to have a vehicle-miles-traveled reduction target.

The leading states in building energy codes and compliance (Chapter 4) were **California** and **Illinois**. Only four states—**California, Illinois, Maryland**, **and New Jersey**—have adopted the latest commercial *and* residential building energy codes without significant weakening amendments.

Massachusetts, **Maryland**, and **California** took top points for their combined heat and power policies (Chapter 5), while **California**, **Illinois**, **Minnesota**, and **New York** led the way in state government initiatives (Chapter 6). All of these states offer financial incentives to consumers and state and local governments, and also invest in research and development programs focused on energy efficiency.

California continues to lead the nation in its setting of appliance standards (Chapter 7). This year, to address its drought conditions, California adopted new standards for plumbing products that will lead to both energy and water savings.

Table ES1 gives an overview of how the states fared in each scoring category.

Table ES1. Summary of state scores in the *2015 State Scorecard*

Rank	State	Utility & public benefits programs & policies (20 pts.)	Trans-portation policies (10 pts.)	Building energy codes (7 pts.)	Combined heat & power (4 pts.)	State government initiatives (7 pts.)	Appliance efficiency standards (2 pts.)	**TOTAL SCORE (50 pts.)**	Change in rank from 2014	Change in score from 2014
1	Massachusetts	20	8.5	6	4	5.5	0	**44**	0	2
2	California	14	10	7	4	6.5	2	**43.5**	0	3
3	Vermont	19	7	6.5	2	5	0	**39.5**	0	2
4	Oregon	13	8	6.5	2.5	5.5	1	**36.5**	-1	-1
4	Rhode Island	20	5	5	3	3	0.5	**36.5**	-1	-1
6	Connecticut	15	6	5	3	5.5	1	**35.5**	0	0
7	Maryland	12	7	6.5	4	5	0.5	**35**	2	5
8	Washington	11	8	6.5	2.5	5	0.5	**33.5**	0	0
9	New York	10	8.5	5	3	6	0	**32.5**	-2	-2.5
10	Illinois	10	6	7	2	6	0	**31**	1	4
10	Minnesota	13.5	4	5.5	2	6	0	**31**	0	2
12	Colorado	8.5	5	4.5	1	5	0.5	**24.5**	1	0
12	Iowa	11	2.5	6	1.5	3.5	0	**24.5**	2	0.5
14	District of Columbia	6	6.5	6	1	3.5	0.5	**23.5**	7	3.5
14	Maine	8	6	2	2.5	5	0	**23.5**	2	1
14	Michigan	11.5	4.5	4	1	2.5	0	**23.5**	-2	-2.5
17	Arizona	11.5	3.5	2	1.5	3	0.5	**22**	-2	-1.5
17	Pennsylvania	4	6	4.5	2.5	5	0	**22**	3	1.5
19	Hawaii	12	4	2	1	2.5	0	**21.5**	-2	0
20	New Hampshire	9	2	4	1	3	0.5	**19.5**	2	1
21	New Jersey	5	6	4	1.5	2.5	0	**19**	-2	-2
22	Wisconsin	7.5	2	2.5	2	4	0	**18**	-5	-3.5
23	Utah	6.5	2	3.5	1	4	0	**17**	0	-1
24	Delaware	0	6	4.5	1.5	4.5	0	**16.5**	1	-0.5
24	North Carolina	2	4	4	2	4.5	0	**16.5**	0	-1
26	Texas	0.5	3	6	2	4	0.5	**16**	8	3
27	Florida	1.5	5	5.5	1	2.5	0	**15.5**	1	-1
27	Ohio	7	0.5	3	1.5	3.5	0	**15.5**	-2	-1.5
29	Idaho	4	0.5	5.5	0.5	3.5	0	**14**	1	-0.5
29	Kentucky	2.5	1	5	0.5	5	0	**14**	4	0.5
31	Arkansas	7	1	3.5	0	1.5	0	**13**	0	-1
31	Montana	3.5	0	5	1	3.5	0	**13**	0	-1
31	Nevada	3	1	4	1	4	0	**13**	-2	-3
31	New Mexico	4.5	1	3	1	3.5	0	**13**	-6	-4
31	Tennessee	1.5	4.5	1.5	0.5	5	0	**13**	7	1
31	Virginia	-0.5	5	4	0	4.5	0	**13**	4	0.5
37	Georgia	1.5	4.5	3.5	0	2.5	0.5	**12.5**	-2	0
38	Indiana	4	2.5	2	0.5	2	0	**11**	2	0.5
38	Oklahoma	3	1	3	0.5	3.5	0	**11**	-3	-1.5
40	South Carolina	1	3	3	0	3	0	**10**	2	0
41	Alabama	0	0.5	4.5	0	4.5	0	**9.5**	-2	-1.5
42	Alaska	0	2	1.5	1	4.5	0	**9**	5	1
42	Nebraska	0.5	0.5	5	0	3	0	**9**	0	-1
44	Missouri	1.5	1	1.5	0.5	4	0	**8.5**	0	-0.5
45	Kansas	0	1	2	0.5	4.5	0	**8**	-5	-2.5
45	West Virginia	-0.5	3	4.5	0.5	0.5	0	**8**	1	-0.5
47	Mississippi	0.5	1	2.5	0.5	3	0	**7.5**	0	-0.5
48	Louisiana	0.5	1.5	2	0.5	1.5	0	**6**	-4	-3
48	South Dakota	3	0.5	0.5	0.5	1.5	0	**6**	1	-1.5
50	Wyoming	1	1	2	0	1.5	0	**5.5**	0	-1
51	North Dakota	0	1.5	1.5	0.5	0.5	0	**4**	0	0

We also included three US territories in our research this year: Puerto Rico, Guam, and the US Virgin Islands. While we did score these territories, we did not include them in our general rankings. All of them have taken some steps toward ensuring that building energy codes meet the requirements of the American Recovery and Reinvestment Act, but they have not yet invested heavily in energy efficiency in other sectors. The best-performing of these, Puerto Rico, would rank 48th if it were a state. Table ES2 shows their scores.

Table ES2. Summary of scores for territories in the *2015 State Scorecard*

Territory	Utility & public benefits programs & policies (20 pts.)	Transportation policies (10 pts.)	Building energy codes (7 pts.)	Combined heat & power (4 pts.)	State government initiatives (7 pts.)	Appliance efficiency standards (2 pts.)	**TOTAL SCORE (50 pts.)**	Change in score from 2014
Puerto Rico	0	2.5	2.5	0	2	0	**7**	0
Guam	0	0	3	0	0.5	0	**3.5**	–1
US Virgin Islands	0	0	2.5	0	0.5	0	**3**	–1

STRATEGIES FOR IMPROVING ENERGY EFFICIENCY

Put in place and adequately fund an EERS or similar energy savings target. EERS policies establish specific energy savings targets that utilities or independent statewide program administrators must meet through customer energy efficiency programs. They serve as an enabling framework for cost-effective investment, savings, and program activity. EERS policies can catalyze increased energy efficiency and its associated economic and environmental benefits.

Examples: Massachusetts, Arizona, Hawaii, Rhode Island

Adopt updated, more stringent building energy codes, improve code compliance, and involve efficiency program administrators in code support. Buildings use more than 40% of the total energy consumed in the United States, making them an essential target for energy savings. Mandatory building energy codes are one way to ensure a minimum level of energy efficiency for new residential and commercial buildings.

Examples: California, Maryland, Illinois, Mississippi

Set quantitative targets for reducing vehicle miles traveled, and integrate land use and transportation planning. Like buildings, transportation consumes a substantial portion of the total energy used in the United States. Although the recent federal fuel economy standards will go a long way in helping to reduce fuel consumption, states will realize even greater energy savings by codifying targets for reducing vehicle miles traveled (VMT) as well as integrating land use and transportation planning to create sustainable communities with access to multiple modes of transportation.

Examples: California, New York, Massachusetts, Oregon

Treat cost-effective and efficient CHP as an energy efficiency resource equivalent to other forms of energy efficiency. Many states list CHP as an eligible technology within their EERS or renewable portfolio standard (RPS), but they relegate it to a bottom tier. ACEEE

recommends that states give CHP savings equal footing, and this requires that they develop a specific methodology for counting energy savings attributed to its utilization. If CHP is allowed as an eligible resource, EERS target levels should be increased to take into account the CHP potential and ensure that CHP does not displace traditional energy efficiency measures.

Example: Massachusetts

Expand state-led efforts—and make them visible. Initiatives may include putting in place sustainable funding sources for energy efficiency incentive programs; investing in energy efficiency–related research, development, and demonstration centers; and leading by example by incorporating energy efficiency into government operations. States have many opportunities to lead by example, including reducing energy use in public buildings and fleets, demonstrating the market for energy service companies that finance and deliver energy-saving projects, and funding research centers that focus on breakthroughs in energy-efficient technologies.

Examples: New York, Connecticut, Alaska

Introduction

The year 2015 marks a tipping point for energy efficiency. State policies are increasingly encouraging utilities to invest in cost-effective efficiency, prompting them to adopt new business models that align their interests with those of customers and policymakers. Utilities across the United States invested more than $7 billion in energy efficiency over the past year. States are also spurring energy efficiency investment through advancements in building energy codes, transportation planning, and leading by example in their own buildings. These investments in energy efficiency reap huge benefits, giving businesses, governments, and consumers more control over how and when they use energy. Efficiency saves money, drives investment across all sectors of the economy, creates jobs, and reduces the environmental impact of energy use. This summer's release of the Clean Power Plan by the Environmental Protection Agency (EPA) further motivates states to invest in cost-effective energy efficiency as a compliance option.

Governors, legislators, regulators, and citizens are increasingly recognizing that energy efficiency is a crucially important state resource. As a result, many innovative policies and programs that promote energy efficiency originate at the state level. *The 2015 State Energy Efficiency Scorecard* reflects these successes through a comprehensive analysis of state efforts to support energy efficiency.

This is the ninth edition of the *State Energy Efficiency Scorecard*. As in the past, this year's *State Scorecard* ranks states on their policy and program efforts, not only assessing performance but also documenting best practices and recognizing leadership. The *State Scorecard* provides an annual benchmark of the progress of state energy efficiency policies and programs. It encourages states to continue strengthening their commitment to efficiency, thereby promoting economic growth and environmental benefits.

The report has eight chapters. In Chapter 1 we discuss our methodology for scoring states (including changes made this year), present the overall results of our analysis, and provide several strategies states can use to improve their energy efficiency. Chapter 1 also highlights the leading states, most-improved states, and efficiency trends revealed by the rankings.

Subsequent chapters present detailed results for six major policy areas. Chapter 2 covers utility and public benefits programs and policies. Chapter 3 discusses transportation policies. Chapter 4 deals with building energy code adoption and state code compliance efforts. Chapter 5 scores states on policies that encourage and enable combined heat and power (CHP) development. Chapter 6 deals with state government initiatives, including financial incentives, lead-by-example policies, energy efficiency–focused research and development (R&D), and building energy use disclosure policies. Chapter 7 covers appliance and equipment efficiency standards. Finally, Chapter 8 offers our closing thoughts on the report's findings and our expectations for what we will see from states in the coming year.

Chapter 1. Methodology and Results

Author: Annie Gilleo

SCORING

States are the test beds for policies and regulations, and no two states are exactly the same. To reflect this diversity, we chose metrics that are flexible enough to capture the range of policy and program options that states use to encourage energy efficiency. The policies and programs evaluated in the *State Scorecard* aim to directly reduce end-use energy consumption; set long-term commitments to energy efficiency; establish mandatory performance codes and standards; accelerate the adoption of the most energy-efficient technologies; reduce market, regulatory, and information barriers to energy efficiency; and provide funding for energy efficiency programs.

Table 1 lists six of the primary policy areas in which states have historically pursued energy efficiency. These include

- Utility and public benefits programs and policies[1]
- Transportation policies
- Building energy codes
- Policies encouraging combined heat and power (CHP) systems
- State government–led initiatives around energy efficiency
- Appliance and equipment standards

Table 1. Scoring by policy area and metrics

Policy areas and metrics	Maximum score	% of total points
Utility and public benefits programs and policies	20	40%
Spending on electricity efficiency programs	4	8%
Spending on natural gas efficiency programs	2	4%
Incremental savings from electricity efficiency programs	6	12%
Incremental savings from natural gas efficiency programs	3	6%
Large customer opt-out programs*	(–1)	NA
Energy efficiency resource standards (EERSs)	3	6%
Performance incentives and fixed cost recovery	2	4%
Transportation policies	10	20%
Greenhouse gas (GHG) tailpipe emissions standards	1.5	3%
Electric vehicle (EV) registrations	1	2%
High-efficiency vehicle consumer incentives	0.5	1%
Targets to reduce vehicle miles traveled	1	2%

[1] A public benefits fund provides long-term funding for energy efficiency initiatives, usually through a small surcharge on electricity consumption collected on customers' bills.

Policy areas and metrics	Maximum score	% of total points
Change in vehicle miles traveled	1	2%
Integration of transportation and land use planning	1	2%
Complete streets policies	1	2%
Transit funding	1	2%
Transit legislation	1	2%
Freight plans and energy efficiency targets	1	2%
Building energy codes	7	14%
Level of code stringency	4	8%
Code compliance study	1	2%
Code enforcement activities	2	4%
Combined heat and power	4	8%
Interconnection standards	0.5	1%
Policies to encourage CHP as a resource	2	4%
Additional incentives for CHP	0.5	1%
Additional policy support	1	2%
State government initiatives	7	14%
Financial incentives	2.5	5%
Energy disclosure policies	1	2%
Lead-by-example efforts in state facilities and fleets	2	4%
Research and development	1.5	3%
Appliance and equipment efficiency standards	2	4%
Maximum total score	50	100%

*** Large customer opt-out programs allow a class of customers to withdraw from energy efficiency programs, reducing the potential savings available, so we deduct points for these policies.**

Our allocation of points among the policy areas is designed to reflect the relative magnitude of energy savings possible through the measures scored. We rely on an analysis of scholarly work and the judgment of ACEEE staff and outside experts about the impact of state policies on energy efficiency in the sectors we cover. This year we reviewed cross-sector energy savings potential studies to update our understanding of the energy savings available in each policy area (Geller et al. 2007; Neubauer et al. 2009, 2011; Molina, Elliott, and Vaidyanathan 2010; Molina et al. 2011). While new studies were limited, we did incorporate the findings of Hayes et al. (2014) and, as a result, updated our overall distribution of points.

As in the past, we found that the savings potential of utility and public benefits programs is approximately 40% of the total energy savings potential of all policy areas scored. Building energy codes could contribute, on average, about 14–15% of the total savings potential.

Based on our updated analysis of state energy savings potential studies, we found CHP policies could account for about 7–8% of total energy savings, a slight change from last year that we discuss below. We allocated points among policy areas according to these findings. That is, we gave 40% of the 50 total possible points, or 20 points, to utility and public benefits program and policy metrics, 14% (7 points) to building energy codes, and 8% (4 points) to improved CHP policies. We used the same methodology to allocate the other policy area points, with 10 points awarded for transportation policies and programs and 2 points going to state appliance and equipment standards. Savings from the policies and programs measured in our chapter on state initiatives are hard to quantify, but we have assigned a significant number of points to this policy area because it makes government commitment to energy efficiency clear and visible.

Within each policy area, we developed a scoring methodology based on a diverse set of criteria that are detailed in each policy chapter. We used these criteria to assign a score to each state. The scores were informed by data requests sent to state energy officials, public utility commission staff, and experts in each policy area. To the best of our knowledge, policy information for *The 2015 State Energy Efficiency Scorecard* is accurate as of the end of August 2015.

As always, the *State Scorecard* is meant to reflect the current policy landscape, incorporating changes from year to year. We do not envision that the allocation of points both across and within sectors will forever remain the same. We continue to adjust our methodology to represent the current energy efficiency policy and program landscape. This year we made changes to our scoring methodology in several policy areas. We outline these changes later in this chapter and discuss them in more depth in the relevant policy chapters. As new studies of the potential of energy efficiency measures emerge, and as states implement new policy designs, we will consider changing the allocation of points, adding new metrics or subtracting others, or even eliminating entire categories of scoring, all with the goal of best representing states' evolving efforts to capture the potential for energy efficiency in the systems and sectors of their economies.

STATE DATA COLLECTION AND REVIEW

We continue to improve our outreach to state-level stakeholders to verify the accuracy and comprehensiveness of the policy information on which we score the states. As in past years, we asked each state utility commission to review statewide data for the customer-funded energy efficiency programs presented in Chapter 2 and the CHP policies detailed in Chapter 5. Forty-five state commissions responded, nearly identical to the number of responses we received last year. We also asked each state energy office to review information on transportation policies (Chapter 3), building energy codes (Chapter 4), CHP (Chapter 5), and state government–led initiatives (Chapter 6). We received responses from energy offices in 48 states and territories, slightly less than the near-perfect response rate we achieved in 2014. In addition, we gave state energy office and utility commission officials the opportunity to review and submit updates to the material on ACEEE's State and Local Policy Database (ACEEE 2015).[2] We also asked them to review and provide comments on a draft version of *The 2015 State Energy Efficiency Scorecard* prior to publication. We used

[2] Available at database.aceee.org/.

publicly available data and responses from prior years to evaluate states that did not respond to our data request or request for review. In addition, expert working groups were convened to provide further information on building energy codes and CHP policies in states.

Best-Practice Policy and Performance Metrics

The scoring framework described above is our best attempt to represent the myriad efficiency metrics as a quantitative score. There are clear limitations to converting spending data, energy savings data, and policy adoption metrics spanning six policy areas into one score. Quantitative energy savings performance metrics are confined mostly to programs run by utilities and third-party administrators using ratepayer funds. These programs are subject to strict evaluation, measurement, and verification standards. Although states make many other efforts to encourage efficiency, these are typically not evaluated with the same rigor, so it is difficult to capture comprehensive quantitative data for these programs.

While our preference is to include metrics based on energy savings achieved in every sector, these data are not widely available. Therefore, with the exception of utility policies, we have not scored energy efficiency policy areas on reported savings or spending data attributable to a particular policy action. Instead we have developed best-practice metrics for scoring the states. While these metrics do not score outcomes directly, they credit states that are implementing policies likely to lead to more energy-efficient outcomes. For example, *potential* energy savings from improved building energy codes and appliance efficiency standards have been documented, although *actual* savings from these policies are rarely evaluated. Given the lack of consistent ex post data, we rely on these best-practice metrics. To the extent possible, we have also attempted to reflect outcome metrics; for example, EV registrations and reductions in vehicle miles traveled are both meant to reflect positive outcomes of transportation policies. Full discussions of the policy and performance metrics used can be found in each chapter.

DATA SCOPE

The *State Scorecard* reflects state-level energy efficiency policy environments as well as states' performance in implementing programs. Energy efficiency initiatives implemented by actors at the federal or local level or in the private sector (with the exception of investor-owned utilities [IOUs] and CHP facilities) fall outside the scope of this report. Regions, counties, and municipalities have become very active in energy efficiency program development, a trend that we do not track in the *State Scorecard* but a positive trend that should reinforce the energy efficiency efforts taking place at the state level. However a few metrics in the *State Scorecard* do capture non-state efforts, such as local adoption of building codes, local land-use policies, and state financial incentives aimed at local energy efficiency efforts. We also include municipal utilities in our data set to the extent that they report energy efficiency data to the US Energy Information Administration (EIA), state public utility commissions, or other state and regional groups. As much as possible, however, we aim to focus specifically on state-level energy efficiency activities. Data on local energy efficiency efforts are captured in ACEEE's biennial *City Energy Efficiency Scorecard* (Ribeiro et al. 2015).

The *State Scorecard* also does not cover private-sector investments in efficient technologies outside of customer-funded or government-sponsored energy efficiency programs. While utility and public programs are critical to leveraging private capital, the development of an independent metric measuring private sector investment falls outside the scope of this report.

CHANGES IN SCORING METHODOLOGY FROM LAST YEAR

This year, we updated the scoring methodology in four policy areas to better reflect potential energy savings, economic realities, and changing policy landscapes. Most notably, overall point allocation was adjusted for two categories in the *2015 State Scorecard*. Our assessment of recent potential studies indicated that transportation-sector policies had the potential to account for greater energy savings. Therefore, we adjusted our scoring in this category from 9 points to 10. We allocated the additional point among existing policy metrics in our analysis of transportation policies.

Our analyses of state potential studies also indicated that our previous allocation of points toward CHP policies and programs was likely too heavily weighted when compared with potential energy savings across all sectors and policy areas represented in the *State Scorecard*.[3] We corrected this issue by removing a point from CHP. We also attempted to streamline and clarify our methodology in this chapter by developing four overarching policy categories. Some metrics, like interconnection standards and financial incentives, reflect scoring methodology of past years. We developed a new, umbrella category to score states on activities and policies designed to encourage CHP as a resource. These changes are described in detail in Chapter 5.

In Chapter 2, Utility and Public Benefits Programs and Policies, we made several changes in order to better reflect the most up-to-date policy environment throughout the United States. Most notably, we increased our emphasis on achieved savings by awarding more points to electric and natural gas savings. While utility avoided cost levels (and the potential for cost-effective energy savings) vary by state, our research continues to show widespread potential for high savings across the country (Neubauer 2014).

In Chapter 4, Building Energy Codes, we updated our scoring methodology to reflect the introduction of 2015 energy codes. We also made adjustments to our scoring criteria to reflect both ACEEE's increased efforts to collect data on compliance activities and the national requirement that states achieve 90% compliance with codes mandated by the American Recovery and Reinvestment Act (ARRA) by 2017.

We discuss additional details on scoring, including changes to methodology, within each chapter.

[3] See state-specific analyses in Geller et al. 2007; Neubauer et al. 2009 and 2011; Molina, Elliott, and Vaidyanathan 2010; Molina et al. 2011; and national estimates in Hayes et al. 2014.

2015 STATE ENERGY EFFICIENCY SCORECARD RESULTS

We present the results of the *State Scorecard* in figure 1 and describe them more fully in table 2. In this section, we also highlight some key changes in state rankings, discuss which states are making notable new commitments to energy efficiency, and provide a series of recommendations for states wanting to increase their energy efficiency.

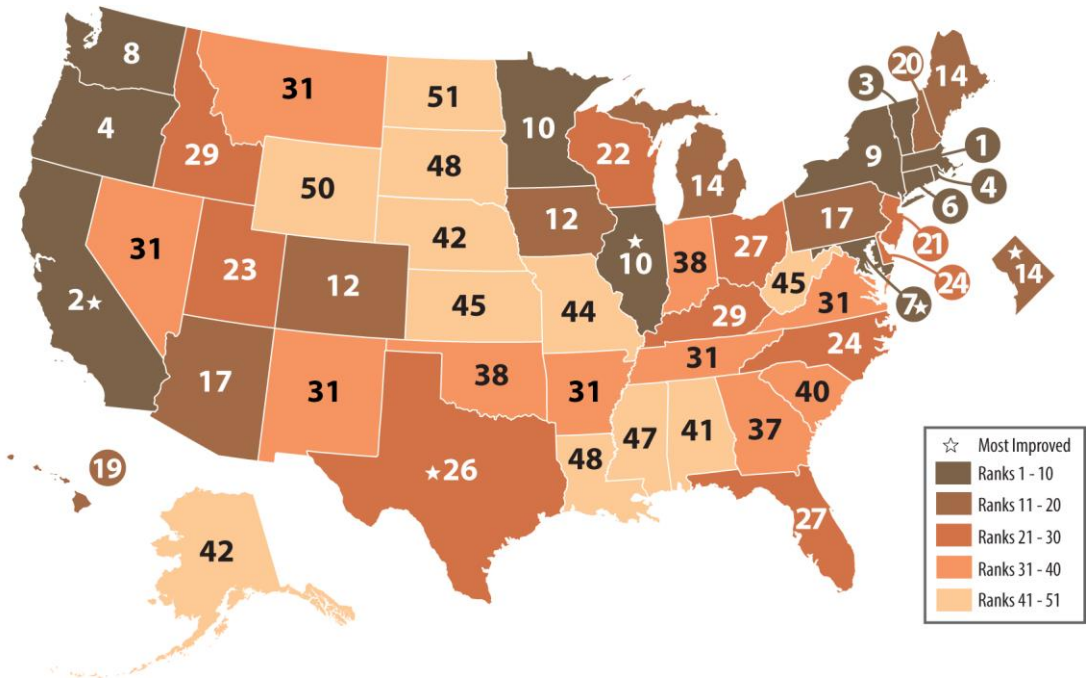

Figure 1. *2015 State Scorecard* rankings

Table 2. Summary of state scores in the *2015 State Scorecard*

Rank	State	Utility & public benefits programs & policies (20 pts.)	Trans-portation policies (10 pts.)	Building energy codes (7 pts.)	Combined heat & power (4 pts.)	State government initiatives (7 pts.)	Appliance efficiency standards (2 pts.)	**TOTAL SCORE (50 pts.)**	Change in rank from 2014	Change in score from 2014
1	Massachusetts	20	8.5	6	4	5.5	0	**44**	0	2
2	California	14	10	7	4	6.5	2	**43.5**	0	3
3	Vermont	19	7	6.5	2	5	0	**39.5**	0	2
4	Oregon	13	8	6.5	2.5	5.5	1	**36.5**	-1	-1
4	Rhode Island	20	5	5	3	3	0.5	**36.5**	-1	-1
6	Connecticut	15	6	5	3	5.5	1	**35.5**	0	0
7	Maryland	12	7	6.5	4	5	0.5	**35**	2	5
8	Washington	11	8	6.5	2.5	5	0.5	**33.5**	0	0
9	New York	10	8.5	5	3	6	0	**32.5**	-2	-2.5
10	Illinois	10	6	7	2	6	0	**31**	1	4
10	Minnesota	13.5	4	5.5	2	6	0	**31**	0	2
12	Colorado	8.5	5	4.5	1	5	0.5	**24.5**	1	0
12	Iowa	11	2.5	6	1.5	3.5	0	**24.5**	2	0.5
14	District of Columbia	6	6.5	6	1	3.5	0.5	**23.5**	7	3.5
14	Maine	8	6	2	2.5	5	0	**23.5**	2	1
14	Michigan	11.5	4.5	4	1	2.5	0	**23.5**	-2	-2.5
17	Arizona	11.5	3.5	2	1.5	3	0.5	**22**	-2	-1.5
17	Pennsylvania	4	6	4.5	2.5	5	0	**22**	3	1.5
19	Hawaii	12	4	2	1	2.5	0	**21.5**	-2	0
20	New Hampshire	9	2	4	1	3	0.5	**19.5**	2	1
21	New Jersey	5	6	4	1.5	2.5	0	**19**	-2	-2
22	Wisconsin	7.5	2	2.5	2	4	0	**18**	-5	-3.5
23	Utah	6.5	2	3.5	1	4	0	**17**	0	-1
24	Delaware	0	6	4.5	1.5	4.5	0	**16.5**	1	-0.5
24	North Carolina	2	4	4	2	4.5	0	**16.5**	0	-1
26	Texas	0.5	3	6	2	4	0.5	**16**	8	3
27	Florida	1.5	5	5.5	1	2.5	0	**15.5**	1	-1
27	Ohio	7	0.5	3	1.5	3.5	0	**15.5**	-2	-1.5
29	Idaho	4	0.5	5.5	0.5	3.5	0	**14**	1	-0.5
29	Kentucky	2.5	1	5	0.5	5	0	**14**	4	0.5
31	Arkansas	7	1	3.5	0	1.5	0	**13**	0	-1
31	Montana	3.5	0	5	1	3.5	0	**13**	0	-1
31	Nevada	3	1	4	1	4	0	**13**	-2	-3
31	New Mexico	4.5	1	3	1	3.5	0	**13**	-6	-4
31	Tennessee	1.5	4.5	1.5	0.5	5	0	**13**	7	1
31	Virginia	-0.5	5	4	0	4.5	0	**13**	4	0.5
37	Georgia	1.5	4.5	3.5	0	2.5	0.5	**12.5**	-2	0
38	Indiana	4	2.5	2	0.5	2	0	**11**	2	0.5
38	Oklahoma	3	1	3	0.5	3.5	0	**11**	-3	-1.5
40	South Carolina	1	3	3	0	3	0	**10**	2	0
41	Alabama	0	0.5	4.5	0	4.5	0	**9.5**	-2	-1.5
42	Alaska	0	2	1.5	1	4.5	0	**9**	5	1
42	Nebraska	0.5	0.5	5	0	3	0	**9**	0	-1
44	Missouri	1.5	1	1.5	0.5	4	0	**8.5**	0	-0.5
45	Kansas	0	1	2	0.5	4.5	0	**8**	-5	-2.5
45	West Virginia	-0.5	3	4.5	0.5	0.5	0	**8**	1	-0.5
47	Mississippi	0.5	1	2.5	0.5	3	0	**7.5**	0	-0.5
48	Louisiana	0.5	1.5	2	0.5	1.5	0	**6**	-4	-3
48	South Dakota	3	0.5	0.5	0.5	1.5	0	**6**	1	-1.5
50	Wyoming	1	1	2	0	1.5	0	**5.5**	0	-1
51	North Dakota	0	1.5	1.5	0.5	0.5	0	**4**	0	0

As in 2014, we did not rank the three territories we included in our research this year, although we did score them in all the categories. In general, territories scored near the bottom, largely because their publicly owned utilities do not offer energy efficiency programs. Though all three territories we reviewed have taken some steps toward ensuring building energy codes are in place, they have not invested heavily in energy efficiency in other sectors. Furthermore, we were unable to gather detailed information to update our understanding of policies and programs. Table 3 shows scores for Puerto Rico, Guam, and the US Virgin Islands. Puerto Rico scores highest among territories, although it would rank only 48th if included in the general scoring table. Generally, these territories have not taken steps to adopt the most recent iterations of building codes.

Table 3. Summary of scores for territories in the *2015 State Scorecard*

Territory	Utility & public benefits programs & policies (20 pts.)	Trans-portation policies (10 pts.)	Building energy codes (7 pts.)	Combined heat & power (4 pts.)	State government initiatives (7 pts.)	Appliance efficiency standards (2 pts.)	**TOTAL SCORE (50 pts.)**	Change in score from 2014
Puerto Rico	0	2.5	2.5	0	2	0	**7**	0
Guam	0	0	3	0	0.5	0	**3.5**	–1
US Virgin Islands	0	0	2.5	0	0.5	0	**3**	–1

How to Interpret Results

Although we provide individual state scores and rankings, the differences among states are most instructive in tiers of 10. The difference between states' total scores in the middle tiers of the *State Scorecard* is small: only 5 points separate the states in the second and third tiers, and just 3 points in the fourth tier. These tiers also have a significant number of states tied in the rankings. For example, Arkansas, Montana, Nevada, New Mexico, Tennessee, and Virginia are all tied for 31st. For the states in these three tiers, small improvements in energy efficiency will likely have a significant effect on their rankings. Conversely, idling states will easily fall behind as other states in this large group ramp up efficiency efforts.

The top tier, however, exhibits more variation in scoring, with a 13-point range, representing about one-third of the total variation in scoring among all the states. Massachusetts and California continued to score higher than other states and retained their spots at the top, despite our several methodological changes this year. Other states in the top tier are also well-established high scorers. All of these states have made broad, long-term commitments to energy efficiency, indicated by their staying power at the top of the *State Scorecard* over the past eight years. Notably, the top tier did see some significant movement this year, with New York, Rhode Island, and Oregon each dropping at least one position while Maryland rose two places and Illinois moved into the top 10 for only the second time.

2015 Leading States

Massachusetts retained the top spot in the *State Energy Efficiency Scorecard* rankings for the fifth year in a row, having overtaken California in 2011on the basis of its continued commitment to energy efficiency under its Green Communities Act of 2008. The legislation laid the foundation for greater investments in energy efficiency programs by requiring gas

and electric utilities to save a large and growing percentage of energy every year through energy efficiency. In late 2012, Massachusetts finalized its three-year plan, setting annual electricity savings targets of 2.5–2.6% through 2015 and natural gas targets of 1.08–1.19% per year through 2015 for regulated utilities (MA EEAC 2012). The draft plan for the next three-year cycle continues with aggressive annual goals of 2.5% for electric and 1.08% for natural gas net savings (MA EEAC 2015). These are some of the most ambitious savings targets in the country, helping Massachusetts achieve net savings of well over 2% of electricity sales in 2014 and attain a perfect score for its utilities policies and programs in this year's *State Scorecard*.

Massachusetts also leads in other areas of the *State Scorecard*, including its commitment to reducing energy use in state buildings and fleets and its policies to create a supportive environment for the development of CHP facilities in the state.

California is another leading state, following Massachusetts by only 0.5 points. California was one of only two states to receive full points for its building energy codes and compliance initiatives, and it also scored highest for its transportation policies and state-led efficiency initiatives. Vermont ranks third this year, the same place it held in 2014, due to its strong performance across nearly every policy area. Oregon and Rhode Island were tied, with Connecticut behind them by only 1 point. Rhode Island achieved the highest electricity savings of any state, reporting statewide savings of well over 3%. Maryland moved up the rankings within the top tier this year, setting an example of continuous improvement even among top-ranking states. Maryland, Illinois, and California not only place in the top tier in 2015 but are among the most improved states overall compared with last year.

Table 4 shows the number of years that states have been in the top 5 and top 10 spots in the *State Scorecard* rankings since 2007.

Table 4. Leading states in the *State Scorecard*, by years at the top

State	Years in top 5	Years in top 10
California	9	9
Oregon	8	9
Massachusetts	8	9
Vermont	7	9
New York	6	9
Connecticut	5	9
Rhode Island	2	8
Washington	0	9
Minnesota	0	8
Maryland	0	5
Illinois	0	2
Maine	0	2
New Jersey	0	2
Wisconsin	0	1

In total, 7 states have occupied the top 5 spots, and 14 have appeared somewhere in the top 10 since the first edition of the *State Scorecard*. California is the only state to have held a spot among the top five in all nine years, followed by Oregon and Massachusetts for eight years. Though New Jersey, Wisconsin, and Maine have all placed in the top 10 in the past, none scored high enough to be ranked in the top tier this year.

Changes in Results Compared with *The 2014 State Energy Efficiency Scorecard*

Changes in states' overall scores this year compared to previous *State Scorecard*s stem not only from changes in states' efforts to improve energy efficiency and but also from modifications to our scoring methodology. Therefore variations from last year's rankings are not solely due to changes in states' efforts. Given the number of metrics in the *State Scorecard* and states' varying efforts, relative movement among the states should be expected.

Table 5 presents the results of *The 2015 State Energy Efficiency Scorecard* compared with last year's results, by policy area and direction of change.

Table 5. Number of states gaining or losing points compared with 2014, by policy

Policy category	States gaining points		No change		States losing points	
Utility & public benefits	8	15%	12	22%	34	63%
Transportation*	36	66%	11	20%	7	13%
Building energy codes	18	33%	9	17%	27	50%
Combined heat and power*	15	28%	23	42%	16	30%
State government initiatives	16	30%	35	65%	3	6%
Appliance standards	1	2%	53	98%	0	0%
Total score	17	31%	8	13%	29	56%

Includes territories. Percentages may not total 100 due to rounding. *The overall number of points in these sections changed from 2014 to 2015.

Overall, 17 states gained points and 27 states and 2 territories lost points compared with last year. Eight states had no change in score.[4] Some of these changes in points awarded are due to our methodological changes, and so the number of states losing points should not be interpreted as a sign that states are necessarily losing ground. Rather, we raised the bar and awarded points for more ambitious programs and policies, particularly in natural gas and electricity savings and the transportation sector.

The landscape for energy efficiency is clearly in constant flux, and many opportunities remain for states to lead the way. The changes in state scores reflect an ever-rising bar for energy efficiency policies and outcomes. For example, 34 states lost points in Chapter 2, Utility and Public Benefits Programs and Policies. This overall decrease reflects our added emphasis on outcome metrics rather than policy metrics. That said, the general pattern is

[4] The *State Scorecard* looks at all 50 states and the District of Columbia, which, while not a state, is grouped under that heading for convenience. We also score, but do not rank, three territories. Puerto Rico is included in this count.

not indicative of a lack of progress among states. While several states did backslide in terms of policy, most continued to make advances. Savings from electric efficiency programs in 2014 totaled approximately 25.7 million megawatt-hours (MWh), a 5.8% increase over the 2013 savings reported in last year's *State Scorecard*. These savings are equivalent to nearly 0.7% of total retail electricity sales in the United States in 2014. More information on state scores for utility programs is included in Chapter 2.

Similarly, about half of the states lost points in Chapter 4, Building Energy Codes, due to the implementation of a new code cycle in 2015. To earn top points in this category, states needed to be on a clear path to adoption or to have fully implemented the most recent codes for both commercial and residential construction. Only a few states have adopted the most recent codes (as of fall 2015), but it is likely that over the next year we will see increased code adoption and an improvement in scores for the 2016 edition of the *State Scorecard*. More information on state scores for building energy codes is included in Chapter 4.

Most-Improved States

Twenty states rose in the rankings this year, and while all should be applauded, several made particularly noteworthy gains in overall points compared with last year.[5] This year's most improved states were Maryland, Illinois, the District of Columbia, California, and Texas. All of these states earned significantly more points than last year. For some, this led to notable jumps in the rankings. Table 6 shows changes in points and rank compared with last year for these states.

Table 6. Changes from 2014 for most-improved states

	Change in score	Change in rank	2015 ranking
Maryland	+5	+2	7
Illinois	+4	+1	10
District of Columbia	+3.5	+7	14
California	+3	--	2
Texas	+3	+8	26

***Most-improved standing is based on the change in a state's score compared to last year.**

Several of this year's most improved states also performed well in the overall rankings. For example, Maryland has been a top-performing state for several years and in 2015 rose to the seventh spot. This year, Maryland increased its commitment to energy efficiency by establishing new, more aggressive energy savings targets for utilities. The state's public service commission issued an order in July calling on utilities to ramp up energy savings targets by 0.2% each year to reach the state's 2% savings goal. Maryland is also an early adopter of 2015 International Energy Conservation Code® (IECC) standards for commercial and residential buildings.

[5] Note that change in rank reflects performance relative to other states. Change in score refers to absolute number of points earned.

This is the second year that Illinois has ranked in the top 10. This year, Illinois improved across nearly all policy categories in the *State Scorecard*. Although efficiency investments are limited under the state's EERS policy, advocates and state leaders have worked to find effective ways to maximize utility spending on cost-effective energy efficiency through other channels. Under a procurement agreement with the Illinois Power Agency, utilities must acquire all cost-effective energy efficiency in their procurement plans. Illinois also received maximum points for building energy codes, being well on the way to adopting the 2015 IECC for both commercial and residential codes and funding code compliance through several activities.

California is another top-performing state that also ranks as most improved. This year, California is just one-half point away from the number one position, having significantly upped the level of energy efficiency investments in the state. Through the California Clean Jobs Act (Prop. 39), the state has allocated significant funding to energy efficiency projects in schools. The state also began implementing a cap-and-trade program (required by the California Global Warming Solutions Act of 2006) in 2013. Energy efficiency makes up a significant portion of the state's strategy for meeting greenhouse gas emissions-reduction goals under this program.

This is the second year in a row that the District of Columbia has been one of the most improved states in our *State Scorecard*. Compared with last year, the District increased scores for its utility programs, transportation policies, and government initiatives. In addition, the District's commercial building energy codes surpass the 2012 IECC with their inclusion of the 2012 International Green Construction Code. Significant ramping-up of natural gas energy efficiency programs also pushed the District upward in the rankings. The District climbed seven spots in the rankings to 14th overall.

This year, Texas earned additional points for its building code compliance efforts. The state is working with the US Department of Energy (DOE) to develop a comprehensive understanding of code compliance rates within the state, and it has partnered with the South-central Partnership for Energy Efficiency as a Resource (SPEER) to deliver code compliance training and convene stakeholders. Texas also benefited somewhat from methodology changes in our CHP analysis, including broader criteria for CHP treatment within an EERS. Nonetheless, the state installed the most new CHP capacity in 2014, adding 525 MW through two new installations and two large expansions.

Other states have also made recent efforts related to energy efficiency. Pennsylvania finalized a new phase of energy savings targets, ensuring utilities achieve electricity savings through 2021. Rhode Island continues to reap the benefits of its EERS and is the first state to achieve incremental electricity savings of above 3%. Delaware continues to convene stakeholders to develop the framework for an EERS.

States Losing Ground

Sixteen states fell in the rankings this year due to a number of factors, including policy or program rollbacks, relatively faster progress by other states, and changes to the scoring methodology in several of our policy areas (utilities, transportation, CHP, and building codes). States' losing ground also indicates the complex relationship between changes in

total score and changes in rank. Of the 27 states that lost points, 14 fell in the rankings.[6] The rankings of eight others did not change, while four states actually rose in the rankings despite losing points compared to last year. Two states, Georgia and Hawaii, scored the same number of points as they earned in 2014 but nonetheless fell in the rankings. Because of the number of metrics covered in the *State Scorecard* and states' differing efforts, relative movement among the states should be expected. As mentioned earlier, the difference among states' total scores, particularly in the third and fourth tiers of the *State Scorecard*, is small, meaning that idling states can easily fall behind in the rankings as others ramp up efforts to become more energy efficient.

Three states had the most noticeable overall drops in score compared with last year. These were New Mexico, Wisconsin, Louisiana, and Nevada.

In general, we see three trends among these states and others losing ground in the *State Scorecard.* First, among other things, many of these states are relying on outdated versions of building energy codes. For example, neither New Mexico nor Louisiana have taken steps to adopt building energy codes beyond the 2009 codes required by ARRA, despite IECC and ASHRAE finalizing two subsequent iterations of codes. Wisconsin's residential building code is even further behind, based on the 2006 version of the IECC. Although Nevada has adopted updated recent building codes, the city of Las Vegas, a major population and construction hub within the state, has opted out of energy code requirements for residential buildings, significantly reducing the effect of the statewide code.

Second, many of the states falling behind are not increasing energy savings year after year and are therefore being outpaced as other states ramp up programs to meet higher savings targets. These states typically have not fully implemented changes to the utility business model that encourage utilities to take full advantage of energy efficiency as a resource, including decoupling, performance incentives, and energy savings targets. However we do expect to see improvement over the next few years in some states. For example, New Mexico is exploring decoupling, and Louisiana began "Quick Start" energy efficiency programs in late 2014.

Finally, opt-out provisions have been approved in many of the states falling behind in the *State Scorecard* rankings. These provisions allow large customers to avoid paying in to energy efficiency programs, forcing other customers to subsidize them and limiting the amount of energy savings utilities can achieve.

STRATEGIES FOR IMPROVING ENERGY EFFICIENCY

No state received the full 50 points in *The 2015 State Energy Efficiency Scorecard*, reflecting the fact that opportunities remain in all states—including leading states—to improve energy efficiency. For states wanting to raise their standing in the *State Scorecard* and, more important, to capture greater energy savings and the associated public benefits, we offer the following recommendations based on the metrics we track.

[6] The three territories also lost points this year, but they are not included in our rankings.

Put in place, and adequately fund, an EERS or similar energy savings target. These policies establish specific energy savings targets that utilities or independent statewide program administrators must meet through customer energy efficiency programs and market transformation. They also serve as an enabling framework for cost-effective investment, savings, and program activity that, as seen in many of the leading states, can have a catalytic effect on increasing energy efficiency and its associated economic and environmental benefits. While some states opt to include energy efficiency within the integrated resource planning (IRP) process, experience suggests that EERS policies truly drive higher cost-effective efficiency savings than any other method. The long-term goals associated with an EERS send a clear signal to market actors about the importance of energy efficiency resources in utility program planning, creating a level of certainty that encourages large-scale, productive investment in energy efficiency technologies and services. EERS targets should be established alongside rigorous, robust integrated and distributed resources planning. Long-term energy savings targets require leadership, sustainable funding sources, and institutional support to deliver on their goals. See Chapter 2 for further details.

Examples: Massachusetts, Arizona, Hawaii, Rhode Island

Adopt updated, more-stringent building energy codes, improve code compliance, and enable efficiency program administrators to be involved in code support. Buildings consume more than 40% of the total energy used in the United States, making them an essential target for energy savings. Mandatory building energy codes are one way to ensure a minimum level of energy efficiency for new residential and commercial buildings. Model codes are only as effective as their level of implementation, however, and improved compliance activities, including training and code-compliance surveys, are increasingly important. Another emerging policy driver for capturing energy savings from codes is the enabling of utility and program administrators to support compliance activities. See Chapter 4 for further details.

Examples: California, Maryland, Illinois, Mississippi

Set quantitative targets for reducing vehicle miles traveled, and integrate land use and transportation planning. Like buildings, transportation consumes a substantial portion of the total energy used in the United States. Although the recent federal fuel economy standards will go a long way in helping to reduce fuel consumption, states will realize even greater energy savings by addressing transportation system efficiency as a whole. Codifying targets for reducing vehicle miles traveled (VMT) as well as ensuring that states integrate land use and transportation planning to create sustainable communities with access to multiple modes of transportation are both important steps toward achieving substantial reductions in energy use.

Examples: California, New York, Massachusetts, Oregon

Treat cost-effective and efficient CHP as an energy efficiency resource equivalent to other forms of energy efficiency. Several states list CHP as an eligible technology within their EERS or RPS but relegate it to a bottom tier, letting other renewable technologies and efficiency resources take priority within the standard. ACEEE recommends that CHP

savings be given equal footing, and this requires that states develop a specific methodology for counting CHP savings. If CHP is considered an eligible resource, total energy savings target levels should be increased to take into account CHP potential. Massachusetts has accomplished this in its Green Communities Act.

Example: Massachusetts

Expand and make visible state-led efforts, such as funding for energy efficiency incentive programs, benchmarking requirements for state building energy use, and investments in energy efficiency–related research and development centers. State-led initiatives complement the existing landscape of utility programs, leveraging resources from the state's public and private sectors to generate energy and cost savings that benefit taxpayers and consumers. States have many opportunities to lead by example, including reducing energy use in public buildings and fleets, enabling the market for energy service companies (ESCOs) that finance and deliver energy-saving projects, and funding research centers that focus on energy-efficient technology breakthroughs. See Chapter 6 for further details.

Examples: New York, Connecticut, Alaska

Chapter 2. Utility and Public Benefits Programs and Policies

Authors: Seth Nowak, Annie Gilleo, and Tyler Bailey

INTRODUCTION

The utility sector is critical to the implementation of energy efficiency throughout the economy, as electric and natural gas utilities and independent statewide program administrators deliver a substantial share of US electricity and natural gas efficiency programs.[7] Utility customers fund these programs, either through utility rates or statewide public benefits funds. Driven by regulation from state utility commissions, utilities and independent statewide program administrators in some states have been delivering energy efficiency programs and market transformation initiatives for decades, offering various efficiency services for residential, commercial, industrial, and low-income customers.[8]

Utilities and administrators implement energy efficiency programs in all 50 states and the District of Columbia.[9] Program approaches include financial incentives such as rebates and loans; technical services such as audits, retrofits, and training for architects, engineers, and building owners; and educational campaigns about the benefits of energy efficiency improvements. Utilities and administrators also continue to develop new and creative ways of delivering energy efficiency to their customers. As state regulators and utilities increasingly examine distribution system planning as part of utility of the future discussions, energy efficiency has a large role to play as a low-cost and clean distributed resource.

METHODOLOGY

For this chapter, we gathered statewide data on

- 2013 and 2014 utility energy sales (electricity and natural gas) to customers
- 2013 and 2014 utility revenues from retail energy sales
- Number of residential natural gas customers in 2013
- 2014 and 2015 budgets for electricity and natural gas energy efficiency programs
- 2013 and 2014 actual spending for electricity and natural gas energy efficiency programs
- 2013 and 2014 incremental net and gross energy electricity and natural gas energy efficiency program savings[10]
- Policies and regulations to encourage utility investment in energy efficiency

[7] Other major programs, run by state governments, are discussed in Chapter 6.

[8] For more information on the historical growth of utility energy efficiency programs, see ACEEE's *Three Decades and Counting: A Historical Review and Current Assessment of Electric Utility Energy Efficiency Activity in the States* (York et al. 2012).

[9] The three territories surveyed this year did not report savings from ratepayer-funded programs.

[10] Gross savings are those expected from energy efficiency program, crediting all installed efficiency measures, including those that would have been installed in the absence of programs. Net savings are those attributable to the program, typically calculated by removing free riders (program participants who would have implemented or installed the measures without incentive, or with a lesser incentive). States differ in how they define, measure, and account for free-ridership and other components of the net savings calculation (Haeri and Khawaja 2012).

- Utility policies and programs related to large customers, including self-direct and opt-out provisions
- Data access policies and provisions[11]

Our data sources included information requests completed by state utility commissions, the Consortium for Energy Efficiency (CEE 2012–2015), Energy Information Administration (EIA 2014, 2015a, 2015b, 2015c), and regional efficiency groups.[12] Since these organizations often revise and update program data, we sent the data we gathered, including last year's *State Scorecard* data, to state utility commissions and independent administrators for review. Table 7 shows overall scores for utility programs and policies. Tables 9, 11, 13, and 15 provide data on electricity and natural gas efficiency program spending and savings in the most recent years for which data are available.

SCORING AND RESULTS

This chapter reviews and ranks the states based on their performance in implementing utility-sector efficiency programs and enabling policies that are evidence of states' commitment to energy efficiency. The seven utility scoring metrics are

- Electricity program spending as a percentage of statewide electric utility revenues (4 points)
- Natural gas program spending per residential gas customer (2 points)
- Incremental electricity program savings as a percentage of retail sales (6 points)[13]
- Incremental natural gas program savings as a percentage of residential and commercial sales (3 points)
- Opt-out provisions for large customers (reduction of 1 point)
- Energy efficiency resource standards for utilities and statewide program administrators (3 points)
- Utility business models that encourage energy efficiency, including performance incentives and mechanisms for addressing lost revenue (2 points)

A state could earn up to 20 points in this category, or 40% of the total possible 50 points in the *State Scorecard*. We set this point allocation because the savings potential of utility and public benefits programs is approximately 40% of the total energy savings potential of all policy areas scored. Studies suggest that electricity programs typically achieve at least three times more primary energy savings than natural gas programs (Eldridge et al. 2009; Geller et al. 2007). However gas programs are beginning to constitute larger portions of energy efficiency portfolios across the country. Utility-sector potential studies generally indicate

[11] We used these data from state responses to present best practices, not to develop scores.

[12] CEE surveys administrators of public benefits programs annually to capture trends in aggregated budgets and expenditures. CEE has granted ACEEE permission to reference survey results as of a point in time for the purpose of capturing updates to the budget, expenditure, and impacts data. The full report is at www.cee1.org/annual-industry-reports.

[13] ACEEE defines incremental savings as new savings from programs implemented in a given year. Incremental savings are distinct from annual savings (the savings in a given year from programs implemented in prior years that are still saving energy) and cumulative savings (all savings accrued over the life of a particular program).

significant untapped potential for natural gas efficiency programs (Neubauer 2011; Itron 2006; Mosenthal et al. 2014; GDS 2013; Cadmus 2010). Therefore, we allocated 10 points to performance metrics for electricity programs (annual spending and savings data) and 5 points to performance metrics for natural gas programs (annual spending and savings data). For both electricity and natural gas efficiency programs, we awarded more points to actual savings achieved and fewer points to program spending. We also scored states on a variety of enabling policies.

Our methodology for this policy area has some unintended impacts. It disadvantages several states because of the types of energy used or fuels offered to consumers. Hawaii, for example, consumes almost no natural gas (EIA 2015); it aims energy efficiency efforts at reducing electricity consumption only. To correct for this issue, we awarded Hawaii the points for natural gas efficiency spending, savings, and regulatory structures equivalent to the proportion of points it earned for corresponding electricity programs and policies. We gave the same treatment to the three territories included in this report. Elsewhere, particularly in the Northeast, energy efficiency efforts often aim to reduce the consumption of fuel oil. While we capture these efforts in program spending if they are combined with efficiency programs targeting electricity or natural gas, we have not otherwise accounted for fuel oil savings.

We continue our practice of reporting programs' incremental energy savings (new savings from programs in each program cycle), not cumulative energy savings (all savings accrued over the life of a particular program). This could be seen as disadvantaging states with long-standing energy efficiency efforts. We report incremental savings in the *State Scorecard* for two reasons. First, basing our scoring on cumulative energy savings would involve levels of complexity that are beyond the scope of the *State Scorecard*, including identifying the start year for the cumulative series, accurately accounting for the life of energy efficiency measures, and measuring the persistence of savings. Second, the *State Scorecard* aims to provide a snapshot of states' current energy efficiency programs, and incremental savings give a clearer picture of recent efforts.[14]

There are some possible metrics we do not use for scoring. We do not attempt to include program cost effectiveness or acquisition costs of energy savings. All states have cost-effectiveness requirements for energy efficiency programs. However the wide diversity of measurement approaches across states makes comparison less than straightforward. Also, several states require that program administrators pursue all cost-effective efficiency. Although some states have prioritized low acquisition costs and encouraged maximizing the *degree* of cost effectiveness, promoting larger *amounts* of marginally cost-effective energy

[14] This year we requested that our contacts at state commissions provide lifetime savings from electric and gas energy efficiency programs. Lifetime savings, as we use the phrase here, are the expected energy savings over the lifetime of an installed measure(s), calculated by multiplying the annual MWh or therm reduction associated with a measure(s) by the expected lifetime of that measure(s). EIA refers to this type of data as "incremental life cycle" savings. We did not use this measure for scoring this year, as we did not have data for more than half of the states.

savings is another valid approach. We also do not adjust savings for variations in avoided costs of energy across states, as there are examples of achieving deep energy savings in both high- and low-cost states.

Also note that scores are for states as a whole, and therefore may not be representative of the specific efforts of each utility within the state. We do not assess the energy savings performance of individual utilities. A single utility, or small set of utilities, may do very well in terms of energy efficiency programs and associated metrics (spending, savings), but when viewed in combination with all utilities in that state, such efforts can be masked by other utilities not performing as well. The reverse may also be true.

Table 7 lists states' overall utility scoring. Explanations of each metric follow.

Table 7. Summary of state scores on utility and public benefits programs and policies

State	2014 electricity program spending (4 pts.)	2014 gas program spending (2 pts.)	2014 electricity program savings (6 pts.)	2014 gas program savings (3 pts.)	Opt-out provision (–1 pt.)	Energy efficiency resource standard (3 pts.)	Performance incentives & fixed cost recovery (2 pts.)	Total score (20 pts.)
Massachusetts	4	2	6	3	0	3	2	20
Rhode Island	4	2	6	3	0	3	2	20
Vermont	4	2	5.5	2.5	0	3	2	19
Connecticut	3.5	2	3.5	1.5	0	2.5	2	15
California	3	1	4.5	2	0	1.5	2	14
Minnesota	2	1	3.5	2.5	0	2.5	2	13.5
Oregon	3.5	1	3.5	1.5	0	2.5	1	13
Hawaii	1	0.5	4.5	2	0	2	2	12
Maryland	4	0.5	3.5	0	0	3	1	12
Arizona	1.5	0	4.5	1.5	0	3	1	11.5
Michigan	1.5	1	4	2	0	1.5	1.5	11.5
Iowa	2.5	2	3.5	1.5	0	1.5	0	11
Washington	4	0.5	3	0.5	0	2	1	11
Illinois	2	1.5	3	1.5	0	1.5	0.5	10
New York	1	2	2.5	1	0	1.5	2	10
New Hampshire	1.5	2	1.5	3	0	0	1	9
Colorado	1.5	0.5	2.5	0.5	0	2.5	1	8.5
Maine	1	1	3.5	0.5	-1	2.5	0.5	8
Wisconsin	1	0.5	2	1.5	0	1.5	1	7.5
Arkansas	1.5	1	1.5	1	-1	1.5	1.5	7
Ohio	0.5	2	3	0	-1	1	1.5	7
Utah	2	1	2	1	0	0	0.5	6.5
District of Columbia	0.5	1.5	1.5	1	0	0	1.5	6
New Jersey	1.5	1	2	0.5	0	0	0	5

State	2014 electricity program spending (4 pts.)	2014 gas program spending (2 pts.)	2014 electricity program savings (6 pts.)	2014 gas program savings (3 pts.)	Opt-out provision (–1 pt.)	Energy efficiency resource standard (3 pts.)	Performance incentives & fixed cost recovery (2 pts.)	Total score (20 pts.)
New Mexico	1	0.5	1.5	0	0	1	0.5	4.5
Idaho	1.5	0	2	0	0	0	0.5	4
Indiana	1	0.5	2	0.5	-1	0	1	4
Pennsylvania	1	0.5	1.5	0	0	1	0	4
Montana	1	0	1.5	0.5	0	0	0.5	3.5
Nevada	1	0	1.5	0	0	0	0.5	3
Oklahoma	1	0.5	0.5	0.5	-1	0	1.5	3
South Dakota	0	0.5	0.5	0.5	0	0	1.5	3
Kentucky	0.5	0	1	0.5	-1	0	1.5	2.5
North Carolina	0.5	0	1.5	0	-1	0	1	2
Florida	0.5	1	0	0	0	0	0	1.5
Georgia	0	0	0.5	0	0	0	1	1.5
Missouri	0.5	0	1.5	0	-1	0	0.5	1.5
Tennessee	0.5	0	0.5	0	0	0	0.5	1.5
South Carolina	0	0	1.5	0	-1	0	0.5	1
Wyoming	0	0	0.5	0	0	0	0.5	1
Louisiana	0	0	0	0	0	0	0.5	0.5
Mississippi	0	0	0	0	0	0	0.5	0.5
Nebraska	0	0	0.5	0	0	0	0	0.5
Texas	0.5	0	0.5	0	-1	0	0.5	0.5
Alabama	0	0	0	0	0	0	0	0
Alaska	0	0	0	0	0	0	0	0
Delaware	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0
Kansas	0	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0
Virgin Islands	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	-1	0	0.5	-0.5
West Virginia	0	0	0.5	0	-1	0	0	-0.5

DISCUSSION

Electricity and Natural Gas Efficiency Program Funding

The structure and delivery of customer-funded electric energy efficiency programs have changed dramatically over the past three decades, mostly in conjunction with restructuring

efforts.[15] In the 1980s and 1990s, such programs were almost exclusively the domain of utilities, which administered and implemented programs under regulatory oversight.

Efforts in the mid-1990s to restructure and deregulate the electric utility markets led numerous states to implement public benefits charges as a new source of funding for efficiency. These public benefits approaches established new structures and tasked utilities or, in some states, separate efficiency utilities or other third parties with administering and delivering energy efficiency, renewable energy, and low-income programs.[16]

Despite the establishment of those public benefits programs, restructuring still resulted in a precipitous decline in funding for customer-funded electricity energy efficiency programs, from almost $1.8 billion in 1993 to about $900 million in 1998 (nominal dollars). The principal reasons for this decline included utilities' uncertainty about newly restructured markets and the expected loss of cost-recovery mechanisms for their energy efficiency programs.[17] Generally, utilities did not see customer-funded energy efficiency programs as being compatible with competitive retail markets.

After restructuring efforts slowed in some states, utility commissions placed renewed focus and importance on energy efficiency programs. From its low point in 1998, spending for electricity programs increased fivefold by 2010, from approximately $900 million to $4.6 billion. In 2014, total spending for electricity efficiency programs reached nearly $5.7 billion. Adding natural gas program spending of $1.4 billion, we estimate total efficiency program spending of more than $7 billion in 2014 (see figure 2).[18]

[15] By "customer-funded energy efficiency" programs—also known as ratepayer-funded energy efficiency programs—we mean energy efficiency programs funded through charges wrapped into customer rates or appearing as some type of charge on customer utility bills. This includes both utility-administered programs and public benefits programs administered by other entities. We do not include data on separately funded low-income programs, load management programs, or energy efficiency research and development.

[16] States that have established nonutility administration of efficiency programs include Vermont, New York, Oregon, Wisconsin, Delaware, New Jersey, Maine, Hawaii, and the District of Columbia.

[17] Under traditional regulatory structures, utilities do not have an economic incentive to help their customers become more energy efficient because their revenues and profits fall in line with falling energy sales due to energy efficiency programs. To address this disincentive, state regulators allow utilities to recover, at a minimum, the costs of running energy efficiency programs through charges on customer bills. For more on this issue, see York and Kushler (2011).

[18] Note that in prior years, the *State Scorecard* has given utility funding figures in terms of budgets rather than spending in order to deal with a time lag in data availability. This year, we report actual spending. Analysis of past data shows that, nationwide, actual spending is typically 80-90% of total budgets in any given year. Because of this, our overall spending numbers are somewhat lower than the budget data reported in the past.

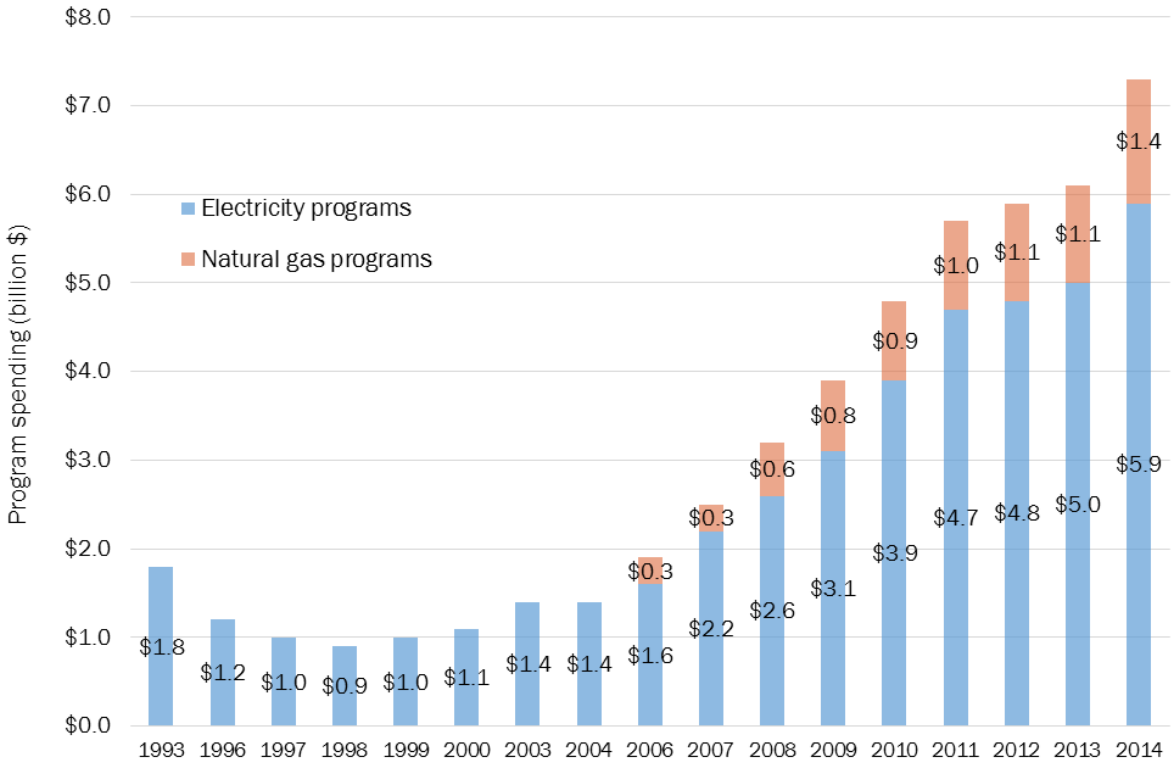

Figure 2. Annual electric and natural gas energy efficiency program spending. Natural gas spending is not available for the years 1993–2004. *Sources:* Nadel, Kubo, and Geller 2000; York and Kushler 2002, 2005; Eldridge et al. 2007, 2008, 2009; CEE 2012, 2013, 2014, 2015; Gilleo et al. 2015.

Given states' increasing commitments to energy efficiency, growth will likely continue over the next decade, albeit at a slower rate. One analysis of customer-funded energy efficiency program budgets estimated that funding for electric and natural gas programs will rise to $15.6 billion by 2025 due to the impact of all-cost-effective efficiency policies in leading states, achievement of EERS targets, and peer learning (Barbose et al. 2013). The authors also suggest a regional expansion of the US energy efficiency market, with a large portion of the projected increases in spending coming from states in the Southeast that historically have had relatively low levels.

Furthermore, we expect many states to use energy efficiency as one way to comply with EPA Clean Power Plan rules for carbon emissions in existing power plants (EPA 2014a). While states have just begun to assess potential pathways for meeting the GHG regulations outlined under section 111(d) of the Clean Air Act, ACEEE researchers found that energy efficiency policies can yield a 26% reduction in GHG emissions overall (Hayes et al. 2014).[19] The policies and technologies included in our analysis have already been tested, and the benefits can be quantified. We also found on average that states could meet 69% of their targets through energy efficiency (Hayes 2015). As state plans to meet 111(d) requirements

[19] This analysis is based on the targets proposed in the draft version of the EPA rule. ACEEE had not yet analyzed final targets during the writing of this report.

become more concrete over the next several years, it is likely that spending on energy efficiency will continue to rise.

We have made an important change in our reporting of spending data in this edition of the *State Scorecard.* We began reporting energy efficiency program *budgets* rather than spending in the 2010 *State Scorecard*. We did this to make our reporting more timely and to better represent the rapid increases in energy efficiency funding that states had been making.[20] This year we used our outreach to states to gather better information on *actual* spending in 2014. Most states were able to provide 2014 actual spending figures, and we did not need to seek out a single national data set that broke out individual state spending on gas and electric energy efficiency. Therefore we report spending data, rather than budget data, in the *State Scorecard*. We have adjusted data in figure 2, above, to illustrate actual spending for all years. From year to year, the median and average ratios of budgets to spending have remained fairly constant, ranging from about 83-89% in aggregate from 2009 to 2012.

This year, for the 10 states that did not provide data for 2014 spending on energy efficiency programs for electric or natural gas utilities, we used 2013 spending data from CEE (2015) or as supplied by our state contacts in their 2015 utility data request responses.

Please note that spending data are subject to variation across states. Several states report performance incentives as part of utility efficiency program spending, resulting in higher spending numbers. While most performance incentives are based on shared net benefits, viewed as an expense, the relative amounts of the incentives are in the range of 5–15% of program spending (Nowak et al. 2015). In the future, we will ask states to disaggregate program spending from shareholder or other performance incentives. As in past years, we sent spending data gathered from the sources above to state utility commissions for review. Tables 9 and 11 below report electricity and natural gas efficiency program spending, respectively.

SCORES FOR ELECTRIC PROGRAM SPENDING

States could receive up to 4 points based on energy efficiency spending as a percentage of 2014 electric utility revenues.[21] Spending representing at least 4.0% of revenues earned the maximum of 4 points. For every 0.5% less than 4%, a state's score decreased by 0.5 points. Table 8 lists the scoring bins for each level of spending.

[20] Prior to 2010, we depended on actual spending data from EIA, which had a two-year time lag.

[21] Statewide revenues are from EIA (2014a). We measure spending as a percentage of revenues to normalize the level of energy efficiency spending. Blending utility revenues from all customer classes gives a more accurate measure of utilities' overall spending on energy efficiency than does expressing budgets per capita, which might skew the data for utilities that have a few very large customers. An alternative metric, statewide electric energy efficiency spending per capita, is presented in Appendix B.

Table 8. Scoring of electric efficiency program spending

2014 spending as % of 2014 revenues	Score
4.00% or greater	4
3.50–3.99%	3.5
3.00–3.49%	3
2.50–2.99%	2.5
2.00–2.49%	2
1.50–1.99%	1.5
1.00–1.49%	1
0.5–0.99%	0.5
Less than 0.5%	0

Table 9 shows state-by-state results and scores for this category.

Table 9. 2014 electric efficiency program spending by state

State	2014 spending ($million)	% of statewide electricity revenues	Score (4 pts.)
Rhode Island	81.1	6.81%	4
Massachusetts	503.8	6.14%	4
Vermont	48.1	5.95%	4
Maryland	319.3	4.27%	4
Washington	279.5	4.22%	4
Oregon	159.8	3.88%	3.5
Connecticut	180.6	3.62%	3.5
California	1237.6	3.14%	3
Iowa	108.5	2.80%	2.5
Utah	57.2	2.27%	2
Illinois	265.1	2.13%	2
Minnesota[1]	135.6	2.09%	2
New Jersey	201.5	1.96%	1.5
Arkansas	72.2	1.95%	1.5
Colorado	95.1	1.77%	1.5
Idaho[2]	31.7	1.72%	1.5
New Hampshire	28.3	1.69%	1.5
Michigan	178.2	1.56%	1.5
Arizona	120.1	1.54%	1.5
Oklahoma	71.9	1.48%	1
Nevada	49.2	1.46%	1
Maine	22.0	1.45%	1
New York	314.0	1.33%	1
Pennsylvania	197.6	1.31%	1
Montana[3]	15.5	1.28%	1
Indiana	111.7	1.20%	1
New Mexico	24.9	1.12%	1
Hawaii	33.3	1.06%	1
Wisconsin	75.0	1.01%	1
District of Columbia	13.5	0.99%	0.5
Missouri	67.0	0.90%	0.5
North Carolina	106.6	0.86%	0.5
Florida	202.8	0.83%	0.5
Kentucky	39.5	0.63%	0.5
Ohio*	86.4	0.60%	0.5
Texas	201.3	0.59%	0.5
Tennessee	51.9	0.56%	0.5
South Carolina	36.5	0.47%	0
South Dakota	4.9	0.44%	0
West Virginia	11.0	0.44%	0
Wyoming[4]	5.3	0.40%	0
Nebraska	8.9	0.34%	0
Georgia	36.3	0.27%	0
Alabama*	15.1	0.18%	0
Mississippi	8.1	0.17%	0
Delaware	1.9	0.15%	0
North Dakota*	0.7	0.05%	0
Louisiana	2.2	0.03%	0
Kansas*	0.9	0.02%	0
Virginia*	0.8	0.01%	0
Alaska*	0.0	0.00%	0
Guam	0.0	0.00%	0
Puerto Rico	0.0	0.00%	0
Virgin Islands	0.0	0.00%	0
US total	**5,919.8**	-	
Median	**50.5**	**1.09%**	

Spending data are from public service commission staff as listed in Appendix A. * Where 2014 spending was not available, we substituted 2013 spending as reported by CEE 2015, except where noted. [1] 2013 actual spending as reported in MN data request. [2] 2013 actual spending from CEE 2015, includes share of BPA electric spending. [3] 2013 actual spending as reported by EIA 2015a. [4] 2013 actual spending from CEE 2015, includes share of BPA electric spending.

In this category, we scored states on 2014 electricity energy efficiency program spending for customer-funded energy efficiency programs. These are funded through charges included in utility customers' rates or as a line item on customer bills. This includes spending by investor-owned, municipal, and cooperative utilities, public power companies or

authorities, and public benefits program administrators. We did not collect data on the federal Weatherization Assistance Program, which gives money to states on a formula basis. We did include revenues from the Regional Greenhouse Gas Initiative (RGGI) that contribute to customer-funded energy efficiency program portfolios of member states, as well as energy efficiency programs funded through AB32 and Proposition 39 in California.[22] Where Regional Greenhouse Gas Initiative funds were channeled to energy efficiency initiatives implemented by state governments, we included them in Chapter 6, State Government–Led Initiatives.

SCORES FOR NATURAL GAS PROGRAM SPENDING

We scored states on natural gas efficiency program spending by awarding up to 2 points based on 2014 program spending data gathered from CEE (2015) and a survey of state utility commissions and independent statewide administrators. In order to directly compare spending data among the states, we normalized spending by the number of residential natural gas customers in each state, as reported by EIA (2014b).[23] Table 10 shows scoring bins for natural gas program spending. We awarded states that spent $50 or more per residential customer the full 2 points.

Table 10. Scoring of natural gas utility and public benefits spending

2014 gas spending per customer	Score
$50 or greater	2
$35.00–49.99	1.5
$20.00–34.99	1
$5.00–19.99	0.5
Less than $5.00	0

This year, we continued to see an increase in spending on natural gas efficiency programs. Overall spending for natural gas programs rose to $1.4 billion, with 19 states spending more than $20 per residential customer. However natural gas efficiency spending remained significantly lower than spending for electricity energy efficiency programs. Table 11 shows states' scores.

[22] AB32 is California's greenhouse gas reduction bill that resulted in a cap-and-trade program. Proposition 39 grants significant funding to energy efficiency programs targeting schools. Both programs are subject to evaluation, measurement, and verification at least as stringent as utility programs.

[23] We use spending per residential customer for natural gas because reliable natural gas revenue data are sparse, and use of per capita data unfairly penalizes states with natural gas service to only a portion of the state's population (such as Vermont). State data on the number of residential customers is from EIA (2014b).

Table 11. 2014 natural gas efficiency program spending by state

State	2014 gas spending ($million)	$ per 2014 residential customer	Score (2 pts.)
Massachusetts	171.1	$116.20	2
Rhode Island	20.2	$87.10	2
Connecticut	43.5	$84.09	2
New Hampshire	7.1	$71.90	2
Ohio*	43.2	$67.85	2
Vermont	2.3	$55.89	2
New York	179.4	$51.78	2
Iowa	45.8	$50.89	2
Illinois	130.0	$37.36	1.5
District of Columbia	4.6	$35.48	1.5
Oregon	23.1	$32.99	1
California	341.9	$32.65	1
Florida	22.0	$32.36	1
Maine	0.8	$32.30	1
Minnesota[1]	46.2	$31.64	1
Utah	26.3	$30.78	1
New Jersey	89.8	$30.42	1
Michigan	72.9	$24.71	1
Arkansas*	11.1	$21.16	1
Maryland	17.3	$17.29	0.5
Washington	17.0	$15.42	0.5
South Dakota	2.5	$14.19	0.5
Oklahoma	12.9	$13.88	0.5
Wisconsin	18.8	$11.11	0.5
Indiana*	15.4	$9.62	0.5
Pennsylvania*	21.9	$9.49	0.5
Colorado	15.5	$9.27	0.5
New Mexico	4.2	$7.34	0.5
Hawaii †	0.0	$0.00	0.5
Arizona[2]	5.0	$4.23	0
Nevada	3.0	$3.78	0
Virginia*	2.1	$1.90	0
Kentucky*	1.3	$1.82	0
North Carolina	2.1	$1.78	0
Wyoming	0.2	$1.78	0
Missouri	2.2	$1.60	0
Mississippi	0.7	$1.58	0
Delaware	0.2	$1.29	0
North Dakota*	0.1	$0.97	0
Texas	3.3	$0.73	0
South Carolina*	0.4	$0.59	0
Montana	0.1	$0.22	0
Alabama	0.0	$0.00	0
Alaska	0.0	$0.00	0
Georgia	0.0	$0.00	0
Guam†	0.0	$0.00	0
Idaho	0.0	$0.00	0
Kansas	0.0	$0.00	0
Louisiana	0.0	$0.00	0
Nebraska	0.0	$0.00	0
Puerto Rico†	0.0	$0.00	0
Tennessee	0.0	$0.00	0
Virgin Islands†	0.0	$0.00	0
West Virginia	0.0	$0.00	0
US total	**1,427.4**	-	
Median	**3.1**	**$8.30**	

Spending data are from public service commission staff as listed in Appendix A unless noted otherwise. * Where 2014 spending data were not available, we substituted 2013 actual spending as reported by CEE 2015 or by public service commission staff. † Hawaii and the territories use limited natural gas and therefore earn points commensurate with electric efficiency spending scores. [1] 2013 actual spending as reported in MN data request. [2] 2013 actual spending as reported in AZ data request.

Savings from Electricity and Natural Gas Efficiency Programs

We assess the overall performance of electricity and natural gas energy efficiency programs by the amount of energy saved. Utilities and nonutility program administrators pursue numerous strategies to achieve energy efficiency savings. Program portfolios may initially concentrate on the most cost-effective and easily accessible measure types, like energy-efficient lighting and appliances. As utilities gain experience, as technologies mature, and as customers become aware of the benefits of energy efficiency, the number of approaches increases. Utilities estimate program energy savings, which are then subject to internal or third-party evaluation, measurement, and verification (EM&V) and are typically reported to the public utility commission on a semiannual or annual basis.

In states ramping up funding in response to aggressive EERS policies, programs typically shift focus from widget-based approaches (e.g., installing a new, more efficient water heater) to more comprehensive deep-savings approaches, which seek to generate more energy efficiency savings per program participant by conducting whole-building or system retrofits. Some deep-savings approaches also draw on complementary efficiency efforts, such as utility support for full implementation of building energy codes.[24] Deep-savings approaches may also add to the emphasis on whole-building retrofits and comprehensive changes in systems and operations by including behavioral elements that empower customers.

SCORES FOR INCREMENTAL SAVINGS IN 2014 FROM ELECTRIC EFFICIENCY PROGRAMS

We report 2014 statewide energy efficiency savings as a percentage of 2014 retail electricity sales and scored the states on a scale of 0 to 6. We awarded up to 5 points last year. Our intention in boosting the number of points for energy savings is to increase our emphasis on performance rather than policy. We relied primarily on states to provide these data. Thirty-seven states and the District of Columbia fully completed our data request form. Where no data for 2014 were available, we used the most recent savings data available, whether from state-reported 2013 savings from the *2014 State Scorecard* or from EIA (2015a).

As in 2014, states that achieved savings of at least 2.0% of electricity sales earned full points. We continue to see examples of states raising the bar beyond 2% electricity savings. In the future, we plan to award maximum points only for higher levels of savings (i.e., 2.5%). This year, states that achieved electricity savings of 2% or more in 2014 earned 6 points, with scores decreasing by 0.5 points for every 0.166% decrease in savings.

Table 12 lists the scoring bins for each level of savings.

[24] See Nowak et al. (2011) for a full discussion of this topic.

Table 12. Scoring of utility and public benefits electricity savings

2014 savings as % of sales	Score
2% or greater	6
1.83–1.99%	5.5
1.67–1.82%	5
1.50–1.66%	4.5
1.33–1.49%	4
1.17–1.32%	3.5
1.00–1.16%	3
0.83–0.99%	2.5
0.67–0.82%	2
0.50–0.66%	1.5
0.33–0.49%	1
0.17–0.32%	0.5
Less than 0.17%	0

Table 13 shows state results and scores. Nationwide reported savings from utility and public benefits electricity programs in 2014 totaled 25.7 million MWh, equivalent to 0.7% of sales.[25]

[25] As noted above, 2014 savings were not available in some states at the time of publication. In these cases, we substituted 2013 electricity savings. We have noted these instances in table 13.

Table 13. 2014 net incremental electricity savings by state

State	2014 net incremental savings (MWh)	% of 2014 retail sales	Score (6 pts.)
Rhode Island	268,468	3.51%	6
Massachusetts	1,339,026	2.50%	6
Vermont	102,770	1.85%	5.5
California ǂ	4,082,256	1.58%	4.5
Arizona	1,190,123	1.57%	4.5
Hawaii	144,240	1.53%	4.5
Michigan	1,386,912	1.35%	4
Connecticut	387,863	1.32%	3.5
Maryland	792,354	1.29%	3.5
Oregon	595,548	1.27%	3.5
Minnesota ǂ	824,756	1.22%	3.5
Maine	145,413	1.21%	3.5
Iowa	550,035	1.17%	3.5
Illinois	1,513,045	1.08%	3
Ohio*	1,565,049	1.05%	3
Washington ǂ	946,565	1.02%	3
New York	1,338,551	0.92%	2.5
Colorado[1]	472,000	0.88%	2.5
Wisconsin	527,283	0.76%	2
Indiana[2]	768,927	0.74%	2
Utah	213,468	0.71%	2
Idaho	159,310	0.81%	2
New Jersey ǂ	500,784	0.68%	2
Montana*	92.923	0.66%	1.5
North Carolina	854,582	0.64%	1.5
Pennsylvania ǂ	866,721	0.59%	1.5
Nevada	194,861	0.57%	1.5
New Hampshire ǂ	61,046	0.56%	1.5
District of Columbia	60,879	0.54%	1.5
New Mexico	123,919	0.54%	1.5
South Carolina	435,399	0.53%	1.5
Arkansas	249,303	0.53%	1.5
Missouri ǂ	431,218	0.52%	1.5
Kentucky	286,272	0.37%	1
Oklahoma	180,032	0.30%	0.5
Tennessee	292,100	0.30%	0.5
Georgia	316,394	0.23%	0.5
West Virginia	74,339	0.23%	0.5
Nebraska	67,878	0.23%	0.5
South Dakota	26,056	0.21%	0.5
Texas[3]	728,047	0.19%	0.5
Wyoming*	29,571	0.17%	0.5
Mississippi	75,815	0.15%	0
Florida[4]	329,000	0.15%	0
Alabama	56,045	0.06%	0
Delaware ǂ	4,415	0.04%	0
Alaska*	2,138	0.03%	0
Virginia*	26,233	0.02%	0
Louisiana[5]	19,215	0.02%	0
North Dakota*	2,567	0.02%	0
Kansas*	2,224	0.01%	0
Guam	0	0.00%	0
Puerto Rico	0	0.00%	0
Virgin Islands	0	0.00%	0
US total	**25,734,569**	**0.69%**	
Median	**258,886**	**0.56%**	

Savings data are from public service commission staff as listed in Appendix A unless noted otherwise. Sales data are from EIA 2015b. *For these states, we did not have 2014 savings data, so we scored them on 2013 savings as reported in EIA 2015a unless otherwise noted. ǂ At least a portion of savings reported as gross. The gross portion has been adjusted by a net-to-gross factor of 0.9 to make it more comparable with net savings figures reported by other states. [1] 2013 savings as reported in CO data request. [2] MEEA. [3] SPEER. [4] 2013 savings as reported in FL data request. [5] Entergy New Orleans 2014.

We score states on net incremental electricity savings that resulted from energy efficiency programs offered in 2014.[26] We normalize these data by dividing by total electricity sales. Data for electricity sales are based on EIA's *Monthly Electric Utility Sales and Revenue Report with State Distributions* (2015b) and *Annual Electric Power Industry Report* (2015a). Energy savings are from survey responses from state utility commissions and statewide utility program administrators.

States use different methodologies for estimating efficiency program energy savings, and these differences can produce inequities when making comparisons.[27] A state's EM&V process plays a key role in determining how savings are quantified. This is particularly true of a state's treatment of free riders (savings attributed to a program that would have occurred anyway in the absence of the program) and spillover (savings *not* attributed to a program that would *not* have occurred without it). States report energy savings as either net or gross, with net savings accounting for free riders and free drivers, and gross savings not accounting for these.[28] Our research specifically focuses on net savings.

ACEEE researchers found, in a national survey of evaluation practices, that of the 45 jurisdictions with formally approved customer-funded energy efficiency programs, 21 jurisdictions reported net savings, 12 reported gross savings, and 9 reported both, for different purposes (Kushler, Nowak, and Witte 2012).[29] These findings point to several important caveats to the electric program savings data. First, a number of states do not estimate or report net savings. In these cases, we have applied a standard factor of 0.9 to convert gross savings to net savings (a net-to-gross ratio).[30] Doing so allows a more straightforward comparison with other states that report net electricity savings. Savings (or some portion of savings) reported as gross are marked by a dagger (ǂ) in table 13.[31] In Arizona, a measurement and verification study concluded that net savings are equal to

[26] Incremental electricity savings are new savings achieved from measures implemented in the reporting year. Data for 2014 were not available in all states and territories, but we felt that due to the high level of reporting of these numbers, it was possible to compare the most recent data available among states. We substituted 2013 data for states that could not report 2014 savings data. Readers should also note that programs that have been running for several years at a high level of funding are achieving the highest levels of *cumulative* electricity savings (total energy savings achieved to date from efficiency measures). *Incremental* savings data, which measure new savings achieved in the current program year, are the best way to directly compare state efforts due to the difficulty in tracking the duration of programs and their savings.

[27] See Sciortino et al. (2011).

[28] Free drivers are utility customers who install energy efficiency measures as a result of a program but are not themselves participants in the energy efficiency program.

[29] This includes 44 states and the District of Columbia. Three states did not offer a response to this question.

[30] A net-to-gross ratio of 0.9 falls within the range of factors used by several states in calculating net efficiency program savings, including Massachusetts (MA EEAC 2010), Maryland (Itron 2011), New York (Jacobs et al. 2010), Vermont (Efficiency Vermont 2012), and Michigan. An analysis of data collected for this edition of the *State Scorecard* confirmed that this ratio is still representative.

[31] Savings were determined to be gross based on Kushler, Nowak, and Witte (2012) and on responses to our survey of public utility commissions.

gross savings within the state. In such cases, we have not applied a conversion factor, and consider reported savings to be net.

Scores for Incremental Savings in 2014 from Natural Gas Efficiency Programs

Utilities are increasing the number and size of natural gas programs in their portfolios. However data on savings resulting from these programs are still limited. In this category, we awarded points to states that were able to track savings from their natural gas efficiency programs and that realized savings of at least 0.2% as a percentage of sales in the residential and commercial sectors. We relied on data from state utility commissions. Table 14 lists scoring criteria for natural gas program savings. This year we raised the thresholds and increased the available points for natural gas savings, from a maximum of 2 points for savings of 1% of sales or greater, up to 3 points for savings exceeding 1.2% of sales.

Table 14. Scoring of natural gas program savings

Natural gas savings as % of sales	Score
1.20% or greater	3
1.00–1.19%	2.5
0.80–0.99%	2.0
0.60–0.79%	1.5
0.40–0.59%	1
0.20–0.39%	0.5
Less than 0.20%	0

Table 15 shows states' scores for natural gas program savings.

Table 15. State scores for 2014 natural gas efficiency program savings

State	2014 net incremental gas savings (MMTherms)	% of commercial and residential retail sales	Score (3 pts.)
Rhode Island	4.10	1.37%	3
New Hampshire	2.16	1.32%	3
Massachusetts	28.60	1.24%	3
Vermont	0.90	1.10%	2.5
Minnesota*	26.82	1.09%	2.5
Michigan	50.00	0.99%	2
California ł	68.58	0.93%	2
Hawaii**	—	0.00%	2
Wisconsin	18.30	0.77%	1.5
Illinois	52.30	0.77%	1.5
Oregon	5.85	0.76%	1.5
Arizona*	5.34	0.74%	1.5
Connecticut	6.47	0.69%	1.5
Iowa ł	8.38	0.65%	1.5
Arkansas	4.47	0.54%	1
Utah	6.00	0.54%	1
New York	37.79	0.52%	1
District of Columbia	1.33	0.44%	1
Montana*	1.60	0.38%	0.5
Washington ł	5.22	0.38%	0.5
Colorado	6.86	0.35%	0.5
Kentucky*	2.96	0.32%	0.5
New Jersey ł	12.87	0.32%	0.5
Oklahoma	3.48	0.32%	0.5
Indiana*	6.30	0.28%	0.5
Maine	0.27	0.27%	0.5
South Dakota	0.60	0.23%	0.5
Nevada*	0.96	0.13%	0
New Mexico	0.64	0.10%	0
North Carolina	1.26	0.10%	0
Maryland	1.50	0.10%	0
Missouri	1.27	0.07%	0
Kansas*	0.46	0.05%	0
Mississippi	0.20	0.04%	0
Delaware ł	0.04	0.02%	0
South Carolina*	0.08	0.02%	0
Alabama	0.00	0.00%	0
Alaska	0.00	0.00%	0
Florida	0.00	0.00%	0
Georgia	0.00	0.00%	0
Guam	0.00	0.00%	0
Idaho	0.00	0.00%	0
Louisiana	0.00	0.00%	0
Nebraska	0.00	0.00%	0
North Dakota	0.00	0.00%	0
Ohio	0.00	0.00%	0
Pennsylvania	0.00	0.00%	0
Puerto Rico	0.00	0.00%	0
Tennessee	0.00	0.00%	0
Texas	0.00	0.00%	0
Virgin Islands	0.00	0.00%	0
Virginia	0.00	0.00%	0
West Virginia	0.00	0.00%	0
Wyoming	0.00	0.00%	0
US total	**373.9**	**0.46%**	
Median	**0.96**	**0.12%**	

Savings data were reported by contacts at public utility commissions as listed in Appendix A unless otherwise noted. All sales data are from EIA 2014. States that did not report natural gas savings for 2013 or 2014, and for which data were not available elsewhere, were treated as having no savings. * These states did not report 2014 savings and were scored on 2013 savings as reported by public utility commission contacts. ** Hawaii is awarded points commensurate with points received for electricity savings. ł At least a portion of savings reported as gross. The gross portion has been adjusted by a net-to-gross factor of 0.9 to make it more comparable with net savings figures reported by other states.

Opt-Out Provisions for Large Customers

For the second time in the *State Scorecard*, we assessed opt-out and self-direct provisions for large customers. Increasingly, large customers are seeking to opt out of utility energy efficiency programs. They assert that they have already done all the energy efficiency that is cost-effective; however, this is seldom the case (Chittum 2011).

Opt-out policies have several negative consequences. Failure to include large customer programs in an energy efficiency portfolio increases the cost of the resource for all customers and reduce the benefits. In effect, allowing the large customers to opt out forces other consumers to subsidize them. It also prevents utilities from capturing all highly cost-effective energy savings, which may contribute to higher overall system costs because of the substitution of more expensive supply resources. While the ideal solution is for utilities to offer programs that are responsive to the needs of these large consumers, ACEEE's research suggests that this does not always happen (Chittum 2011). In those cases, we suggest giving these customers the option of self-directing their energy efficiency program dollars.[32] This option provides a path for including large customer energy efficiency in the state's portfolio of savings while encouraging utilities to improve program offerings to become more responsive to all customers' needs. Examples of self-direct programs are described in Appendix C.

SCORES FOR LARGE CUSTOMER OPT-OUT PROVISIONS

This year we again included opt-out as a category in which states may lose points rather than gain them. We subtracted 1 point for states with provisions in place allowing electric or natural gas customers, or both, to opt out of energy efficiency programs.[33]

We did not subtract points for self-direct programs. When implemented properly, these programs can effectively meet the needs of large customers. However self-direct programs vary from state to state, with some requiring more stringent measurement and verification of energy savings than others (Chittum 2011). In the future, we may examine these programs with a more critical eye and subtract points from states that lack strong evaluation and measurement. Table 16 shows states with opt-out programs.

[32] Self-direct programs allow some customers, usually large industrial or commercial ones, to self-direct energy efficiency fees usually paid on utility bills directly into energy efficiency investments in their facilities instead of into a broader, aggregated pool of funds. These programs should be designed to include comparable methods for verification and measurement of investments and energy savings.

[33] By default, most large gas customers already are opted out because they take wholesale delivery (frequently directly from transmission) and are thus outside the purview of state government. We did not subtract points in these cases.

Table 16. Provisions allowing large customers to opt out of energy efficiency programs

State	Opt-out description	Score
Arkansas	Customers with more than 1 MW or 70,000 therms in monthly demand may opt out. Only nonmanufacturing customers must offer documentation of similar planned or achieved savings. A significant percentage of eligible load has opted out, although it varies by utility.	–1
Indiana	IC 8-1-8.5-9: An industrial customer receiving services at a single site constituting more than 1 MW of electric capacity from an electricity supplier may, before July 1, 2019, opt out of participating in an energy efficiency program that is established by an electric supplier in response to a demand-side management commission order by providing notice to that electric supplier.	–1
Kentucky	Customers statewide are eligible to opt out on the basis of rate class. Currently, about 80% of eligible load has opted out, with the remaining 20% made up primarily of TVA customers.	–1
Maine	Large customers that take transmission and subtransmission service are automatically opted out of Maine's efficiency programming. These customers do not pay into Maine's cost-recovery mechanism (CRM) programming. However federal stimulus funds and collected money from the Regional Greenhouse Gas Initiative have allowed Efficiency Maine to offer energy efficiency programming to the state's largest industrial customers. LD 1559, enacted in 2013, approved the first direct contract between Maine's investor-owned utilities and Efficiency Maine for the purpose of delivering new efficiency and distributed generation projects for large industrial customers.	–1
Missouri	Any customer meeting one or more of the following criteria may opt out of participation in utility-offered demand-side programs: 1. The customer has one or more accounts within the service territory of the electric utility that had a demand of the individual accounts of 5,000 kW or more in the previous 12 months. 2. The customer operates an interstate pipeline pumping station, regardless of size. 3. The customer has accounts within the service territory of the electric utility that had, in aggregate across its accounts, a coincident demand of 2,500 kW or more in the previous 12 months, and the customer has a comprehensive demand-side or energy efficiency program and can demonstrate an achievement of savings at least equal to those expected from utility-provided programs.	–1
North Carolina	All industrial-class electric customers are eligible for opt-out. Also by Commission Rule R8-68 (d), large commercial class with 1 million kWh of annual energy consumption are eligible to opt out. Opted-out load represents about 40–45% of industrial and large commercial load.	–1
Ohio	Beginning in January 2015, Ohio Senate Bill 310 gives certain customers the ability to opt out of energy efficiency programs entirely. Large customers may opt out of a utility's energy efficiency provisions if they receive service above the primary voltage level (e.g., GSU and GT rate schedules) or are a commercial or industrial customer with more than 45 million kWh usage through a meter or through more than one meter at a single location for the preceding calendar year with a written request for registration as a self-assessing purchaser pursuant to section 5727.81 of the Revised Code.	–1
Oklahoma	All transportation-only gas customers are eligible to opt out. For electric utilities, any customer with consumption greater than 15 million kWh annually. Combined meters may meet the threshold. Approximately 90% of eligible electric customers opt out, representing about 30% of total load.	–1

State	Opt-out description	Score
South Carolina	Industrial, manufacturing, or retail commercial customers with 1 million kWh annual usage or greater are eligible to opt out. Self-certification only is required. Roughly 50% of eligible companies opt out, and that represents roughly 50% of the eligible load.	–1
Texas	In Texas, for-profit customers that take electric service at the transmission level are not allowed to participate in utilities' energy efficiency programming and therefore do not pay for it. Instead, industrial customers develop their own energy efficiency plans if desired and work with third-party providers to implement and finance energy efficiency investments. There is no measurement or monitoring of the investments these large customers do or do not make.	–1
Virginia	Certain large customers are exempt from paying for the costs of new energy efficiency programs. Dominion Power customers may qualify by having average demands between 500 kW and 10 MW; customers over 10 MW do not participate in the state's energy efficiency programming by law. Once customers opt out, they cannot take advantage of existing programming nor be charged for it. Customers must show that they have already made energy efficiency investments or plan to in the future. Customers must submit measurement and verification reports yearly in support of their opting out of programs funded by a cost-recovery mechanism (CRM).	–1
West Virginia	Customers with demand of 1 MW or greater may opt-out. Claims of energy and/or demand reduction are certified to utilities with future evaluation by the Commission to take place in a later proceeding. The method of such future evaluation has not been specified. To date, 16 large customers have opted out.	–1

Energy Efficiency Resource Standards

Energy efficiency targets for utilities, often called EERS, are critical to encouraging savings over the near and long term. Twenty-five states now have fully funded EERS policies that establish specific energy savings targets that utilities and program administrators must meet through customer energy efficiency programs. These policies set multiyear targets for electricity or natural gas savings, such as 1% or 2% incremental savings per year or 20% cumulative savings by 2025.[34]

EERS policies differ from state to state, but each is intended to establish a sustainable, long-term role for energy efficiency in the state's overall energy portfolio. ACEEE considers a state to have an EERS if it has a policy in place that

1. Sets clear, long-term (3+ years) targets for electricity or natural gas savings
2. Makes targets mandatory
3. Includes sufficient funding for full implementation of programs necessary to meet targets

Several states have chosen to enforce all cost-effective efficiency requirements, which call for utilities and program administrators to determine and invest in the maximum amount of cost-effective efficiency feasible. ACEEE considers states with all cost-effective requirements

[34] *Multiyear* is defined as spanning three or more years. EERS policies may set specific targets as a percentage of sales, as specific gigawatt-hour energy savings targets without reference to sales in previous years, or as a percentage of load growth.

to have EERS policies in place once these policies have led to multiyear savings targets and have also met the rest of the criteria listed above.

EERS policies aim explicitly for quantifiable energy savings, reinforcing the idea that energy efficiency is a utility system resource on par with supply-side resources. These standards also help utility system planners more clearly anticipate and project the impact of energy efficiency programs on utility system loads and resource needs. Energy savings targets are generally set at levels that push efficiency programs to achieve higher savings than they otherwise would have, with goals typically based on analysis of the energy efficiency savings potential in the state to ensure that the targets are realistic and achievable. EERS policies maintain strict requirements for cost effectiveness so that efficiency programs are guaranteed to provide overall benefits to customers. These standards help to ensure a long-term commitment to energy efficiency as a resource, building essential customer engagement as well as the workforce and market infrastructure necessary to sustain the high levels of savings.[35]

SCORES FOR ENERGY EFFICIENCY RESOURCE STANDARDS

In this category, we credited states that had mandatory savings targets codified in EERS policies. We relied on legislation and utility commission dockets for our research in this section.

A state could earn up to 3 points for an EERS policy based on a number of factors. As shown in table 17, we scored states on a sliding scale based on the level of savings called for by their electricity savings targets. States could also earn an additional 0.5 points if natural gas was included in the savings goals. Some EERS policies also contain cost caps that limit spending, thereby reducing the effectiveness of the EERS policy. This year, we did not subtract points for the existence of a cost cap, although we do note whether a cost cap is in place in the results table below. Most of the states that have such policies in place have found themselves constrained. As a result, regulators have approved lower energy savings targets. In these cases, we score states on the lower savings targets approved by regulators that take the cost cap into account, rather than on the higher legislative targets.

We awarded top points to states with energy savings targets of 2% of sales or greater. Last year we gave maximum points to states with electricity savings goals greater than 1.5%. Multiple states have proved that long-term savings of over 2% are feasible and cost-effective. Therefore, raising the bar in this policy area seemed necessary.

[35] The ACEEE report *Energy Efficiency Resource Standards: A New Progress Report on State Experience* analyzed current trends in EERS implementation and found that most states were meeting or were on track to meet energy savings targets (Downs and Cui 2014).

Table 17. Scoring of energy savings targets

Electricity savings target or current level of savings met	Score
2% or greater	3
1.25–1.99%	2
0.5–1.25%	1
Less than 0.5%	0

Other considerations	Score
EERS includes natural gas	+0.5

To aid in comparing states, we estimated an average annual savings target over the next five years or the period specified in the policy. For example, Arizona plans to achieve 22% cumulative savings by 2020, so the average incremental savings target is 2.5% per year.

States with pending targets had to be on a clear path toward establishing a binding mechanism in order to earn points in this category. Examples of a clear path included draft decisions by commissions awaiting approval within six months, or agreements among major stakeholders on targets. States with a pending EERS policy that had not yet established a clear path toward implementation include Utah[36] and Delaware.[37] The New Hampshire Public Utilities Commission opened a docket in 2015 that is also likely to result in an EERS. However proposals for specific targets have not yet been filed, and so New Hampshire falls into this group as well.[38]

See table 18 below for scoring results and Appendix D for full policy details. Table 19 also lists two unscored factors that can affect a policy's outcome. We note states with cost caps in place that limit overall spending allowable on energy efficiency, although we do not subtract points for these caps. Rather, we score states based on the savings they have determined are achievable within the constraints of the cost cap.

Table 18. State scores for energy efficiency resource standards

State	Approx. annual electric savings target (2015–2020)	Cost cap	Natural gas	Score (3 pts.)
Massachusetts	2.6%		•	3
Arizona	2.5%		•	3
Rhode Island	2.5%		•	3
Vermont	2.1%			3
Maryland	2.0%		•	3

[36] Utah has both a legislative goal (House Joint Resolution 9) and a Renewable Portfolio Goal (S.B. 202) that includes energy efficiency savings targets. Neither of these goals has been codified into regulatory language by the Public Service Commission, so they remain advisory, not binding.

[37] Delaware initiated a planning process in 2014 that will likely result in energy savings goals. However no specific targets for utilities have been proposed as of publication.

[38] NHPUC staff issued a straw proposal for an EERS in February. See NHPUC (2015) for more details.

State	Approx. annual electric savings target (2015–2020)	Cost cap	Natural gas	Score (3 pts.)
Maine	1.6%		•	2.5
Minnesota	1.5%		•	2.5
Connecticut	1.4%		•	2.5
Colorado	1.3%		•	2.5
Oregon	1.3%		•	2.5
Washington	1.5%			2
Hawaii	1.4%			2
Iowa	1.2%		•	1.5
California	1.0%		•	1.5
Michigan	1.0%	•	•	1.5
Arkansas	0.9%		•	1.5
New York[1]	0.8%		•	1.5
Wisconsin	0.7%	•	•	1.5
Illinois[2]	0.7%	•	•	1.5
Pennsylvania	0.8%	•		1
New Mexico	0.6%			1
Ohio[3]	0.6%			1
Nevada	0.4%			0
North Carolina	0.4%			0
Texas	0.1%	•		0

States with voluntary targets are not listed in this table. Targets in states with cost caps reflect most recent approved savings levels under budget constraints. See Appendix D for details and sources. [1] Reflects targets proposed by utilities under current REV proceeding. [2] Annual savings target as approved under rate cap. Utilities have additional energy efficiency requirements based on an energy efficiency procurement plan through the Illinois Power Agency. [3] Reflects utility targets under the freeze, including updated FirstEnergy savings goals.

Since the publication of the 2014 edition of the *State Energy Efficiency Scorecard*, several states have extended their policies or adopted new, more stringent savings targets. For example, the Public Service Commission of Maryland issued Order No. 87082 in July 2015, extending energy savings targets past 2015 and eventually ramping them up to 2% per year. Pennsylvania extended electricity savings targets through 2021 in the Public Utility Commission's Phase III Final Implementation Order in Docket No. M-2014-2424864. The Rhode Island State Senate voted to extend the state's least-cost procurement requirements through 2024.

Other states have faced challenges to their EERS policies. Maine suffered a temporary setback to its all cost-effective energy efficiency policy after state regulators voted to set a low cap on ratepayers' contribution toward funding of efficiency programs. However state legislators corrected a drafting error in the state's energy efficiency legislation and overrode

the governor's veto to enable full funding of Efficiency Maine for all cost-effective energy efficiency. In Ohio, state legislators voted to freeze the EERS for two years. Most utilities have continued to implement programs as previously planned, but the legislation has resulted in major program cuts in the FirstEnergy service territory. Planning for the period after the freeze is currently under way.

We also see uncertainty in New York looking forward. Although it is likely that savings targets will continue to play a role in utility performance assessments in the future, it is unclear exactly what these targets will be. As part of the state's ongoing Reforming the Energy Vision (REV) proceeding, the commission carried 2015 electric savings goals for utilities into 2016 and called on utilities to propose targets over the following two years that were at least as high as current savings levels.[39] Since the commission has made clear that—at least over the next three-year period—savings targets will continue to be an important and mandatory measure of performance, we continue to give credit for an EERS policy.

Long-term energy savings targets require leadership, sustainable funding sources, and institutional support for states to achieve their goals. Several states currently have or in the past have had EERS-like structures in place but have lacked one or more of these enabling elements, and thus have undercut the achievement of their savings goals. States in this situation include Florida and New Jersey, neither of which earned points in this category this year.[40] Most states with EERS policies or other energy savings targets are meeting their goals and on are track to meet future goals (Downs and Cui 2014).

Utility Business Model and Energy Efficiency: Earning a Return and Fixed Cost Recovery

Under traditional regulatory structures, utilities do not have an economic incentive to help their customers become more energy efficient. They typically have a disincentive, because falling energy sales from energy efficiency programs reduce utilities' revenues and profits, an effect referred to as lost revenues or lost sales. Since utilities' earnings are usually based on the total amount of capital invested in certain asset categories, such as transmission and distribution infrastructure and power plants, and the amount of electricity sold, the financial incentives are very much tilted in favor of increased electricity sales and expanding supply-side systems.

This dynamic has led industry experts to devise ways of addressing the possible loss of earnings and profit that can result from customer energy efficiency programs in order to remove utilities' financial disincentive to promote energy efficiency. There are three key policy approaches to properly aligning utility incentives and removing barriers to energy efficiency. The first is to ensure that utilities can recover the direct costs associated with energy efficiency programs. This is a minimum threshold requirement for utilities and

[39] The New York Public Service Commission's February 2015 order in the REV case directed that "longer-term goals should exceed existing targets." Utilities have filed plans for the 2016–2018 period with incremental electricity savings ranging from 0.4% to 1.2% of retail sales per year.

[40] In 2014, Florida utilities proposed reducing efficiency efforts from 2010 levels by at least 80%. The Florida Public Service Commission approved this proposal. In New Jersey available funds for energy efficiency are far below the amount necessary to meet savings targets laid out by state legislators.

related organizations to fund and offer energy efficiency programs, and every state allows this in some form. Given the wide acceptance of program cost recovery, we do not address it in the *State Scorecard*.

The other two mechanisms are fixed cost recovery (decoupling and other lost revenue adjustment mechanisms) and performance incentives. Decoupling—the disassociation of a utility's revenues from its sales—is intended to make the utility indifferent to decreases or increases in sales, removing what is known as the throughput incentive. Although decoupling does not necessarily make the utility more likely to promote efficiency programs, it removes or reduces the disincentive for it to do so. Additional mechanisms for addressing lost revenues include modifications to customers' rates that permit utilities to collect these revenues, either through a lost-revenue adjustment mechanism (LRAM) or other ratemaking approach. ACEEE prefers the decoupling approach for addressing the throughput incentive and considers LRAMs to be more appropriate as a short-term solution.

Performance incentives are financial incentives that reward utilities (and in some cases nonutility program administrators) for reaching or exceeding specified program goals. These may include a shareholder incentive that is awarded based on achievement of energy savings targets and an incentive based on spending goals. Of the two, ACEEE recommends the former, shareholder incentives based on achieved savings. A number of states have enacted mechanisms such as these that align utility incentives with energy efficiency, as seen in table 20.[41]

SCORES FOR UTILITY BUSINESS MODEL AND ENERGY EFFICIENCY

A state could earn up to 2 points in this category, including up to 1 point for having implemented performance incentive mechanisms and up to 1 point for having implemented full revenue decoupling for its electric and natural gas utilities. Details describing the scoring methodology are provided in table 19. Information about individual state decoupling policies and financial incentive mechanisms is available on ACEEE's State and Local Policy Database (ACEEE 2015).

Table 19. Scoring of utility financial incentives

Scoring criteria for addressing fixed cost recovery	Score
Decoupling has been established for at least one major utility, for both electric and natural gas.	1
Decoupling has been established for at least one major utility, either electric or natural gas. An LRAM or ratemaking approach for recovery of lost revenues has been established for at least one major utility for both electricity *and* natural gas.	0.5

[41] For a detailed analysis of performance incentives, see Nowak et al. (2015). For a detailed analysis of LRAM, see Gilleo et al. (2015).

Scoring criteria for addressing fixed cost recovery	Score
No decoupling policy has been implemented, although it may have been authorized by the legislature or commission. An LRAM or ratemaking approach for recovery of lost revenues has been established for a major utility for either electric *or* natural gas.	0
Scoring criteria for performance incentives	**Score**
Performance incentives have been established for a major utility (or statewide independent administrator) for both electric *and* natural gas.	1
Performance incentives have been established for a major utility (or statewide independent administrator) for either electric *or* natural gas.	0.5
No incentive mechanism has been implemented, although it may have been authorized or recommended by the legislature or commission.	0

This year, 27 states have a performance incentive in place for at least one major electric utility and 17 states have incentives for natural gas energy efficiency programs. Twenty-nine states have addressed disincentives for investment in energy efficiency for electric utilities. Of these, 14 have a lost revenue adjustment mechanism and 15 have implemented decoupling. For natural gas utilities, 6 states have implemented an LRAM and 22 have a decoupling mechanism. Table 20 outlines these efforts.

Table 20. Utility efforts to address lost revenues and financial incentives

	Decoupling or LRAM			Performance incentives			
State	Electric	Natural gas	Score (1 pt.)	Electric	Natural gas	Score (1 pt.)	Total score (2 pts.)
California	Yes	Yes	1	Yes	Yes	1	2
Connecticut	Yes	Yes	1	Yes	Yes	1	2
Hawaii*	Yes	—	1	Yes	—	1	2
Massachusetts	Yes	Yes	1	Yes	Yes	1	2
Minnesota	Yes	Yes	1	Yes	Yes	1	2
New York	Yes	Yes	1	Yes	Yes	1	2
Rhode Island	Yes	Yes	1	Yes	Yes	1	2
Vermont	Yes	Yes	1	Yes	Yes	1	2
Arkansas	Yes[1]	Yes[1]	0.5	Yes	Yes	1	1.5
District of Columbia	Yes	No	0.5	Yes	Yes	1	1.5
Kentucky	Yes[1]	Yes[1]	0.5	Yes	Yes	1	1.5
Michigan	No	Yes	0.5	Yes	Yes	1	1.5
Ohio	Yes[2]	No	0.5	Yes	Yes	1	1.5
Oklahoma	Yes[1]	Yes	0.5	Yes	Yes	1	1.5
South Dakota	Yes[1]	Yes[1]	0.5	Yes	Yes	1	1.5
Arizona	Yes[1]	Yes[2]	0.5	Yes	No	0.5	1
Colorado	No	Yes[1]	0	Yes	Yes	1	1

State	Decoupling or LRAM			Performance incentives			Total score (2 pts.)
	Electric	Natural gas	Score (1 pt.)	Electric	Natural gas	Score (1 pt.)	
Georgia	No	Yes	0.5	Yes	No	0.5	1
Indiana	Yes[1]	Yes	0.5	Yes	No	0.5	1
Maryland	Yes	Yes	1	No	No	0	1
New Hampshire	No	No	0	Yes	Yes	1	1
North Carolina	Yes[1]	Yes	0.5	Yes	No	0.5	1
Oregon	Yes	Yes	1	No	No	0	1
Washington	Yes	Yes	1	No	No	0	1
Wisconsin	No	No	0	Yes	Yes	1	1
Idaho	Yes	No	0.5	No	No	0	0.5
Illinois	No	Yes	0.5	No	No	0	0.5
Louisiana	Yes[1]	No	0	Yes	No	0.5	0.5
Maine	Yes	No	0.5	No	No	0	0.5
Mississippi	Yes[1]	Yes[1]	0.5	No	No	0	0.5
Missouri	Yes[1]	No	0	Yes	No	0.5	0.5
Montana	Yes[1]	Yes[1]	0.5	No	No	0	0.5
Nevada	Yes[1]	Yes	0.5	No	No	0	0.5
New Mexico	No	No	0	Yes	No	0.5	0.5
South Carolina	Yes[1]	No	0	Yes	No	0.5	0.5
Tennessee	No	Yes	0.5	No	No	0	0.5
Texas	No	No	0	Yes	No	0.5	0.5
Utah	No	Yes	0.5	No	No	0	0.5
Virginia	No	Yes	0.5	No	No	0	0.5
Wyoming	No	Yes	0.5	No	No	0	0.5
Alabama	No	No	0	No	No	0	0
Alaska	No	No	0	No	No	0	0
Delaware	No	No	0	No	No	0	0
Florida	No	No	0	No	No	0	0
Guam	No	—	0	No	—	0	0
Iowa	No	No	0	No	No	0	0
Kansas	Yes[1]	No	0	No	No	0	0
Nebraska	No	No	0	No	No	0	0
New Jersey	No	No	0	No	No	0	0
North Dakota	No	No	0	No	No	0	0
Pennsylvania	No	No	0	No	No	0	0
Puerto Rico	No	—	0	No	—	0	0
Virgin Islands	No	—	0	No	-	0	0
West Virginia	No	No	0	No	No	0	0

[1] No decoupling, but lost revenue adjustment mechanism in place. [2] Both decoupling and lost revenue adjustment mechanism in place.
* Hawaii received full points for both gas and electric, since minimal amounts of natural gas are used on the islands.

ADDITIONAL POLICIES

Data Access

For the first time, we asked our contacts at state public service commissions about the scope of utility energy usage data made available to customers and third parties. Data access can help customers save energy in homes, large buildings, and communities. It is important for third parties to have access to customer data as they can provide customers with a more in-depth analysis that includes recommendations for eliminating inefficiencies. To facilitate the transparency of these data, states can develop guidelines or regulations that require utilities to send the data directly to third parties with customer permission. Alternatively, customers may acquire the data and share it with the third party themselves. Guidelines and regulations can also address privacy concerns. Even with state policies in place, there is no guarantee of customer consent. One avenue toward increased customer acceptance is to educate consumers about the benefits of increased data access.

Although state policies can encourage data sharing among utilities, their customers, and third parties, their absence does not mean utilities cannot act. Either way, utilities can still facilitate these relationships. For example, utilities in several states have taken action to provide customers access to their own energy use data through an online portal with the option of releasing it to third parties for greater analysis even when no statewide policy in in place.

Data requests to our contacts asked if the state has guidelines or regulations regarding the use cases and/or process for third-party access to customer energy use data; if utilities are required to provide energy use data to customers, owners of multitenant buildings, or public agencies; what the terms and details of the requirements are; and if utilities provide energy usage data for customers to download in an electronic format.

Responses are summarized in table 21. States were not scored on their responses.[42]

[42] Complete information on data access as reported by states can be found at database.aceee.org/.

Table 21. Guidelines and requirements for provision of energy usage data

State	Guidelines established regarding process for third-party access to customer energy data	Requirement for provision of energy use data to customers	Requirement for provision of aggregate data to owners of multi-tenant buildings	Requirement for provision of aggregate data to public agencies	Provision of energy data usage to customers in electronic format by utilities within state
Alabama					●
California	●	●	●	●	●
Connecticut	●	●		●	●
District of Columbia	●		●		●
Georgia					●
Illinois	●				●
Maine	●	●		●	●
Maryland	●				
Massachusetts					●
Michigan					●
Nevada	●				●
New Hampshire	●				●
New Jersey					●
New York			●		
Oklahoma	●	●			●
Oregon	●				●
Rhode Island					●
Texas	●	●			●
Utah					●
Vermont					●
Washington					●
Wisconsin	●			●	●

Complete information on data access policies can be found in the State and Local Policy Database (ACEEE 2015). States that have no policies in place or that did not provide responses are not included in the table.

States that have taken notable steps toward clarifying guidelines for the provision of customer energy usage data are described below.

Leading and Trending States for Data Access

District of Columbia. The Sustainable DC Act of 2014 included a provision that mandates both electric and gas utilities to provide aggregated whole-building data upon request to a building owner, making it the first jurisdiction in the country to do so. These data are then made available for download and through automated upload to ENERGY STAR® Portfolio Manager. Data are aggregated to the whole-building level for five or more accounts, to address any privacy concerns and simplify the process of benchmarking multitenant buildings.

California. In May 2014 the California Public Service Commission approved Decision (D.) 14-05-016 adopting rules to provide eligible third-party access to energy usage and usage-related data within IOU territories. The Decision directed the California IOUs to establish the Data Request and Release Process, which is under way, as well as an Energy Data Access Committee comprising relevant stakeholders to serve as an informal advisory body. The Decision identifies more than 10 use cases and outlines a data release process and NDA to protect consumer privacy.

Texas. Regardless of the utilities that serve them, customers can access their data by registering with the portal smartmetertexas.com. Third parties can also readily gain access to customer data after consent is received in order to help them make informed decision about reducing their energy use. Furthermore, SPEER has published the *Smart Energy Roadmap for Texas*, which details numerous ways to improve collection and access of data to customers as well as to better inform customers of the savings opportunities that are available.

States across the country continue to ramp up utility-scale energy efficiency efforts. While many of the traditional leaders remain in this space, states and regions relatively new to energy efficiency are also making notable progress. Several examples are described below.

Leading and Trending States in Utility and Public Benefits Programs and Policies

Massachusetts. Massachusetts has a long record of success in energy efficiency programs implemented by electricity and natural gas distributors. The state took a major leap forward in 2008 when it passed the Green Communities Act, which established energy efficiency as the "first priority" energy resource and created an Energy Efficiency Advisory Council to collaborate with utilities on developing statewide efficiency plans in three-year cycles. The first three-year plan aimed to achieve annual electric savings equal to 2.4% of sales and annual natural gas savings equal to 1.5% of sales in 2012, making it one of the most aggressive EERS in the nation. In late 2012, Massachusetts finalized its second three-year plan for statewide energy efficiency programs. The plan set electricity targets of 2.5–2.6% and natural gas targets of 1.08–1.19% from 2013 to 2015. In 2013 and 2014, the state saw electricity savings of over 2% of retail sales.

Vermont. Vermont pioneered the third-party administration model of implementing energy efficiency programs, which has been replicated in many states, including Maine, New Jersey, Delaware, Oregon, and the District of Columbia. Efficiency Vermont, the state's "energy efficiency utility," runs programs for a wide range of customers and leads the nation in producing consistent energy savings. Vermont's excellent performance is due in large part to a strategic commitment by the Vermont Public Service Board to fund programs at aggressive levels in order to reach new customers and achieve deep savings. The Public Service Board has an optimal mix of policies, including an EERS and performance incentives, to encourage successful programs.

Rhode Island. Rhode Island invests a greater proportion of utility revenues in energy efficiency than any other state due to its requirement that utilities invest in all cost-effective energy efficiency. A recent revision of the state's energy efficiency potential study confirmed that it should continue to strive for electricity savings of over 2% per year for the next three years. Natural gas targets of at least 1% per year are similarly aggressive. The state's energy efficiency plans are overseen by a stakeholder board with representatives from government agencies, environmental groups, businesses, and consumer advocates.

Arkansas. Arkansas is leading in the Southeast, having significantly ramped up its utility-sector energy efficiency initiatives since 2007. In that year the Arkansas Public Service Commission approved rules for conservation and energy efficiency programs requiring electric and natural gas utilities to administer energy efficiency programs. In 2010 the state adopted an EERS for both electricity and natural gas and established rules for cost recovery, performance incentives, and utility resource planning. Arkansas recently commissioned a potential study to inform future targets. Both electric and natural gas savings continue to increase, although an opt-out provision may limit future savings. Arkansas is also developing a new financing mechanism for residential utility customers to add more energy efficiency program offerings to the utilities' core programs.

Chapter 3. Transportation Policies

Author: Shruti Vaidyanathan

INTRODUCTION

Energy efficiency scores for the transportation category reflect state actions that go beyond federal policies to achieve a more energy-efficient transportation sector. These may be measures to improve the efficiency of vehicles purchased or operated in the state, policies to promote more efficient modes of transportation, or the integration of land use and transportation planning to reduce the need to drive.

SCORING AND RESULTS

While ambitious fuel economy and GHG standards for light-duty vehicles are now in place at the national level through 2025, states continue to play a crucial role in ensuring continuing progress toward high-efficiency vehicles.[43] Consequently, we awarded 1 point to states that have chosen to adopt California's GHG vehicle emissions standards, and an additional 0.5 point to those that have also adopted the state's zero-emission vehicle (ZEV) program. States with more than 20 registered electric vehicles (EVs) per 100,000 people earned 0.5 points, and those with more than 50 EVs per 100,000 people earned 1 point. We also awarded 0.5 points to states with consumer incentives for the purchase of high-efficiency vehicles.

States that adopted reduction targets for vehicle miles traveled (VMT) statewide were eligible for 1 point. Only six states earned points in this category. Among them is Vermont, which outlined VMT goals in a Comprehensive Energy Plan adopted in 2011. This plan requires per capita VMT to remain at or below 2011 levels and overall VMT growth to be limited to 1.5% annually.

We awarded 1 additional point to states whose rolling 10-year VMT average fell by 5% or more between 2011 and 2013. A reduction of between 1% and 5% earned 0.5 points. We did not adjust VMT data to account for fluctuations in economic conditions.

Policies promoting compact development and ensuring the accessibility of major destinations are essential to reducing energy use in transportation in the long term. States with smart growth statutes earned 1 point. These statutes include the creation of zoning overlay districts such as those established by the Massachusetts Chapter 40R program, as well as various other incentives to encourage sustainable growth. For details, refer to the ACEEE State and Local Policy Database (ACEEE 2015).

We also awarded 1 point to states with "complete streets" statutes, which ensure proper attention to the needs of pedestrians and cyclists in all road projects.

[43] The light-duty standards finalized by EPA and DOT in 2012 are up for review in 2017, and states that have adopted California's GHG emissions program can help ensure that the federal standards are not weakened in the midterm evaluation process. California's zero-emission vehicle (ZEV) program, which most of these same states have also adopted, is proving to be a major driver of advanced technology vehicles in the light-duty market.

States can lead the way in improving not only vehicle fuel efficiency but also the efficiency of transportation systems more broadly. States received points based on the magnitude of their transit spending: relatively large investments ($50 per capita or more) received 1 point, while investments ranging from $20 to $50 per capita received 0.5 points. Maryland, for instance, saw a 40% increase in per capita transit spending between fiscal years 2012 and 2013. States that have a dedicated transit revenue stream also earned 1 point in this year's *State Scorecard*. Twenty-two states have transit statutes in place that provide sustainable funding sources for operating expenses in addition to the expansion and maintenance of transit facilities. For details, see Appendix G.

With regard to freight system efficiency, states could earn 0.5 points if they have a freight-specific transportation plan meeting MAP-21 requirements.[44] We awarded an additional 0.5 point if those plans contained energy efficiency performance metrics.

Table 22 shows the results. ACEEE recognizes that variations in the geography and the urban/rural composition of states mean that some of the policies mentioned in this chapter may not be feasibly implemented in certain states. Nevertheless, every state can make additional efforts to reduce its transportation energy use. Additional details on state transit funding, transportation policies, and incentives for the purchase of high-efficiency vehicles are included in Appendixes E, F, and G.

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[44] Requirements laid out in the Moving Ahead for Progress in the 21st Century Act.

Table 22. State scores for transportation policies

State	GHG tailpipe emissions standards and ZEV program (1.5 pts.)[1]	EV registrations per 100,000 people (1 pt.)[2]	High-efficiency vehicle consumer incentives (0.5 pts.)[3]	VMT targets (1 pt.)[4]	Average % change in VMT per capita (1 pt.)[5]	Integration of transportation and land use planning (1 pt.)[4]	Complete streets legislation (1 pt.)[6]	Transit funding (1 pt.)[7]	Dedicated transit revenue stream statutes (1 pt.)[4]	MAP-21 freight plans and goals (1 pt.)[4]	Total score (10 pts.)
California	1.5	1	0.5	1	1	1	1	1	1	1	10
Massachusetts	1.5	1	0.5	1	0	1	1	1	1	0.5	8.5
New York	1.5	0.5	0.5	1	1	1	1	1	1	0	8.5
Oregon	1.5	1	0	1	1	1	1	0	1	0.5	8
Washington	1	1	0.5	1	1	1	1	0	1	0.5	8
Maryland	1.5	1	0.5	0	0.5	1	1	1	0	0.5	7
Vermont	1.5	1	0	1	1	1	1	0	0	0.5	7
District of Columbia	1.5	1	0.5	0	1	0	1	1	0	0.5	6.5
Connecticut	1.5	0.5	0.5	0	0.5	1	1	1	0	0	6
Delaware	1	0	0.5	0	1	1	1	1	0	0.5	6
Illinois	0	0.5	0.5	0	0.5	1	1	1	1	0.5	6
Maine	1.5	0	0	0	1	1	1	0	1	0.5	6
New Jersey	1.5	0.5	0.5	0	0	1	1	1	0	0.5	6
Pennsylvania	1	0.5	0.5	0	1	0	1	1	1	0	6
Colorado	0	1	0.5	0	1	0	1	0	1	0.5	5
Florida	0	0.5	0	0	1	1	1	0	1	0.5	5
Rhode Island	1.5	0.5	0	0	0.5	1	1	0.5	0	0	5
Virginia	0	0.5	0	0	1	1	1	0.5	0.5	0.5	5
Georgia	0	1	0	0	1	0	1	0	1	0.5	4.5
Michigan	0	0	0	0	0.5	1	1	0.5	1	0.5	4.5
Tennessee	0	1	0.5	0	1	0	1	0	1	0	4.5
Hawaii	0	1	0	0	0	1	1	0	1	0	4
Minnesota	0	0	0	0	0.5	0	1	1	1	0.5	4

State	GHG tailpipe emissions standards and ZEV program (1.5 pts.)[1]	EV registrations per 100,000 people (1 pt.)[2]	High-efficiency vehicle consumer incentives (0.5 pts.)[3]	VMT targets (1 pt.)[4]	Average % change in VMT per capita (1 pt.)[5]	Integration of transportation and land use planning (1 pt.)[4]	Complete streets legislation (1 pt.)[6]	Transit funding (1 pt.)[7]	Dedicated transit revenue stream statutes (1 pt.)[4]	MAP-21 freight plans and goals (1 pt.)[4]	Total score (10 pts.)
North Carolina	0	0	0	0	0.5	1	1	0	1	0.5	4
Arizona	0	1	0.5	0	0.5	1	0	0	0	0.5	3.5
South Carolina	0	0	0.5	0	1	0	1	0	0	0.5	3
Texas	0	0.5	0.5	0	1	0	1	0	0	0	3
West Virginia	0	0	0	0	1	0	1	0	1	0	3
Indiana	0	0.5	0	0	0	0	1	0	0.5	0.5	2.5
Iowa	0	0	0	0	0.5	1	0	0	1	0	2.5
Puerto Rico	0	0	0.5	0	0	1	1	0	0	-	2.5
Alaska	0	0	0	0	1	0	0	1	0	0	2
New Hampshire	0	0.5	0	0	0.5	1	0	0	0	0	2
Utah	0	0.5	0.5	0	1	0	0	0	0	0	2
Wisconsin	0	0	0	0	1	0	1	0	0	0	2
Louisiana	0	0	0.5	0	0	0	1	0	0	0	1.5
North Dakota	0	0	0	0	0	1	0	0	0	0.5	1.5
Arkansas	0	0	0	0	0	0	0	0	1	0	1
Kansas	0	0	0	0	0	0	0	0	1	0	1
Kentucky	0	0	0	0	0.5	0	0	0	0	0.5	1
Mississippi	0	0	0	0	0	0	1	0	0	0	1
Missouri	0	0	0	0	0.5	0	0	0	0	0.5	1
Nevada	0	1	0	0	0	0	0	0	0	0	1
New Mexico	0	0.5	0	0	0.5	0	0	0	0	0	1
Oklahoma	0	0.5	0	0	0.5	0	0	0	0	0	1
Wyoming	0	0	0	0	1	0	0	0	0	0	1
Alabama	0	0	0	0	0	0	0	0	0	0.5	0.5

State	GHG tailpipe emissions standards and ZEV program (1.5 pts.)[1]	EV registrations per 100,000 people (1 pt.)[2]	High-efficiency vehicle consumer incentives (0.5 pts.)[3]	VMT targets (1 pt.)[4]	Average % change in VMT per capita (1 pt.)[5]	Integration of transportation and land use planning (1 pt.)[4]	Complete streets legislation (1 pt.)[6]	Transit funding (1 pt.)[7]	Dedicated transit revenue stream statutes (1 pt.)[4]	MAP-21 freight plans and goals (1 pt.)[4]	Total score (10 pts.)
Idaho	0	0	0	0	0.5	0	0	0	0	0	0.5
Nebraska	0	0	0	0	0.5	0	0	0	0	0	0.5
Ohio	0	0	0	0	0	0	0	0	0	0.5	0.5
South Dakota	0	0	0	0	0.5	0	0	0	0	0	0.5
Montana	0	0	0	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0	0	-	0
US Virgin Islands	0	0	0	0	0	0	0	0	0	-	0

[1] Clean Cars Campaign 2015; C2ES 2015. [2] IHS Automotive Polk 2015. [3] DOE 2015.[4] State legislation. [5] FHWA 2014. [6] NCSC 2015. [7] AASHTO 2015.

DISCUSSION

Tailpipe Emissions Standards and Zero-Emission Vehicle Program

As a longtime leader in setting vehicle emissions standards, California has been instrumental in prodding the federal government to establish GHG standards that draw new efficiency technologies into the market. The state's success in this role is due in part to auto manufacturers' preference for minimizing the number of distinct regulatory regimes for vehicles. In 2002 California passed the Pavley Bill (Assembly Bill 1493), the first law in the United States to address GHG emissions from vehicles. The law requires the California Air Resources Board to regulate GHGs as part of the California Low Emission Vehicle Program. The GHG reductions from this law are being achieved largely through improved fuel efficiency, making these standards, to a significant degree, energy efficiency policies.

In 2010, the EPA and the US Department of Transportation (DOT) issued harmonized national standards for fuel economy and GHG emissions for model years 2012 to 2016. The standards match California's GHG tailpipe standards in stringency and call for fleet-wide average fuel economy of 34.1 miles per gallon (mpg) by 2016. In 2012 the California Air Resources Board adopted new GHG standards for model years 2017 to 2025. DOT and EPA subsequently finalized new GHG and fuel economy standards as well, calling for a fleet-wide average of 54.5 mpg by 2025. The EPA, DOT, and California programs are now harmonized. As the federal programs undergo a midterm evaluation between 2016 and 2018, the commitment of California and other states that have adopted California's program to reducing vehicle GHG emissions will be important in maintaining the strength of the standards because of automakers' strong preference for a single, national program.

California now also has an updated ZEV program that requires increasing production of plug-in hybrid, battery electric, and fuel-cell vehicles from 2018 to 2025. The program requires automakers to produce zero-emission vehicles to reduce GHG and criteria pollutant emissions. Manufacturers of passenger cars and light trucks (up to 8,500 pounds) must earn a certain number of ZEV credits by meeting state requirements that outline the number of zero-emission vehicles that they must produce and deliver for sale (C2ES 2015).

States may choose to adopt either the federal vehicle emissions standards or California's. Fifteen states and the District of Columbia have adopted California's GHG regulations in recent years, but Arizona and Florida repealed their programs in 2012. The states that continue to honor the California standards include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington (Clean Cars Campaign 2015). States may also choose to adopt the ZEV program. To date 10 states have adopted a ZEV mandate (C2ES 2015).

Electric Vehicle Registrations

Electric vehicles are typically more fuel efficient than traditional vehicles (DOE 2015d). As more electric vehicles (EVs) become available to drivers, states can help to overcome the barriers to their widespread adoption. In addition to reducing the high up-front costs of these vehicles, states can provide incentives for the construction of the required fueling infrastructure. Additionally, nonfinancial benefits such as emissions testing exemptions can make it more convenient to own an EV. The total number of EV registrations indicates the states' success in making EVs a feasible vehicle option for drivers.

Incentives for High-Efficiency Vehicles

Because high-efficiency vehicles contain new, advanced technologies, their purchase price is high, and this is a barrier to their entry into the marketplace. To encourage consumers to purchase fuel-efficient vehicles, states may offer a number of financial incentives, including tax credits, rebates, and sales tax exemptions. Several states offer tax incentives to purchasers of alternative-fuel vehicles, including those that run on compressed natural gas, ethanol, propane, or electricity, and in some cases hybrid vehicles (electric or hydraulic). Although alternative-fuel vehicles can provide environmental benefits by reducing pollution, they do not necessarily increase fuel efficiency, and we did not include policies to promote their purchase in the *State Scorecard*. However the *State Scorecard* does include incentives for EVs and hybrids, since these vehicles do have high fuel efficiency. With the arrival of a wide range of plug-in vehicles in recent years, tax credits for electric and hybrid vehicles are playing an important role in spurring their adoption.

We also did not give credit for incentives like designated lanes and preferred parking for high-efficiency vehicles, as they promote increased vehicle use and consequently have questionable net energy benefits.

Vehicle Miles Traveled (VMT) Reduction Targets and VMT Growth

Improved vehicle fuel economy will not adequately address energy use in the transportation sector in the long term if growth in total VMT goes unchecked. While VMT on US highways declined during the recession, economic recovery has brought an upward trend (FHWA 2015). EIA projects a 20% increase in light-duty VMT between now and 2030; while this is lower than previous EIA estimates (EIA 2015d), it still outpaces anticipated population growth in the United States. Other analyses, however, predict lower growth rates for VMT. Demographic changes, the increased availability of electronic services like smartphone transit information apps, and rising mode shares for public transit, biking, and walking after years of decline could sustain a reduced rate of growth in VMT into the future (Dutzik and Baxandall 2013).

In any case, reducing the growth in VMT is a key to managing transportation energy use. Several states have taken on this challenge by setting VMT reduction targets.

Integration of Policies for Land Use and Transportation Planning

Energy-efficient transportation is tied to the integration of transportation and land use policies, and for a state to reduce fuel use through transportation system efficiency, it must plan in a way that successfully addresses land use and transportation considerations simultaneously. Successful strategies vary among states due to differences in their existing infrastructure, geography, and political environment. Still, all states benefit from incorporating core principles of smart growth in comprehensive state plans. Such approaches include measures that encourage

- Transit-oriented development, including mixed land use (mix of jobs, stores, and housing) and good street connectivity that makes neighborhoods friendly to all modes of transportation
- Areas of compact development
- Convenient modes of transportation that provide alternatives to automobiles
- Centers of activity where popular destinations are close together

Complete Streets Policies

Complete streets policies focus on street connectivity and aim to create safe, easy access to roads for all pedestrians, bicyclists, motorists, and public transportation users. Complete streets foster increased use of alternatives to driving and have a significant impact on a state's fuel consumption. According to the National Complete Streets Coalition, modest increases in biking and walking could save 2.4 billion gallons of fuel annually across the country (NCSC 2012). A complete streets policy directs states' transportation agencies to evaluate and incorporate complete streets principles and tasks transportation planners with ensuring that all roadway infrastructure projects allow for equitable access to and use of those roadways.

State Transit Funding

While states receive some federal funds for public transit, a significant proportion of transit funding comes from their own budgets. A state's investment in public transit is a key indicator of its interest in promoting energy-efficient modes of transportation, although realizing the potential for energy savings through transit typically requires land use changes as well.

Dedicated Transit Revenue Streams

As states find themselves facing increasingly uncertain federal funding streams and federal transportation policies that remain highway focused, many have taken the lead in finding dedicated funding sources for long-term public transit expenditures. To generate a sustainable stream of capital and operating funds, a number of states have adopted legislation that identifies specific sources of funding for public transit. For instance, in 2010 the state of New York passed Assembly Bill 8180, which directs certain vehicle registration and renewal fees toward public transportation. This metric allows us to capture progress made at the state level that is not represented in the time-lagged state transit funding data described above.

Freight

Many states have freight transportation plans in place. With the passage of the 2012 federal transportation funding authorization bill, Moving Ahead for Progress in the 21st Century (MAP-21), DOT now requires that states have such plans in order to be eligible for a 95% federal match on freight projects. MAP-21 also requires that plans include a description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the state (MAP-21 2012).

By adopting concrete energy efficiency targets or performance measures in these freight plans, states can establish energy efficiency as a priority. The adoption of energy efficiency performance measures involves tracking and reporting the energy efficiency of freight movement in the state as a whole and encourages the use of energy efficiency as a criterion for selecting or evaluating freight projects. States can formulate these performance targets in terms of gallons per ton-mile of freight moved, for example, and targets can reflect performance

across all freight modes. Closely related performance measures such as grams of GHG emitted per ton-mile of freight were eligible for a point under this metric as well.

Leading and Trending States: Transportation Policies

California. California is the clear leader in the transportation sector. As part of its plans to implement AB 32, which requires a 25% reduction from 1990 levels in GHG emissions by 2020, California has identified several strategies for smart growth and reduction of VMT. In 2008 the state passed SB 375, which required the California Air Resources Board (CARB) to develop regional, transportation-specific GHG reduction goals in collaboration with metropolitan planning organizations. CARB finalized targets in 2011 that recommended a 5–8% reduction in vehicle-associated GHG emissions by 2020 for the four largest metropolitan planning organizations in the state (CARB 2011). These goals must subsequently be reflected by regional transportation plans that create compact, sustainable development across the state and thus reduce the growth of VMT. Between 2005 and 2007 California adopted the Goods Management Action Plan (GMAP), which emphasizes energy efficiency in goods movement. In 2014 the state created the California Freight Mobility Plan (CFMP), which it structured to address all of the MAP-21 national goals, including GHG emissions reductions. On the vehicle efficiency side, California passed AB 118 in 2009, providing a voucher program for the incremental cost of purchasing hybrid medium- and heavy-duty trucks. Vouchers range from $6,000 to $45,000. The state also offers tax rebates of up to $2,500 for light-duty zero-emission EVs and plug-in hybrid EVs on a first-come, first-served basis, effective until 2023.

New York. New York has steadily moved up the ranks in recent years with its strong efforts toward transportation efficiency. On the vehicle efficiency side, in 2013 the state signed a memorandum of understanding with seven other states to put a combined 3.3 million zero-emission vehicles on the road by 2025. This action supplements the California low-emissions vehicle emissions standards that were adopted in 2005. The state has also made a number of changes to improve system efficiency in the transportation sector. New York is one of the few states in the nation to have a concrete VMT reduction target. A goal set in 2008 calls for a 10% reduction in 10 years. With one of the highest transit ridership rates in the country, the state in 2010 passed Assembly Bill 8180, directing a portion of vehicle registration and license renewal fees to public transportation. The bill also created the Metropolitan Transit Authority Financial Assistance Fund to support subway, bus, and rail service and capital improvements. In 2011 New York adopted a new complete streets policy aimed at providing accessibility for multiple modes of transport.

Oregon. Oregon has made steady progress toward reducing its fuel consumption and VMT in recent years. In 2011 the state adopted transportation-specific GHG reduction goals for six of its largest metropolitan areas that call for a reduction of 17–21% below 2005 levels by 2035. In combination with the state's stringent growth management act, these new goals have helped to move Oregon toward the top of the rankings in this policy area. The state also passed HB 2186 in 2009, which calls for all metropolitan planning organizations to create a GHG emissions task force that looks for alternative land use and transportation planning scenarios that would meet community growth needs while reducing GHG emissions across the state. Oregon is also one of the first states to pass legislation for a VMT fee program. The voluntary program charges drivers a fee of 1.5 cents per mile in lieu of the state's 30 cent-per-gallon gas tax in an effort to reduce the overall number of miles driven.

Washington. Washington has long been a leader in integrating land use and transportation planning to reduce fuel consumption and vehicle miles traveled. The state introduced a Growth Management Act in 1990 in an early attempt to curb suburban sprawl amidst rapid population growth. Washington also has an aggressive VMT reduction target which calls for a 50% reduction in VMT per capita by 2050 relative to 1990 levels. In 2011 the state passed a complete streets law to encourage walkable, multi-modal communities. In 2012 the state legislature adopted House Bill 2660, which created an account to provide grants to public transit agencies to preserve transit service in the state.

Chapter 4. Building Energy Codes

Author: Annie Gilleo

BACKGROUND

Buildings consume 74% of electricity and 41% of total energy used in the United States and account for 40% of US carbon dioxide emissions (DOE 2012). This makes buildings an essential target for energy savings. However, because buildings have long lifetimes and are not easily retrofitted, it is crucial to encourage building efficiency measures during construction. Mandatory building energy codes are one way to target energy efficiency by legally requiring a minimum level of energy efficiency for new residential and commercial buildings.

Code Adoption

In 1978 California enacted the first statewide building energy code in its Title 24 Building Standard. Several states (including Florida, New York, Minnesota, Oregon, and Washington) followed with state-developed codes in the 1980s. During the 1980s and 1990s, the International Code Council® (ICC) and its predecessor code development organizations developed the Model Energy Code (MEC), later renamed the International Energy Conservation Code® (IECC). Today most states use a version of the IECC for their residential buildings, requiring a minimum level of energy efficiency in new residential construction.

Many commercial building codes are based on ASHRAE 90.1 standards, jointly developed by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) and the Illuminating Engineering Society of North America (IESNA). The IECC commercial building provisions include prescriptive and performance requirements that largely coincide with ASHRAE 90.1 requirements. DOE's most recent analysis of commercial codes found the IECC 2015 and ASHRAE 90.1-2013 to be similar in terms of stringency (PNNL 2015).

With the publication of each new edition of the IECC and ASHRAE standards, DOE issues determinations on the codes that ascertain their relative impact when compared with older versions and, if justified, establish the latest iteration as the base code with which all states must comply. Within two years of the final determination states are required to send letters certifying their compliance, requesting an extension, or explaining their decision not to comply.

The most recent versions of the IECC and ASHRAE codes for which DOE has issued energy saving determinations are the ASHRAE 90.1-2013 and the 2015 IECC standards. DOE determinations for these standards are relatively new, finalized in September 2014 for ASHRAE 90.1-2013 and in June 2015 for the 2015 IECC standard. In 2014 DOE reported that ASHRAE 90.1-2013 generates 7.6% greater site energy savings than ASHRAE 90.1-2010 (DOE 2015b). For residential code updates, the difference between codes is much smaller, however. The 2015 IECC achieves about 1% greater site energy savings than the 2012 IECC (DOE 2015b). States are required to file commercial code certification statements with DOE by September 2016 and residential certification statements by June 2017.

Stimulus funding provided through the DOE State Energy Program under the American Recovery and Reinvestment Act of 2009 (ARRA) spurred the majority of states to adopt at least the 2009 IECC and ASHRAE 90.1-2007 standards. ARRA required that each of the 50 states accepting stimulus funding for code implementation and compliance achieve compliance with these codes in 90% of its building stock by 2017.

Code Compliance

Robust implementation and enforcement are necessary to ensure that states will reap the benefits of adopted codes. A variety of methods exist to increase compliance with building codes, many of which are promoted and facilitated by the Building Codes Awareness Project (BCAP). Its Compliance Planning Assistance (CPA) program helps states take practical steps toward achieving full compliance with the model energy codes. The CPA program is divided into two phases. Phase 1 helps states conduct a gap analysis report, which documents a state's existing energy code infrastructure to assess the current gaps, identify best practices, and offer initial recommendations for improvement. In Phase 2, states develop a strategic compliance plan, which is a targeted, state-specific plan with practical near- and long-term action items to move a state toward full energy code compliance.

Along with the CPA program, BCAP has been working with the National Association of State Energy Officials (NASEO) and the Northwest Energy Efficiency Alliance (NEEA) to promote energy code compliance collaboratives. The collaboratives are made up of groups of stakeholders exploring how best to promote the adoption of and compliance with energy codes, including through education, training, key messaging, and advocacy.

DOE provides many resources to help guide states in code compliance efforts. In addition to funding compliance activities in many states through grants, DOE provides technical assistance for compliance efforts through its Building Energy Codes Program. The six regional energy efficiency organizations also work closely with states in their geographic areas in their adoption and compliance efforts.[45] For example, the Midwest Energy Efficiency Alliance (MEEA) works with stakeholders to coordinate code-related activity across local and state jurisdictions, and the South-central Partnership for Energy Efficiency as a Resource (SPEER) worked with the Texas State Energy Conservation Office to launch the Texas Energy Code Compliance Collaborative in 2011.

In addition to these regional and national efforts, states can take other measures to support code compliance. These include

- Providing and supporting training programs and outreach for code compliance in order to increase the number and effectiveness of contractors and code officials that monitor and evaluate compliance
- Conducting a study—preferably every five years—to determine actual rates of energy code compliance, identify compliance patterns, and create protocols for measuring compliance and developing best-practice training programs
- Establishing a system through which utilities are encouraged to support code compliance

[45] The six regional energy efficiency organizations are Northeast Energy Efficiency Partnerships (NEEP), the Southeast Energy Efficiency Alliance (SEEA), the Midwest Energy Efficiency Alliance (MEEA), South-central Partnership for Energy Efficiency as a Resource (SPEER), the Southwest Energy Efficiency Project (SWEEP), and the Northwest Energy Efficiency Alliance (NEEA). These organizations cover all states except California, Hawaii, and Alaska.

Utilities can promote compliance with state and local building codes in a number of ways. Many utilities across the country offer energy efficiency programs that target new construction. In several states that have passed EERS policies, programs have been established that allow utilities to claim savings for code enhancement activities, both for adoption and for compliance. Utilities can fund and administer training and certification programs, assist local jurisdictions with the implementation of tools that streamline enforcement, provide funding for the purchase of diagnostic equipment, and assist with compliance evaluation. They can combine code compliance efforts with efforts to improve energy efficiency beyond code requirements. To encourage utilities to participate, prudent regulatory mechanisms such as program cost recovery or shared savings policies must be in place to compensate them for their efforts.

METHODOLOGY

Our review of state building energy code stringency is based predominantly on publicly available information such as that provided by the Online Code Environment and Advocacy Network (OCEAN), which maintains maps and state overviews of building energy codes, as well as the DOE Building Energy Codes Program and the expert knowledge of several individuals who are active in state building energy code policy and evaluation. Since very recent code adoptions may not be captured by OCEAN or DOE, we also rely on primary data collection. We distributed a data request to energy offices and knowledgeable officials in each state requesting information on their efforts to measure and enforce code compliance.

SCORING AND RESULTS

States earn credit on two measures of building energy codes: the stringency of residential and commercial codes and the level of efforts to support compliance with codes. We awarded points as follows:

- Code stringency
  - Residential energy code (2 points)
  - Commercial energy code (2 points)
- Code compliance
  - Compliance study (1 point)
  - Other compliance activities (2 points)

Thus states could earn a maximum of 4 points for stringency and 3 points for compliance. Note that this is a change from our 2014 methodology, which awarded states 5 points for code stringency and 2 points for compliance activities. This shift acknowledges the significant role that compliance activities play in ensuring building energy codes achieve the estimated energy savings.

Table 23 lists states' overall building energy code scores. This year, both California and Illinois were awarded the maximum score of 7 points. Eight other states achieved scores of 6 or more points due to a combination of stringent energy codes and laudable compliance efforts. Explanations of each metric follow.

Table 23. State scores for building energy codes: stringency and compliance

State	Residential code stringency (2 pts.)	Commercial code stringency (2 pts.)	Compliance study (1 pt.)	Additional compliance activities (2 pts.)	Total score (7 pts.)
California*	2	2	1	2	7
Illinois*	2	2	1	2	7
Maryland	2	2	1	1.5	6.5
Oregon	1.5	2	1	2	6.5
Vermont	1.5	2	1	2	6.5
Washington	2	1.5	1	2	6.5
District of Columbia	1.5	2	0.5	2	6
Iowa†	1.5	1.5	1	2	6
Massachusetts†	1.5	1.5	1	2	6
Texas[1]	2	1	1	2	6
Florida	1.5	1.5	1	1.5	5.5
Idaho	1	1.5	1	2	5.5
Minnesota	1.5	1.5	1	1.5	5.5
Connecticut†	1	1	1	2	5
Kentucky	1	1.5	1	1.5	5
Montana	1	1.5	0.5	2	5
Nebraska	1	1	1	2	5
New York	1	1.5	1	1.5	5
Rhode Island	1	1	1	2	5
Alabama†	1	1	1	1.5	4.5
Colorado	1	1	1	1.5	4.5
Delaware	1.5	1.5	0	1.5	4.5
Pennsylvania	1	1	1	1.5	4.5
West Virginia	1	1	1	1.5	4.5
Michigan[1]	1.5	1	1	0.5	4
Nevada[2]	1.5	1	0	1.5	4
New Hampshire	1	1	0.5	1.5	4
New Jersey*	2	2	0	0	4
North Carolina	1	1.5	1	0.5	4
Virginia	1	1.5	0.5	1	4
Arkansas	1	1	1	0.5	3.5
Georgia	1	1	1	0.5	3.5
Utah	0.5	1.5	0.5	1	3.5
Guam	1	1	0	1	3
New Mexico	1	1	0	1	3
Ohio	1	1	0	1	3
Oklahoma	1	1	0	1	3
South Carolina	1	1	0	1	3
Mississippi	0	1.5	0	1	2.5
Puerto Rico	1	1	0	0.5	2.5
US Virgin Islands	1	1	0	0.5	2.5

State	Residential code stringency (2 pts.)	Commercial code stringency (2 pts.)	Compliance study (1 pt.)	Additional compliance activities (2 pts.)	Total score (7 pts.)
Wisconsin	0.5	1	0.5	0.5	2.5
Arizona	0.5	0.5	0	1	2
Hawaii	0.5	0.5	0	1	2
Indiana	1	1	0	0	2
Kansas	0.5	0.5	0	1	2
Louisiana	1	1	0	0	2
Maine	0.5	0.5	0	1	2
Wyoming	0.5	0.5	0	1	2
Alaska	0.5	0	0	1	1.5
Missouri	0.5	0.5	0	0.5	1.5
North Dakota	0.5	0.5	0	0.5	1.5
Tennessee†	0.5	0.5	0	0.5	1.5
South Dakota	0	0	0	0.5	0.5

* These states have signed or passed legislation requiring compliance with a new iteration of codes effective by September 1, 2016, or their rulemaking processes are far enough along that mandatory compliance is imminent. These states are awarded full credit commensurate with the degree of code stringency as noted in table 24.
† These states indicated they had begun a code adoption process but were not far enough along in the rulemaking process to indicate a clear and imminent compliance time line. [1] Both Texas and Michigan show a clear path toward adoption of new residential codes but are not far enough along to earn advance credit for pending commercial codes. [2] Although Nevada has adopted the 2012 IECC, Las Vegas has removed energy code requirements from buildings constructed prior to 2009 and has not adopted the most recent iteration of codes. *Sources:* Stringency scores derived from data request responses (Appendix A), DOE Building Energy Codes Program (DOE 2015), and discussions with code experts, as of August 2015. Compliance and enforcement scores are based on information gathered in surveys of state building energy code contacts. See the ACEEE State and Local Policy Database for more information on state codes and compliance (ACEEE 2015).

DISCUSSION

Stringency

We assigned each state a score of 0 to 2 points each for residential and for commercial building energy codes, with 2 being assigned to the most stringent codes, for a total of 4 possible points for building code stringency. Although the most recent iteration of the residential IECC delivers only slightly more energy savings than the 2012 IECC, we nonetheless awarded full points only to states that have adopted this code because there is value in maintaining a continual code updating and adoption process. For detailed information on building code stringency in each state, visit ACEEE's State and Local Policy Database or see Appendix H (ACEEE 2015).

We have not limited qualification to codes that have already become effective. A handful of states are still in the process of updating their building energy codes, and we awarded full credit (commensurate with the degree of code stringency) to those states that have exhibited progress and show a clear path leading toward the adoption and implementation of codes within the next year, or by September 1, 2016. In table 23, we asterisked the states with a clear path toward adoption and implementation and awarded them full credit. We describe details more fully in table 24. Other states have begun the process of updating their codes but have not yet officially adopted them, nor have they demonstrated a clear path toward adoption with a definitive effective date for implementation. Nonetheless, it is important to note that the

processes in these states have begun and are moving along. We denoted these states with a dagger symbol in table 23 and describe details more fully in table 24, but we did not award them full credit.

We also awarded credit to states without statewide mandatory building energy codes for various levels of adoption by major jurisdictions. Many home-rule states such as Arizona, Colorado, Kansas, Missouri, and Oklahoma do not have mandatory statewide codes and instead adopt and enforce building energy codes at the local level.[46] Some of these local jurisdictions are major urban areas that have adopted the ARRA and 2012 codes and should be given credit for their efforts. We have not developed a quantitative method for determining the overall impact of jurisdictional code adoptions relative to statewide energy consumption or some other normalizing metric, in part because of a lack of consistent data across states, but we will consider this in the next iteration of our *State Scorecard*.

Table 24 summarizes our scoring methodology for code stringency.

Table 24. Scoring of state residential and commercial building energy codes stringency

Residential building code	Commercial building code	Score (2 pts. each)
Exceeds 2012 IECC or meets or exceeds 2015 IECC	Meets or exceeds 2015 IECC or ASHRAE 90.1-2013 or equivalent	2
Meets 2012 IECC or equivalent	Meets or exceeds 2012 IECC or equivalent or ASHRAE 90.1-2010, or has significant adoption of 2015 IECC or ASHRAE 90.1-2013 in major jurisdictions	1.5
Meets or exceeds 2009 IECC or equivalent	Meets or exceeds 2009 IECC or equivalent or ASHRAE 90.1-2007, or has significant adoption of 2012 IECC or ASHRAE 90.1-2010 in major jurisdictions	1
Meets or exceeds 1998–2006 MEC/IECC (meets EPCA[1]) or equivalent, or has significant adoption in major jurisdictions	Meets or exceeds 1998–2006 MEC/IECC or ASHRAE 90.1-1999/2001 – ASHRAE 90.1-2004 or equivalent, or has significant adoption of 2009 IECC or ASHRAE 90.1-2007 in major jurisdictions	0.5
Has no mandatory state energy code, or code precedes 1998 MEC/IECC	Has no mandatory state energy code, or code precedes ASHRAE 90.1-1999 or equivalent	0

Table 25 shows state-by-state scores for this category.

[46] Home rule decentralizes power, allowing a locality to exercise certain powers of governance within its own administrative area. See database.aceee.org for more information on building codes in home-rule states.

Table 25. State scores for code stringency

State	Residential code description	Score (2 pts.)	Commercial code description	Score (2 pts.)	Total score (4 pts.)
California	Current standards exceed the 2012 IECC. The 2016 standards, adopted in June 2015 and effective January 1, 2017, are expected to exceed the 2015 IECC standards.	2	The 2016 Building Energy Efficiency Standards, adopted in June 2015 and effective January 1, 2017, are expected to exceed ASHRAE/IESNA 90.1-2013 for commercial buildings.	2	4
Illinois	Illinois is scheduled to officially adopt the 2015 IECC for both residential and commercial buildings (with minor amendments that do not weaken the code) on November 30, 2015.	2	Illinois is scheduled to officially adopt the 2015 IECC for both residential and commercial buildings (with minor amendments that do not weaken the code) on November 30, 2015.	2	4
Maryland	2015 IECC as of July 1, 2015	2	2015 IECC as of July 1, 2015	2	4
New Jersey	Adoption and enforcement of the 2015 IECC as of September 8, 2015	2	Adoption and enforcement of the 2015 IECC as of September 8, 2015	2	4
District of Columbia	The 2013 DC Construction Code references the 2012 IECC	1.5	The 2013 DC Construction Code includes not only the 2012 IECC and ASHRAE 90.1-2010, but also the 2012 International Green Construction Code	2	3.5
Oregon	Equivalent to IECC 2012	1.5	With the commercial building updates incorporated into 2014 Oregon Energy Efficiency Specialty Code (OEESC), Oregon's energy code is expected to be within +/– 2% of ASHRAE 90.1-2013.	2	3.5
Vermont	2015 IECC with weakening amendments	1.5	2015 IECC	2	3.5
Washington	Washington State develops a unique energy code. State analysis places the 2012 residential code ahead of the 2015 IECC in terms of energy savings outcomes.	2	The 2012 version of the commercial code requires compliance with the 2012 IECC.	1.5	3.5
Delaware	2012 IECC	1.5	ASHRAE 90.1-2010	1.5	3
Florida	The 5th Edition (2014) Florida Building Code, Energy Conservation consists of the foundation code "2012 IECC" and amendments (effective June 30, 2015).	1.5	The 5th Edition (2014) Florida Building Code, Energy Conservation consists of the foundation code "2012 IECC" and amendments (effective June 30, 2015).	1.5	3
Iowa	2012 IECC with amendments. Iowa is in the process of holding public meetings to adopt the 2015 IECC.	1.5	2012 IECC with reference to ASHRAE 90.1-2010	1.5	3

State	Residential code description	Score (2 pts.)	Commercial code description	Score (2 pts.)	Total score (4 pts.)
Massachusetts	2012 IECC (stretch code equivalent to IECC 2012). Massachusetts has begun the process of adopting the IECC 2015 and ASHRAE standard 90.1-2013 as part of the 9th edition MA building code.	1.5	2012 IECC with reference to ASHRAE 90.1-2010. Massachusetts has begun the process of adopting the IECC 2015 and ASHRAE standard 90.1-2013 as part of the 9th edition MA building code.	1.5	3
Minnesota	2012 IECC	1.5	Commercial energy code is consistent with ANSI/ASHRAE/IES Standard 90.1-2010 and /or the 2012 IECC.	1.5	3
Texas	2009 IRC for SF and 2009 IECC for all other residential buildings. Clear path toward adoption of 2015 IECC.	2	2009 IECC; ASHRAE 90.1-2007 for state-funded buildings. 2015 IECC is pending but had not been published in state register as of September 1, 2015.	1	3
Idaho	2012 IECC with weakening amendments, equivalent to 2009 IECC	1	2012 IECC with reference to ASHRAE 90.1-2010	1.5	2.5
Kentucky	2009 IECC and 2009 IRC with state amendments	1	2012 IECC/ASHRAE 2010-90.1	1.5	2.5
Michigan	Adoption of the 2012 IECC is scheduled to occur in October 2015.	1.5	ASHRAE 90.1-2007. New codes are currently pending, but draft is still subject to amendments.	1	2.5
Montana	2012 code with weakening amendments for residential construction (requirement for exterior insulation removed, and blower door/duct testing requirements delayed for one year)	1	2012 IECC	1.5	2.5
Nevada	2012 IECC	1.5	2012 IECC and ASHRAE 90.1-2010. However Las Vegas did not adopt the most recent code and removed commercial energy code requirements for buildings constructed prior to 2009.	1	2.5
New York	2010 Energy Conservation Construction Code of New York State (ECCCNYS 2010), based on the 2009 IECC, took effect on December 28, 2010, and is mandatory statewide for residential buildings.	1	Energy Conservation Construction Code of New York State (ECCCNYS) 2014 for commercial buildings generally follows the commercial provisions of the 2012 IECC. The ECCCNYS also permits commercial construction to demonstrate compliance using ANSI/ASHRAE/IES 90.1-2010.	1.5	2.5
North Carolina	2009 IECC with amendments	1	2009 IECC with amendments, with reference to ASHRAE 90.1-2010	1.5	2.5
Virginia	2012 IECC with weakening amendments	1	2012 IECC with reference to ASHRAE 90.1-2010	1.5	2.5

State	Residential code description	Score (2 pts.)	Commercial code description	Score (2 pts.)	Total score (4 pts.)
Alabama	2009 IRC. Has initiated process to update to 2015 IECC.	1	ASHRAE 90.1-2007. Has initiated process to update to 2015 IECC.	1	2
Arkansas	2009 IECC	1	2009 IECC	1	2
Colorado	Home-rule state: 2003 IECC mandatory only for jurisdictions that have already adopted energy codes. Voluntary otherwise. 95% of all residential building takes place in jurisdictions that have adopted the 2009 or higher code.	1	Home-rule state: 2003 IECC mandatory only for jurisdictions that have already adopted energy codes.	1	2
Connecticut	Has initiated process to adopt 2012 IECC.	1	Has initiated process to adopt 2012 IECC.	1	2
Georgia	2009 IECC with amendments	1	ASHRAE 90.1-2007 with amendments	1	2
Guam	2009 IECC	1	2009 IECC	1	2
Indiana	2009 IECC	1	ASHRAE 90.1-2007	1	2
Louisiana	Residential buildings must meet the 2009 IRC with reference to the 2009 IECC.	1	ASHRAE 90.1-2007	1	2
Nebraska	2009 IECC	1	2009 IECC with reference to ASHRAE 90.1-2007	1	2
New Hampshire	2009 IECC with amendments	1	2009 IECC with reference to ASHRAE 90.1-2007	1	2
New Mexico	2009 IECC with amendments	1	2009 IECC with amendments. ASHRAE 90.1-2007 is acceptable compliance path.	1	2
Ohio	2009 IECC	1	2009 IECC with reference to ASHRAE 90.1-2007	1	2
Oklahoma	2009 IRC. However significant confusion regarding code enforcement authority has led to limited adoption in the state.	1	2009 ICC/IBC. However significant confusion regarding code enforcement authority has led to limited adoption in the state.	1	2
Pennsylvania	2009 IECC	1	2009 IECC with reference to ASHRAE 90.1-2007	1	2
Puerto Rico	2009 IECC	1	2009 IECC	1	2
Rhode Island	2012 IECC with weakening amendments	1	2012 IECC with weakening amendments	1	2
South Carolina	2009 IECC	1	2009 IECC with reference to ASHRAE 90.1-2007	1	2
US Virgin Islands	2009 IECC	1	2009 IECC	1	2

State	Residential code description	Score (2 pts.)	Commercial code description	Score (2 pts.)	Total score (4 pts.)
Utah	2012 IECC with significant weakening amendments equivalent to requirements of 2006 IECC	0.5	2012 IECC	1.5	2
West Virginia	2009 IECC	1	ASHRAE 90.1-2007	1	2
Mississippi	No mandatory code	0	ASHRAE 90.1-2010	1.5	1.5
Wisconsin	Wisconsin Uniform Dwelling Code (UDC) is mandatory for one- and two-family dwellings and incorporates the 2006 IECC with state amendments.	0.5	Wisconsin Commercial Building Code is based on the 2009 IECC.	1	1.5
Arizona	No mandatory code (home-rule state). Out of the 100 jurisdictions that have adopted codes, 54 have adopted the 2009 IECC or better and an additional 10 have adopted the 2006 IECC; in total, these cover just over 90% of Arizona's population.	0.5	No mandatory code (home-rule state). Out of the 100 jurisdictions that have adopted codes, 54 have adopted the 2009 IECC or better and an additional 10 have adopted the 2006 IECC; in total, these cover just over 90% of Arizona's population.	0.5	1
Hawaii	2006 IECC with amendments; building council has adopted 2009 IECC, but only one county has adopted it.	0.5	2006 IECC with amendments; building council has adopted 2009 IECC, but only one county has adopted it.	0.5	1
Kansas	Based on information obtained in a 2013 survey of local jurisdictions and 2011 US Census permit data, it is estimated that almost 60% of residential construction in Kansas is covered by the 2009 IECC or better.	0.5	In April 2007 the 2006 IECC became the applicable standard for new commercial and industrial structures. Jurisdictions in the state are not required to adopt the code. Many jurisdictions have adopted the 2009 or 2012 IECC.	0.5	1
Maine	2009 IECC (but only about 60% of state is covered)	0.5	ASHRAE 90.1-2007 (but only about 60% of state is covered)	0.5	1
Missouri	No mandatory code, but significant adoption in major jurisdictions	0.5	No mandatory code, but significant adoption in major jurisdictions	0.5	1
North Dakota	No mandatory code, but significant local adoption	0.5	No mandatory code, but significant local adoption	0.5	1
Tennessee	2006 IECC; state has initiated process of moving toward the 2009 IECC.	0.5	2006 IECC and ASHRAE 90.1-2007 for all state buildings; state has initiated process of moving toward the 2012 IECC and ASHRAE 90.1-2010.	0.5	1
Wyoming	No mandatory code, but some jurisdictional adoption. The eight most populated cities and counties in Wyoming have an energy code that meets or exceeds IECC 2006 or equivalent.	0.5	No mandatory code, but some jurisdictional adoption. The eight most populated cities and counties in Wyoming have an energy code that meets or exceeds IECC 2006 or equivalent.	0.5	1

State	Residential code description	Score (2 pts.)	Commercial code description	Score (2 pts.)	Total score (4 pts.)
Alaska	Building Energy Efficiency Standards (BEES) is a state-developed code based on the 2009 IECC with amendments. Only applicable to 25% of construction.	0.5	No mandatory code, but all public facilities must comply with the thermal and lighting energy standards adopted by the Alaska Department of Transportation and Public Facilities.	0	0.5
South Dakota	Voluntary statewide minimum code.	0	Voluntary statewide minimum code.	0	0

ARRA's impact on building code adoption shows that federal policy can catalyze tremendous progress at the state level. While a few states still have not complied with the ARRA requirements, the great majority of new construction across the country, both residential and commercial, is subject to compliance with the ARRA codes. Forty states, the District of Columbia, and the three US territories examined in the *State Scorecard* (Guam, Puerto Rico, and the US Virgin Islands) either have adopted or are on a clear path toward adopting codes at least equivalent to the ARRA codes for residential or commercial buildings, or for both. Some jurisdictions in most home-rule states—where adoption is under the control of local entities—have also adopted codes at least equivalent to the ARRA codes.

Some states have acknowledged the value of regularly adopting the latest iterations of the IECC and ASHRAE 90.1 code standards and have moved beyond the ARRA codes, adopting new iterations of the standards as they are determined. However only a few states have made progress toward adoption of the most recent DOE-certified codes (or local equivalents) for either residential or commercial new construction. Vermont, New Jersey, and Maryland have adopted and begun to enforce the 2015 IECC for both commercial and residential construction.[47] Oregon's commercial provisions are also expected to be equivalent to ASHRAE 90.1–2013 standards. While California and Illinois have not yet adopted the 2015 codes, they earn full credit for exceeding 2012 residential codes because they have shown a clear path toward adoption and enforcement.

At the other end of the spectrum, nine states lack mandatory statewide energy codes for either residential or commercial new construction or for both: Alaska, Arizona, Colorado, Kansas, Mississippi, Missouri, North Dakota, South Dakota, and Wyoming. Some of these home-rule states are nonetheless showing high rates of adoption at the jurisdictional level, including Arizona, Colorado, Kansas, and Missouri. These states are awarded points accordingly.

Compliance

Scoring states on compliance is difficult due to the lack of consistent data on actual compliance rates and the fact that other efforts taken to measure compliance are largely qualitative. Although our metrics for evaluating state compliance and enforcement efforts have not changed, we have shifted the allocation of points to award more credit to states that have completed compliance studies in the past five years. Our thought is that, as we approach the

[47] Although Vermont has adopted the 2015 IECC, amendments to the residential portion of the code weaken thermal envelope requirements and the Energy Rating Index option. The state's score reflects these weakened amendments.

2017 deadline for 90% compliance, a state's code enforcement efforts will be reflected in its compliance rates. So while it is important for states to incorporate these various compliance strategies, the paramount concern is whether or not new construction is actually complying with the state-mandated building energy codes.

By gradually decreasing the relative scoring weight of the qualitative compliance activities and allocating more points to measuring compliance, we are implying not that the qualitative activities are unimportant, but that states that are achieving high rates of compliance are likely incorporating most if not all of these activities into their compliance/enforcement efforts. Our compliance scoring methodology will change somewhat every year for the next several years to reflect an increasing emphasis on the quantitative aspect of this requirement. In order to motivate states to reach and exceed the 90% compliance goal, ACEEE intends eventually to award credit to states based on the publication of compliance studies, the rigor of these studies, and the actual level of compliance they report. For more information on state compliance efforts, visit ACEEE's State and Local Policy Database (ACEEE 2015).

Table 26 shows our scoring methodology for assessing state compliance studies.

Table 26. Scoring of state efforts to assess compliance

Compliance study	Score (1 pt.)
Compliance study has been completed in the past five years, follows standardized protocols, and includes statistically significant sample.	1
Compliance study has been completed in the past five years but does not follow standardized protocols or is not statistically significant.	0.5
No compliance study has been completed in the past five years.	0

Table 27 shows scoring methodology for additional activities to improve and enforce energy code compliance. A state can earn 0.5 points for each compliance strategy it engaged in during the past year. A total of 2 points is possible.

Table 27. Scoring of efforts to improve and enforce code compliance

Additional metrics for state compliance efforts	Score (2 pts.)
Assessments, gap analysis, or strategic compliance plan	0.5
Stakeholder advisory group or compliance collaborative	0.5
Utility involvement	0.5
Training and outreach	0.5

Table 28 lists how states scored for each compliance metric. Details on state activities in these areas are given in the State and Local Policy Database (ACEEE 2015).

Table 28. State scores for energy code compliance efforts

State	Compliance study (1 pt.)	Gap analysis (0.5 pts.)	Stakeholder group (0.5 pts.)	Utility involvement (0.5 pts.)	Training (0.5 pts.)	Total score (3 pts.)
California	●	●	●	●	●	3
Connecticut	●	●	●	●	●	3
Idaho	●	●	●	●	●	3
Illinois	●	●	●	●	●	3
Iowa	●	●	●	●	●	3
Massachusetts	●	●	●	●	●	3
Nebraska	●	●	●	●	●	3
Oregon	●	●	●	●	●	3
Rhode Island	●	●	●	●	●	3
Texas	●	●	●	●	●	3
Vermont	●	●	●	●	●	3
Washington	●	●	●	●	●	3
Alabama	●	●		●	●	2.5
Colorado	●	●	●		●	2.5
District of Columbia	○	●	●	●	●	2.5
Florida	●	●	●		●	2.5
Kentucky	●		●	●	●	2.5
Maryland	●	●	●		●	2.5
Minnesota	●	●	●		●	2.5
Montana	○	●	●	●	●	2.5
New York	●		●	●	●	2.5
Pennsylvania	●	●	●		●	2.5
West Virginia	●	●	●		●	2.5
New Hampshire	○	●	●	●		2
Arkansas	●	●				1.5
Delaware		●	●		●	1.5
Georgia	●				●	1.5
Michigan	●	●				1.5
Nevada		●	●		●	1.5
North Carolina	●				●	1.5
Utah	○			●	●	1.5
Virginia	○		●		●	1.5
Alaska		●			●	1
Arizona				●	●	1
Guam		●			●	1
Hawaii			●		●	1
Kansas			●		●	1
Maine			●		●	1
Mississippi			●		●	1
New Mexico		●		●		1
Ohio		●		●		1
Oklahoma		●			●	1

State	Compliance study (1 pt.)	Gap analysis (0.5 pts.)	Stakeholder group (0.5 pts.)	Utility involvement (0.5 pts.)	Training (0.5 pts.)	Total score (3 pts.)
South Carolina		●			●	1
Wisconsin	○				●	1
Wyoming			●		●	1
Missouri		●				0.5
North Dakota					●	0.5
Puerto Rico					●	0.5
South Dakota		●				0.5
Tennessee					●	0.5
US Virgin Islands					●	0.5
Indiana						0
Louisiana						0
New Jersey						0

Data from state responses to data requests (see Appendix A). States receiving half-credit for compliance studies are indicated with an unfilled circle. See State and Local Policy Database (ACEEE 2015) for more details on each activity.

According to our survey results, almost every state in the country has made some effort to support code compliance, whether a statewide code is mandatory or not. Nearly every state uses at least one of the strategies for boosting compliance discussed above, and a growing number of states use many or all of them. States that received zero points for compliance are those that did not respond to our survey or could not report compliance activities.

For states to attain the ARRA 90% compliance goal, they will have to join utilities and other stakeholders in a concerted effort involving a range of strategies beyond training and outreach. Between now and 2017, and beyond, states should focus on the thorough evaluation and estimation of rates of compliance. It is true that the number of states that have estimated actual compliance rates is slowly increasing, and several states are in the process of conducting compliance studies with assistance from DOE. However only about half the states have completed a compliance study of any type, and few of them follow a standard methodology to measure compliance for both the commercial and the residential sector.

Chapter 5. Combined Heat and Power

Authors: Meegan Kelly and Anna Chittum

INTRODUCTION

Combined heat and power (CHP) systems generate electricity and thermal energy in a single integrated system. CHP is more energy efficient than generating electricity and thermal energy separately because heat that is normally wasted in conventional generation is captured as useful energy. That recovered energy can then be used to meet a thermal demand for onsite processes like heating or cooling a building or generating steam to run a manufacturing process. CHP systems can save customers money and reduce net emissions. The majority are powered by natural gas, but many are fueled by biomass, biogas, or other types of fossil fuels.

SCORING AND RESULTS

States can encourage or discourage CHP in many ways. Financial, technical, policy, and regulatory factors affect the extent to which CHP systems are deployed. This year we developed a new methodology that refines the approach we relied on in previous editions of the *State Scorecard*. It makes the rankings more clear and transparent and reflects the realities of changing CHP markets.

Most notably, we have adjusted the maximum combined score from 5 points to 4. This adjustment more accurately reflects our estimate of CHP's contribution to potential energy savings across all sectors and policy areas represented in the *State Scorecard*. The weighting of each major policy area is based on its potential energy savings (i.e., the state policies likely to result in the highest energy savings have the highest maximum score). Based on our updated analysis of state energy savings potential studies, we found CHP policies could account for about 7–8% of total energy savings, a slight change from last year (Hayes et al. 2014).

We have also streamlined and organized our methodology by developing four overarching policy categories: (1) interconnection standards, (2) encouraging CHP as a resource, (3) deployment incentives, and (4) additional supportive policies. Some categories, like interconnection standards, reflect the scoring methodology of past years. The second one, encouraging CHP as a resource, is a new, umbrella category that scores states on activities and policies that actively identify CHP as an energy resource and integrate CHP into system planning and energy resource acquisition efforts. The full scoring methodology is outlined below and described in detail later in this chapter.

A state could earn up to 4 points based on its adoption of regulations and policies that promote the deployment of CHP systems. Points were awarded for

- The presence and design of interconnection standards (0.5 points)
- The extent to which CHP is identified and encouraged as an energy resource, based on four subcategories:
    - Eligibility of CHP within an energy efficiency resource standard or other, similar regulatory requirement (0.5 points)
    - The presence of utility- or program administrator–run CHP programs designed to acquire CHP energy resources (0.5 points)

  - The presence of state-approved production goals or program budgets for acquiring a defined amount of kWh savings from CHP (0.5 points)
  - Access to production incentives, feed-in tariffs, standard offer programs, or other revenue streams linked to kWh production (0.5 points)
- Deployment incentives, including rebates, grants, and financing; or a net metering standard that applies to CHP (0.5 points)
- Additional supportive policies, including certain streamlined air permits, technical assistance, goals for CHP in critical facilities, resiliency efforts, and policies that encourage the use of renewable or opportunity fuels in conjunction with CHP (1 point)

We also assessed, but did not score, two additional factors:

- The number of recent CHP installations in each state and the total CHP capacity installed in each state
- The range of retail electricity and natural gas prices a typical CHP customer may encounter in each state

Some states recently adopted new and improved policies or regulations, while others are still in the process of developing or improving them. Generally, we did not give credit for a policy unless a legislative body enacted it or an agency or regulatory body promulgated it as an order. We considered policies in place as of August 2015 and relied on primary and secondary sources for data collection. Primary sources included public utility commission dockets and responses to data requests from state energy offices. Secondary sources included policy databases such as the Database of State Incentives for Renewables and Efficiency (DSIRE 2015) and EPA's CHP Partnership database (EPA 2015b).

Table 29 lists each state's total score and its point distribution in each of the above categories.

Table 29. State scores for CHP

	Encouraging CHP as a resource							
State	Intercon-nection (0.5 pts.)	EERS treatment (0.5 pts.)	CHP program (0.5 pts.)	Produc-tion goal (0.5 pts.)	Revenue streams (0.5 pts.)	Deployment incentives (0.5 pts.)	Supportive policies (1 pt.)	Score (4 pts.)
Massachusetts	0.5	0.5	0.5	0.5	0.5	0.5	1	4
California	0.5	0.5	0.5	0.5	0.5	0.5	1	4
Maryland	0.5	0.5	0.5	0.5	0.5	0.5	1	4
Connecticut	0.5	0.5	0	0	0.5	0.5	1	3
New York	0	0.5	0.5	0	0.5	0.5	1	3
Rhode Island	0.5	0.5	0.5	0	0.5	0.5	0.5	3
Oregon	0.5	0.5	0	0	0	0.5	1	2.5
Washington	0.5	0.5	0	0	0	0.5	1	2.5
Pennsylvania	0	0.5	0	0	0.5	0.5	1	2.5
Maine	0.5	0.5	0	0	0	0.5	1	2.5
Minnesota	0.5	0	0	0	0	0.5	1	2
Illinois	0.5	0.5	0	0	0	0	1	2

State	Encouraging CHP as a resource							
	Intercon-nection (0.5 pts.)	EERS treatment (0.5 pts.)	CHP program (0.5 pts.)	Produc-tion goal (0.5 pts.)	Revenue streams (0.5 pts.)	Deployment incentives (0.5 pts.)	Supportive policies (1 pt.)	Score (4 pts.)
North Carolina	0.5	0.5	0	0	0	0.5	0.5	2
Texas	0.5	0.5	0	0	0	0	1	2
Vermont	0.5	0.5	0	0	0	0.5	0.5	2
Wisconsin	0.5	0	0	0	0	0.5	1	2
Arizona	0	0.5	0	0	0	0.5	0.5	1.5
New Jersey	0	0	0	0	0	0.5	1	1.5
Iowa	0.5	0	0	0	0	0	1	1.5
Ohio	0.5	0.5	0	0	0	0.5	0	1.5
Delaware	0.5	0	0	0	0	0.5	0.5	1.5
Florida	0	0	0	0	0	0.5	0.5	1
Colorado	0.5	0	0	0	0	0	0.5	1
Alaska	0	0	0	0	0	0.5	0.5	1
District of Columbia	0.5	0	0	0	0	0.5	0	1
New Mexico	0.5	0	0	0	0	0.5	0	1
Michigan	0.5	0	0	0	0	0	0.5	1
Nevada	0	0.5	0	0	0	0	0.5	1
Utah	0.5	0	0	0	0	0	0.5	1
Hawaii	0	0.5	0	0	0	0	0.5	1
New Hampshire	0	0	0	0	0	0.5	0.5	1
Montana	0.5	0	0	0	0	0	0.5	1
West Virginia	0	0	0	0	0	0.5	0	0.5
Idaho	0	0	0	0	0	0	0.5	0.5
Indiana	0.5	0	0	0	0	0	0	0.5
Louisiana	0	0	0	0	0	0	0.5	0.5
Mississippi	0	0	0	0	0	0	0.5	0.5
Missouri	0	0	0	0	0	0	0.5	0.5
North Dakota	0	0	0	0	0	0.5	0	0.5
Oklahoma	0	0	0	0	0	0.5	0	0.5
South Dakota	0.5	0	0	0	0	0	0	0.5
Tennessee	0	0	0	0	0	0	0.5	0.5
Kansas	0	0	0	0	0	0	0.5	0.5
Kentucky	0	0	0	0	0	0	0.5	0.5
Alabama	0	0	0	0	0	0	0	0
Arkansas	0	0	0	0	0	0	0	0
Georgia	0	0	0	0	0	0	0	0
Guam	0	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0	0
Puerto Rico	0	0	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0	0
US Virgin Islands	0	0	0	0	0	0	0	0

State	Encouraging CHP as a resource							
	Intercon-nection (0.5 pts.)	EERS treatment (0.5 pts.)	CHP program (0.5 pts.)	Produc-tion goal (0.5 pts.)	Revenue streams (0.5 pts.)	Deployment incentives (0.5 pts.)	Supportive policies (1 pt.)	Score (4 pts.)
Virginia	0	0	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	0	0

Detailed information on the policies and programs that earned points in each category is available in the CHP section of the ACEEE State and Local Policy Database (ACEEE 2015).

Massachusetts, California, and Maryland tied for the top score this year, with each state earning the full 4 points. These three states were the only ones to receive credit for a state-approved production goal for CHP generation, which is a strong policy driver for encouraging utilities and program administrators to acquire generation from CHP. However even the top-scoring states can do more to encourage CHP. For example, California meets all the criteria in our scoring methodology, but barriers to deployment still exist, and state policies and programs could be improved so that they are more effective in their treatment of CHP as an energy efficiency resource.

Connecticut, New York, and Rhode Island tied for the second-highest ranking with 3 points each. All of the highest-scoring states (those earning 3 or 4 points) define CHP as an eligible resource in an energy efficiency resource standard, provide access to revenue streams linked to actual KWh production, and offer deployment incentives that improve the economics of CHP investments. Oregon, Washington, Pennsylvania, and Maine rounded out the 10 highest-scoring states.

DISCUSSION

Interconnection Standards

States could receive 0.5 points for having an interconnection standard that explicitly established parameters and procedures for the interconnection of CHP systems. To earn points in this category, a state's interconnection standard needed to

- Be adopted by utilities serving the majority of the state's customers
- Cover all forms of CHP, regardless of fuel
- Have multiple tiers of interconnection and some kind of fast-track option for smaller systems
- Apply to systems up to 10 MW

Having multiple levels (or tiers) of interconnection is important because larger CHP systems are more complex than smaller ones. Because of the potential for impacts on the utility grid, the interconnection of larger systems requires more extensive approvals. These are unnecessary and financially burdensome for smaller systems, which can benefit from a faster and often cheaper path toward interconnection. Scaling transaction costs to project size makes economic sense. Additionally, CHP developers prefer interconnection standards that cover higher size limits

and are based on widely accepted technical industry standards, such as the IEEE 1547 standard.[48]

Encouraging CHP as a Resource

While CHP is known for its energy efficiency benefits, few states actively identify it as an energy resource akin to more traditional sources such as centralized power plants. CHP can offer energy, capacity, and even ancillary services to the grids to which they are connected, but in order to maximize those benefits, states must first identify CHP as a resource and integrate it into system planning and energy resource acquisition efforts.[49] The best way of doing this is to include CHP within state energy efficiency goals and utility programs.

States could receive up to 2 points for activities and policies that encourage CHP as an energy resource. We considered the following subcategories in awarding points:

EERS treatment. We awarded 0.5 points if CHP was clearly defined as eligible in a binding energy efficiency resource standard (EERS) or similar requirement. Most states with EERS policies set goals for future years. These goals are generally a percentage of total electricity sold that must be derived from efficiency resources, with the percentage of these resources increasing over time. To receive credit, a state's EERS must explicitly apply to CHP powered by natural gas, be technology neutral, and be a binding obligation.

CHP programs. We awarded 0.5 points for the existence of CHP programs designed to acquire cost-effective CHP in the same way as other energy efficiency resources are acquired. To earn this half point, states must have major utilities or other program administrators that offer clearly defined CHP programming. States were not given credit simply for having a custom commercial or industrial incentive program that could theoretically be used for CHP. States had to be actively marketing a program to CHP developers and acquiring new CHP resources as part of the program.

Production goal. We awarded 0.5 points for the existence of either a state-approved production goal (kWh) from CHP resources or a program budget for the acquisition of a defined amount of kWh savings from CHP by utilities or program administrators. The presence of either (or both) of these indicates that a state has identified CHP as a resource and, importantly, has given utilities a clear signal to develop and deploy programming designed to acquire CHP. In many states, utilities report receiving mixed signals about whether their regulators are actually

[48] This standard establishes criteria and requirements for interconnection of distributed energy resources with electric power systems. It provides requirements relevant to the performance, operation, testing, safety, and maintenance of the interconnection. For more information, visit www.ieee.org.

[49] The Federal Energy Regulatory Commission (FERC) defines ancillary services as "those services necessary to support the transmission of electric power from seller to purchaser, given the obligations of control areas and transmitting utilities within those control areas, to maintain reliable operations of the interconnected transmission system. Ancillary services supplied with generation include load following, reactive power-voltage regulation, system protective services, loss compensation service, system control, load dispatch services, and energy imbalance services." For more information, visit www.ferc.gov/market-oversight/guide/glossary.asp.

supportive of program spending tied to CHP. This subcategory addresses this particular issue of utility incentives and disincentives to pursue CHP programming.

Revenue streams. We awarded 0.5 points to states that provide access to favorable revenue streams for CHP, including production incentives ($/kWh), feed-in tariffs, standard offer programs, or other revenue streams linked to kWh production. These incentives are specifically designed to encourage measurable energy savings from CHP. Production incentives are linked directly to a CHP system's production or some calculated amount of energy savings relative to an established baseline. Feed-in tariffs usually specify $/kWh payment to CHP operators for exporting electricity to the grid, providing price certainty and long-term contracts that can help finance CHP systems (EPA 2015a). Standard offer programs offer a set price for qualifying CHP production and often have a program cap or point at which the standard offer will no longer be available. Revenue streams through net metering are treated in a separate category described later in this chapter.

In general, we did not give credit for ratepayer-funded custom programs marketed to commercial and industrial sectors that could *potentially* be used for CHP, as the spending and savings for these programs are reflected in other parts of the *State Scorecard*. However we did give credit for programs that included a specific CHP-focused component, such as the identification of and outreach to potential sites for CHP installations.

To earn points in any of the four subcategories outlined above, a state policy or program must be usable by all customer classes and apply to CHP systems powered by natural gas. Detailed information on the policies and programs that earned points in this category is available in the CHP section of the ACEEE State and Local Policy Database (ACEEE 2015).

Deployment Incentives

States could receive 0.5 points for the presence of deployment incentives that improve the economics of a CHP investment but are not necessarily tied to resource acquisition efforts by utilities. There are a variety of ways in which deployment incentives can encourage CHP at the state level, and the leading states have multiple types of incentive programs. To earn points in this category, at least one available incentive must

- Apply to all CHP, regardless of fuel
- Be an investment tax credit, a credit for installed capacity, a loan or loan guarantee, a project grant, or a net metering standard
- Apply to both the commercial and the industrial sectors

Tax incentives for CHP take many forms but are often credits taken against business or real estate taxes. The US Internal Revenue Service (IRS) administers a federal business energy investment tax credit (ITC) that incentivizes CHP systems by offering a credit for 10% of CHP project costs (EPA CHP Partnership 2015). Tax credits administered by the state can similarly provide support for CHP deployment. Although the federal ITC is set to expire on December 31, 2016, tax incentives are usually considered more permanent incentive structures than are grant programs.

State grants can also support CHP deployment by providing financing for capital and other costs. Some grant awards and other simple incentive programs offer rebates or payments linked to the installation of CHP capacity with amounts set in $/kW. Many of these programs are administered in conjunction with production incentives. Low-interest loan programs, loan guarantees, and bonding authorities are other strategies states can use to make CHP systems financially attractive and reduce the cost of financing. To earn *Scorecard* points for these programs, a state has to clearly identify CHP as an eligible project type and market it to CHP project developers who then take advantage of the financing opportunity.

Sound net metering regulations can also incentivize CHP deployment by allowing owners of small distributed generation systems to get credit for excess electricity that they produce onsite. With wholesale net metering, which is sometimes referred to as dual-meter metering, utilities pay customers at the wholesale or avoided-cost rate for any excess electricity exported to the grid. We gave credit to states that offered at least wholesale net metering that applied to CHP systems in all customer classes and offered net metering to natural-gas–fired CHP systems.

Detailed information on incentives for CHP is available from EPA through its CHP Partnership (EPA 2014b) and from the Database of State Incentives for Renewables and Efficiency (DSIRE 2015).[50]

Additional Supportive Policies

A state could receive up to 1 point for the presence of additional policies that support the deployment of CHP. Because barriers to deployment and opportunities to encourage CHP vary from state to state, this category recognizes a wide variety of efforts that states can undertake. States earned 0.5 points for the presence of any one of the following supportive policies, or 1 point for the presence of two or more:

- Policies that encourage the use of opportunity fuels in conjunction with CHP technologies, such as biomass, biogas, anaerobic digester gas, landfill gas, wood, and other waste (including waste heat)
- Emissions treatments that include permit-by-rule for CHP systems for some major pollutants
- Dedicated CHP-focused technical assistance efforts
- Requirements that public buildings and/or other critical facilities consider CHP during times of upgrade and new construction
- Policies and programs that specifically encourage CHP for its resiliency benefits

In previous years we assigned points separately for the eligibility of CHP in a state EERS and a renewable portfolio standard (RPS) in order to note the different roles the two standards can play. As with EERSs, most states with RPS policies set goals for future years that require a percentage of the total electricity sold to be derived from renewable resources. This year, states could earn points for RPSs and other policies that encourage the use of renewable-fueled CHP as an additional supportive policy. The availability of biomass and biogas resources is often

[50] EPA's database is available at www.epa.gov/chp/policies/database.html. The DSIRE database is available at www.dsireusa.org/.

local, and some states are better suited to use these resources than others. Natural gas is available nearly everywhere in the US and is the predominant fuel used by CHP systems. While natural gas CHP systems do not generally benefit from RPS treatment, biomass or biogas systems often do, and we recognize the use of these and other opportunity fuels in this category.

States could also earn points for streamlined air permitting, including permit-by-rule (PBR) processes. These are alternatives to conventional air permits that help to reduce the time and cost involved in permitting eligible CHP units. Additional information on permit-by-rule is available in an EPA fact sheet (EPA 2014).

States could earn points for several other supportive policies in this category. Such policies can include targeted technical assistance programs, education campaigns, or other unique efforts that support CHP. To earn credit for technical assistance, a state's efforts must go beyond the key services provided by DOE's CHP Technical Assistance Partnerships (TAPs). States could also earn points for the presence of requirements to consider CHP for public buildings and critical facilities during times of upgrade or new construction, or for programs that encourage the consideration of CHP's resiliency benefits during grid outages. The CHP section of the ACEEE State and Local Policy Database contains state-by-state descriptions of these policies (ACEEE 2015).

ADDITIONAL FACTORS

There are two additional factors that are noted but do not impact a state's score.

First, we include data on the number of individual CHP systems and the total capacity installed in each state in the past two years.[51] A single year may not accurately reflect a state's CHP activity because planning and installing CHP systems can take several years. We believe such information is useful for comparing states, though it is not in itself a full indicator of a state's CHP friendliness. A variety of economic factors well beyond the control of an individual state may determine the degree to which CHP projects are installed.

One major factor influencing economic attractiveness for CHP is the retail price of energy that a CHP facility actually pays. For this reason, we also include data on the retail electric and natural gas rates paid by facilities in a given state. Higher electricity prices may improve the economic case for CHP in some states, since self-generation may be more cost effective than purchasing electricity from the grid. In other states, lower and stable natural gas prices may help hasten investment in CHP, since many CHP systems are fueled by natural gas. A recent ACEEE analysis considered the impact of average retail prices on state-by-state CHP potential, and differences in energy price clearly impacted CHP deployment (Hayes et al. 2014).

We do not score states based on these prices because states cannot control the retail price of electricity or gas that customers pay. Still, these prices drive a state's CHP market to varying degrees, and policymakers can implement policies that help overcome economic barriers raised

[51] We use data from the DOE CHP Installation Database maintained by ICF International. The data reflected in the *State Scorecard* were released June 1, 2015 and reflect installations as of December 31, 2014 (DOE 2014).

in part by lower electricity prices or higher gas prices. We are exploring the impact of both state policies and the retail price of energy to better understand how market considerations influence CHP installations on a state-by-state basis (Kelly 2015). Future editions of the *State Scorecard* may account for these factors by scoring states on their installed CHP capacity relative to some measure of technical or economic potential.

Table 30 shows installed CHP capacity for the past two years and provides a price range for both electricity and natural gas that a typical CHP customer would pay in 2014. We report a low-range price typical of what a large industrial customer would pay and a high-range price typical of what a smaller commercial customer would pay. This range of prices reflects the potential for CHP in both the industrial and commercial sectors. [52]

Table 30. Installed CHP capacity and fuel prices by state, 2013–14

State	Number of new CHP installations in 2014	Total new capacity installed in 2014 (MW)	Number of new CHP installations in 2013	Total new capacity installed in 2013 (MW)	2014 retail electricity price range (cents/kWh)		2014 retail gas price range ($/thousand cubic ft.)	
					Low	High	Low	High
Alabama	0	0	0	0	6.21	10.84	5.93	11.89
Alaska	3	1	5	3.6	15.78	17.18	7.97	8.34*
Arizona	0	0	0	0	6.64	10.05	7.54	8.76*
Arkansas	0	0	0	0	5.93	8.02	6.98	7.84
California	29	33.5	34	50.7	11.93	15.67	7.73	9.08
Colorado	0	0	0	0	7.28	10.20	5.90*	8.13
Connecticut	1	0.7	10	3	12.95	15.52	8.07	10.28
Delaware	1	0.1	2	106.2	8.43*	10.60	10.98	11.42
District of Columbia	0	0	0	0	8.19	12.22	n/a	11.64*
Florida	1	8.0	2	5.6	8.06	9.97	7.25	11.51
Georgia	0	0	2	41.1	6.52	10.28	6.20	9.72
Hawaii	1	1.7	0	0	30.22	34.32	27.94	40.38
Idaho	0	0	0	0	6.42	7.79	5.97	7.81
Illinois	6	1.3	1	0.1	6.35	8.73	7.94	7.57*
Indiana	1	14	2	2.3	6.87	9.83	6.63	8.23
Iowa	0	0	2	2.6	5.77	8.74	5.95*	8.15
Kansas	1	21	0	0	7.47	10.03	7.10	9.55
Kentucky	2	17	0	0	5.67	9.34	6.16	9.06
Louisiana	0	0	0	0	6.00	9.10	5.90	9.00
Maine	1	0.1	3	0.6	9.01	11.74*	11.33	12.79*
Maryland	6	7.1	1	24.5	9.01	11.21	8.47*	10.44
Massachusetts	7	3.6	12	13.1	12.57	14.65	11.25	12.27

[52] The low-range gas price is based on the average retail rate for an industrial customer or the City Gate price plus a $1 adder, whichever is higher. The high-range price is based on the average retail rate for a commercial customer. This approach was developed in consultation with ICF International to better reflect the economic realities that project developers experience in different markets and in an effort to be consistent with the methodology in a forthcoming DOE report.

State	Number of new CHP installations in 2014	Total new capacity installed in 2014 (MW)	Number of new CHP installations in 2013	Total new capacity installed in 2013 (MW)	2014 retail electricity price range (cents/kWh)		2014 retail gas price range ($/thousand cubic ft.)	
					Low	High	Low	High
Michigan	3	2.9	3	101.1	7.71	10.94	7.64	8.25
Minnesota	2	0.7	1	0.3	7.03	9.61	7.56	6.86*
Mississippi	0	0	0	0	6.75	10.89	6.29	8.36
Missouri	0	0	1	16	6.19	8.82	8.47	8.94
Montana	0	0	2	2.8	5.47	9.60	8.03	9.04
Nebraska	0	0	1	0.4	7.30	8.74	6.58	6.49*
Nevada	1	0.01	0	0	7.08	9.66	7.83	6.61*
New Hampshire	0	0	2	0.1	11.90	14.41	10.68*	12.13*
New Jersey	3	0.1	10	8.1	11.55	13.19	8.19*	10.10
New Mexico	1	6.5	0	0	6.48	10.35	6.38	7.78
New York	41	21.3	32	16.5	6.50	16.11	8.05	8.32
North Carolina	6	42.1	2	1.3	6.43	8.77	7.44	9.08
North Dakota	1	99	0	0	7.80	8.52	5.99*	7.67
Ohio	3	3	2	0.2	6.62	9.80	6.14*	6.2*
Oklahoma	0	0	0	0	5.61	8.02	7.16*	8.21
Oregon	0	0	3	2.9	6.08	8.81	6.40	8.6*
Pennsylvania	5	2.4	11	18.6	7.42	9.72	9.21*	10.15*
Rhode Island	1	12.5	0	0	12.83	14.57	10.14	12.89
South Carolina	0	0	3	19.3	6.25	10.19	6.83	9.55
South Dakota	0	0	0	0	7.05	8.74	7.12	7.76
Tennessee	0	0	0	0	6.58	10.37	6.39	9.42
Texas	4	524.6	3	15.8	6.16	8.13	6.79	8.14
Utah	0	0	0	0	6.07	8.62	6.70*	7.71
Vermont	2	0.6	0	0	10.12	14.61	8.08	9.22
Virginia	1	12	5	130.4	6.97	8.22	6.54*	9.16
Washington	0	0	2	20.3	4.32	7.93	8.52	9.05
West Virginia	0	0	0	0	5.87	7.99	6.06	8.85
Wisconsin	2	10.6	11	71.8	7.65	10.90	8.07	7.07*
Wyoming	0	0	0	0	6.62	8.90	6.27	7.76

*** 2014 prices were not available for some states. The prices displayed for these states are 2013 prices.** ***Sources:*** **DOE 2015c; EIA 2015b; EIA 2014.**

In general, states enacted few notable policies to enhance CHP's attractiveness in the year since we published the *2014 State Scorecard*. However some states did take strong action to support CHP, and we describe a sampling of these efforts below.

Leading and Trending States in Policies to Encourage CHP Development

New York. In 2014 the New York State Energy Research and Development Authority (NYSERDA) implemented its CHP Acceleration Program, which provides financial incentives for the installation of prequalified, pre-engineered CHP systems through the use of an innovative "catalog" model. The catalog allows customers to choose from a selection of approved CHP systems ranging from 50 kW to 1.3 MW, each with assigned rebate amounts. NYSERDA is promoting the program through a series of CHP Expos that connect approved equipment vendors with interested end users. The program design shortens the time it takes to complete a CHP project. It also prioritizes the enhanced resiliency benefits that CHP provides by requiring that approved systems be equipped with the ability to operate during a grid outage.

Illinois. The Illinois Department of Commerce and Economic Opportunity (DCEO) launched its Public Sector CHP Pilot Program in June 2014 to provide incentives for CHP projects that increase energy efficiency of local governments, municipal corporations, public school districts, community college districts, public universities, and state/federal facilities. As part of this effort, the state worked with industry and utilities and developed an agreed-upon energy savings calculation methodology, which is now part of the Illinois Technical Resource Manual (TRM). In June 2015, the largest electric utility in Illinois, ComEd, launched a CHP program that provides up to $25,000 in incentives for both feasibility and interconnection studies, in addition to offering energy incentives after the first year of operation and EM&V.

Minnesota. With grant funding from DOE, Minnesota carried out a strategic stakeholder engagement process in 2014 for the purpose of developing an action plan for CHP deployment in the state. The state held a series of stakeholder meetings to discuss a regulatory framework, the technical and economic potential of CHP, and education and training needs. A final draft of the action plan, including recommendations to effectively advance CHP in Minnesota, was released in October 2015.

Washington. Washington State took a large step toward valuing CHP as a grid-supporting resource when the governor signed HB 1095, a bill requiring the state's larger utilities to consider both the kWh and kW resources provided by CHP in instances where CHP is "dispatchable" or may "provide capacity value." The legislation also streamlined some of the air permitting processes for CHP systems and stipulated that all "critical" public facilities conduct a CHP feasibility assessment when being constructed or renovated.

Chapter 6. State Government-Led Initiatives

Author: Mary Shoemaker

INTRODUCTION

State legislatures and governors can advance energy efficiency policies and programs that affect the sectors discussed in previous chapters, including utilities, transportation, buildings, and CHP. In contrast, this chapter is dedicated to energy efficiency initiatives that are designed, funded, and implemented by state administrators—for example energy offices, universities, economic development agencies, and general services agencies.

We focus on four initiatives commonly undertaken by state governments: financial incentive programs for consumers, businesses, and industry; policies that require building owners or managers to disclose energy usage data; lead-by-example policies and programs to improve the energy efficiency of public facilities and fleets; and research and development for energy efficiency technologies and practices.

SCORING AND RESULTS

States could earn up to 7 points in this policy area:

- Financial incentives offered by state agencies (2.5 points)
- Residential and commercial energy use disclosure policies (1 point)
- Lead-by-example policies (2 points)
- Publicly funded R&D programs focused on energy efficiency (1.5 points)

Table 31 presents the overall results of scoring on state initiatives.

Table 31. Summary of state scores for government–led initiatives

State	Financial incentives (2.5 pts.)	Building energy disclosure (1 pt.)	Lead by example (2 pts.)	R&D (1.5 pts.)	Total score (7 pts.)
California	2.5	0.5	2	1.5	6.5
Illinois	2.5	0	2	1.5	6
Minnesota	2.5	0	2	1.5	6
New York	2.5	0.5	1.5	1.5	6
Connecticut	2.5	0	2	1	5.5
Massachusetts	2.5	0	2	1	5.5
Oregon	2.5	0	1.5	1.5	5.5
Colorado	2.5	0	1	1.5	5
Kentucky	2.5	0	1.5	1	5
Maine	2.5	0.5	1.5	0.5	5
Maryland	2.5	0	1.5	1	5
Pennsylvania	2.5	0	1	1.5	5
Tennessee	2.5	0	1.5	1	5
Vermont	2.5	0	2	0.5	5
Washington	2	0.5	2	0.5	5

State	Financial incentives (2.5 pts.)	Building energy disclosure (1 pt.)	Lead by example (2 pts.)	R&D (1.5 pts.)	Total score (7 pts.)
Alabama	2	0	2	0.5	4.5
Alaska	2.5	0.5	1	0.5	4.5
Delaware	2	0	2	0.5	4.5
Kansas	1.5	0.5	1.5	1	4.5
North Carolina	1	0	2	1.5	4.5
Virginia	2.5	0	1	1	4.5
Missouri	1.5	0	1.5	1	4
Nevada	2	0	1.5	0.5	4
Texas	1	0	2	1	4
Utah	1	0	2	1	4
Wisconsin	1	0	1.5	1.5	4
District of Columbia	0.5	1	1.5	0.5	3.5
Idaho	2.5	0	0.5	0.5	3.5
Iowa	1.5	0	1	1	3.5
Montana	1.5	0	2	0	3.5
New Mexico	1.5	0	2	0	3.5
Ohio	2.5	0	0.5	0.5	3.5
Oklahoma	2.5	0	1	0	3.5
Arizona	1	0	1	1	3
Mississippi	1	0	1.5	0.5	3
Nebraska	1	0	0.5	1.5	3
New Hampshire	1	0	2	0	3
Rhode Island	1	0	1.5	0.5	3
South Carolina	1.5	0	1.5	0	3
Florida	0	0	1	1.5	2.5
Georgia	0	0	1.5	1	2.5
Hawaii	0	0.5	1.5	0.5	2.5
Michigan	1	0	1.5	0	2.5
New Jersey	1	0	1	0.5	2.5
Indiana	1	0	0.5	0.5	2
Puerto Rico	0	0	1.5	0.5	2
Arkansas	0	0	1.5	0	1.5
Louisiana	0.5	0	1	0	1.5
South Dakota	0.5	0.5	0.5	0	1.5
Wyoming	1	0	0.5	0	1.5
Guam	0	0	0.5	0	0.5
North Dakota	0.5	0	0	0	0.5
US Virgin Islands	0	0	0.5	0	0.5
West Virginia	0	0	0	0.5	0.5

DISCUSSION

Financial Incentives

Financial incentives are an important instrument with which to spur the adoption of technologies and practices in homes and businesses. They can take many forms: rebates, loans, grants, or bonds for energy efficiency improvements; income tax credits and deductions for individuals or businesses; and sales tax exemptions or reductions for eligible products. Financial incentives can lower the up-front cost and shorten the payback period for energy efficiency upgrades, shrinking two barriers to consumers and businesses who hope to make cost-effective efficiency investments. Incentives also raise consumer awareness of eligible products, encouraging manufacturers and retailers to market these products more actively and to continue to innovate. As economies of scale improve, prices of energy-efficient products fall, and the products eventually compete in the market without the incentives.

SCORES FOR FINANCIAL INCENTIVES

We relied primarily on the Database of State Incentives for Renewables and Efficiency for information on current state financial incentive programs (DSIRE 2015). We supplemented these data with information from a survey of state energy officials and a review of state government websites and other online resources.

We did not give points in this category for utilities' customer-funded financial incentive programs, which we covered in Chapter 2, Utility and Public Benefits Programs and Policies. Also, while an increasing number of states are launching Property Assessed Clean Energy (PACE) financing programs, to date no one has done a comprehensive study on savings from such programs; therefore they do not receive points in the *State Scorecard* this year. As more data become available, ACEEE will revisit the scoring of these programs in future editions of this report. We did award points for loan programs run by green banks where they incorporate dedicated sources of funding. Acceptable sources of funding included state appropriations or bonds, oil overcharge revenues, auction proceeds from the Regional Greenhouse Gas Initiative or California's cap-and-trade program, other noncustomer sources, and tax incentives. While state and customer funding sometimes overlap—for example, where state R&D is funded through a systems benefits charge—we designed this category to capture energy efficiency initiatives not already covered in Chapter 2.

States earned up to 2.5 points for major financial incentive programs that encourage the purchase of energy-efficient products. We judged these programs on their relative strength, customer reach, and impact.[53] Incentive programs generally received 0.5 points each, but several states have major incentive programs that we deemed worth 1 point each; these include Alaska, Idaho, Iowa, Kansas, Massachusetts, Nebraska, Nevada, Texas, Washington, and Wisconsin. Table 32 describes the bases for our scoring of state financial incentives.

The number of financial programs a state implements may not fully reflect the robustness of its efforts, so this year we attempted to collect additional information from state energy offices regarding state budgets for financial incentives, program participation rates, verified savings

[53] Energy-efficient products include any product or process that reduces energy consumption. While renewable energy technologies such as solar hot-water heating may reduce energy consumption, they are often rolled into larger programs that focus on renewable energy rather than energy efficiency; therefore they are not included at this time.

from incentives, and leveraging of private capital. For more information, see the end of this chapter for a discussion of potential new metrics for state-led initiatives.

Table 32. State scoring on major financial incentive programs

State	Major state financial incentives for energy efficiency	Score (2.5 pts.)
Alaska	Major rebate program (Home Energy Rebate Program); multiple loan programs; grant programs	2.5
California	Two grant programs for school facilities; sales tax exemption for alternative energy manufacturing equipment (includes energy efficiency); rebate program (Energy Upgrade California); loan program for public-sector projects	2.5
Idaho	Income tax deduction for energy efficiency improvements; grant program for school districts; one major low-interest loan program; one bond program	2.5
Illinois	Three grant and three rebate programs; one loan and one bond program	2.5
Kentucky	Three grant programs; personal and corporate energy efficiency tax credits; loan program for state agencies; sales tax exemption for energy-efficient products	2.5
Maryland	Smart Energy Communities Program; five loan programs; one grant program; one rebate program	2.5
Massachusetts	Alternative Energy and Energy Conservation Patent Exemption (personal and corporate); Pathways to Zero Grant Program, and other grant and bond programs	2.5
Minnesota	Seven loan programs	2.5
New York	Green Jobs Green NY Program; several rebate, loan, grant, and incentive programs; Energy Conservation Improvements Property Tax Exemption	2.5
Oklahoma	Energy Efficient Residential Construction Tax Credit (personal and corporate); three loan programs	2.5
Oregon	Residential and business energy tax credits; one loan program; one grant program	2.5
Pennsylvania	State-led Alternative Energy Investment Fund; three grant and three loan programs	2.5
Vermont	Three loan programs; Weatherization Trust Fund; Thermal Energy and Process Fuel Efficiency Program	2.5
Virginia	Energy Leasing Program for state-owned facilities; Clean Energy Manufacturing Grant Program; one loan program; personal and property tax incentives	2.5
Colorado	Mortgage discount for ENERGY STAR homes; loan loss reserve program; school loan program; and a Dairy and Irrigation Efficiency audit program	2.5
Ohio	Two loan programs and one grant program; property tax exemption for energy-efficient projects	2.5
Connecticut	Three loans programs; sales tax exemption for energy-efficient products; Clean Energy Communities incentive program	2.5
Tennessee	Energy Efficient Schools Initiative (loans and grants); two grant programs; one loan program	2.5
Maine	One loan program; two incentives; two rebates	2.5
Alabama	Two state-funded loan programs; AlabamaWISE Home Energy Program (rebates and loans)	2

State	Major state financial incentives for energy efficiency	Score (2.5 pts.)
Nevada	Wide-reaching property tax abatement for green buildings; Home Energy Retrofit Opportunities for Seniors (HEROS); one loan program for state employees	2
Washington	Major grant program for energy efficiency in public facilities and local communities; Washington Farm Energy Program; revolving loan fund	2
Delaware	Three loan programs and one grant program	2
Iowa	Major loan program (Iowa Energy Bank); one grant program	1.5
Kansas	Major loan program (Efficiency Kansas); one grant program	1.5
South Carolina	Tax credit for purchase of new energy-efficient manufactured homes; sales tax cap on energy-efficient manufactured homes; one loan program	1.5
Missouri	Two loan programs; one personal tax deduction	1.5
Montana	Energy conservation installation tax credit; tax deduction for energy-conserving investment; one loan program	1.5
New Mexico	Sustainable Building Tax Credit (personal and corporate); bond program	1.5
Michigan	Two loan programs	1
New Hampshire	Two revolving loan funds	1
Indiana	One rebate program; one tax credit	1
Mississippi	One loan program; one public-sector lease program for energy-efficient equipment	1
Nebraska	Major loan program (Dollar and Energy Savings Loans)	1
New Jersey	Edison Innovation Clean Energy Manufacturing Fund (grants and loans); Edison Innovation Green Growth Fund Loan program	1
North Carolina	One rebate and one loan program	1
Texas	Major loan program (Texas LoanSTAR)	1
Utah	Two loan programs for state-owned buildings and schools	1
Wisconsin	Major loan program (Clean Energy Manufacturing Loan Program)	1
Wyoming	One grant and one loan program	1
Arizona	Property tax exemption for energy-efficient building components and CHP	1
Rhode Island	School Grant Program and an LED Street Light Incentive	1
District of Columbia	Green Building Fund Grant Program	0.5
Louisiana	Home Energy Loan Program	0.5
North Dakota	One grant program	0.5
South Dakota	One loan program	0.5
Arkansas	None	0
Florida	None	0
Georgia	None	0
Guam	None	0

State	Major state financial incentives for energy efficiency	Score (2.5 pts.)
Hawaii	None	0
Puerto Rico	None	0
US Virgin Islands	None	0
West Virginia	None	0

Financial and Information Incentives: Leading and Trending States

Idaho. Idaho's Office of Energy Resources offers a low-interest loan for energy efficiency projects in homes and businesses. The state offers as much as $15,000 for residential projects and up to $100,000 for commercial projects. Idaho also provides an income tax deduction for residential energy efficiency upgrades, which allows a 100% deduction of the cost of installing these improvements. Idaho also has a grant program that helps school districts construct more energy-efficient spaces. The Renewable Energy Project Bond Program provides financing to independent developers of renewable energy projects, including combined heat and power.

Connecticut. Connecticut offers many state-level financial incentives that target a variety of sectors. Through the Energy Conservation Loan program, Connecticut offers loans for residential energy efficiency improvements up to $25,000 for single-family homes or $100,000 for multifamily buildings. The state also offers a 100% tax exemption for residential weatherization products and grants for communities who pledge their support to energy efficiency and renewable energy.

Alaska. Alaska uses a substantial amount of state appropriations to fund energy efficiency incentive programs. The Home Energy Rebate Program uses $160 million in state funding appropriated in 2008, a major investment relative to Alaska's population. The program allows rebates of up to $10,000 based on improved efficiency and eligible receipts. Energy ratings are required before and after the home improvements. The program also provides expert advice on energy efficiency improvements and tracks savings for consumers.

Tennessee. In partnership with Pathway Lending, Tennessee provides low-interest energy efficiency loans to businesses through the Pathway Lending Energy Efficiency Loan Program (EELP). The state also offers grants to utility districts and state and local government entities for projects that promote energy efficiency, clean energy technologies, and improvements in air quality. Through Governor Bill Haslam's EmPower TN initiative, the state has approved funding for energy efficiency and renewable energy projects as part of its FY 2015/2016 budget. This initiative creates an enterprise system to collect energy cost and consumption data to allow tracking, analysis, and benchmarking for every state facility.

Disclosure of Buildings' Energy Use

Building energy disclosure and transparency laws improve consumers' awareness of the energy use of homes and commercial buildings being offered for sale or lease, which can have a significant impact on the economic value of a home or building. By requiring the disclosure of a building's energy use, these laws also give owners information that might lead them to improve their building's energy efficiency.

Energy-use disclosure requirements are a fairly recent policy innovation. New York's Truth in Heating Law, enacted in 1980, led the way for residential disclosure laws, which states began to adopt in the mid-2000s. Commercial disclosure policies are less common at the state level, with only California, Washington, and the District of Columbia requiring energy-use disclosure upon sale or lease (IMT 2015). Local governments are more likely to pursue these policies, but state governments can also use them to incentivize building stock upgrades.

SCORES FOR BUILDING ENERGY-USE DISCLOSURE REQUIREMENTS

We based our review of energy-use disclosure laws on policy information compiled by the Institute for Market Transformation's BuildingRating.org project (IMT 2015). States with mandatory energy-use disclosure laws in place received 0.5 points for a commercial or residential policy. States with both policies in place received 1 point. State disclosure policies are presented in table 33.

Table 33. State energy use disclosure policies

State	Disclosure type	Building energy use disclosure requirements	Score (1 pt.)
District of Columbia	Commercial, residential, multifamily	The Clean and Affordable Energy Act of 2008 requires privately owned commercial buildings to be benchmarked using EPA ENERGY STAR Portfolio Manager on an annual basis. Results are publicly available in the Build Smart DC database.	1
Alaska	Residential	Alaska statute AS.34.70.101 requires the release of utility data for residential buildings at the time of sale.	0.5
California	Commercial	Assembly Bill 1103 requires nonresidential building owners or operators to benchmark their buildings' energy use using EPA's ENERGY STAR Portfolio Manager and to disclose this information to buyers, lenders, and lessees.	0.5
Hawaii	Residential	§508D-10.5 requires residential property owners to disclose energy efficiency consumer information at the time of sale or lease.	0.5
Kansas	Residential	HB 2036 requires builders or sellers of new single-family homes or multifamily buildings of four units or fewer to disclose information regarding the energy efficiency of the structure to buyers (or prospective buyers) prior to signing the contract to purchase and closing the sale.	0.5
Maine	Residential	HP 1468 requires the disclosure of an energy efficiency checklist and allows for the release of audit information of residential buildings, both at the time of sale.	0.5
New York	Residential	Since 1981, the Truth in Heating Law has required the release of utility data of residential buildings at the time of sale.	0.5
South Dakota	Residential	SB 64 (2009) sets forth certain energy efficiency disclosure requirements for new residential buildings at the time of sale.	0.5

State	Disclosure type	Building energy use disclosure requirements	Score (1 pt.)
Washington	Commercial	SB 5854 (2009–2010) requires all nonresidential customers and qualifying public agency buildings to benchmark their buildings' energy use using EPA ENERGY STAR Portfolio Manager and to disclose this information to buyers, lenders, and lessees.	0.5

Disclosure policies based on IMT (2015) and data requests to state energy offices.

Several states have taken the lead in requiring building energy-use disclosure, but no additional states have adopted disclosure policies since our scoring last year. The District of Columbia is the only entity surveyed for this report that currently requires both commercial and residential disclosure, although as disclosure policies become more common, more states will likely expand the scope of their policies to target both markets. More often, local-level jurisdictions pursue these policies. Most recently, Atlanta adopted a commercial benchmarking ordinance.[54]

State Energy Disclosure Policies: Leading and Trending States

Kansas. In 2003 Kansas passed a law requiring the disclosure of energy efficiency information for new homes (KSA 66-1228). The state developed a standard reporting format for builders and sellers of new homes that compares the home's features to the state's energy code guidelines. In 2007 the state amended the energy rating law to move the time of disclosure from the time of closing to the time the house is being shown. Sellers must make a completed energy efficiency checklist available to potential buyers.

District of Columbia. Since 2014 the District has required all commercial and multifamily buildings over 50,000 square feet and all city government buildings over 10,000 square feet to report benchmarking data on a yearly basis. The District uses EPA's ENERGY STAR Portfolio Manager as a standard for building energy performance, measuring total energy use, energy intensity, and carbon emissions. Approximately 480 buildings, representing 120 million square feet, have taken the next step and been certified with the ENERGY STAR label. Prior to April 2014, The District required public buildings of more than 100,000 square feet to report their 2012 energy and water use to the District Department of the Environment.

Lead by Example

State governments can advance energy-efficient technologies and practices in the marketplace by adopting policies and programs to save energy in public-sector buildings and fleets, a practice commonly referred to as "lead by example." In the current environment of fiscal austerity, lead-by-example policies and programs are a proven strategy for improving the operational efficiency and economic performance of states' assets. Lead-by-example initiatives also reduce the negative environmental and health impacts of high energy use and promote energy efficiency to the broader public.

[54] For more information on how municipalities are encouraging building energy disclosure, see Ribeiro et al. (2014) and Cluett and Amann (2013).

STATE BUILDING REQUIREMENTS

States often adopt policies and comprehensive programs to reduce energy use in state buildings. State governments operate numerous facilities, including office buildings, public schools, colleges, and universities, the energy costs of which can account for as much as 10% of a typical government's annual operating budget. In addition, the energy consumed by a state's facilities can account for as much as 90% of its greenhouse gas emissions (EPA 2009). Only a handful of states have not yet implemented an energy efficiency policy for public facilities. Mandatory energy savings targets for new and existing state government facilities are the most widely adopted measures at the state level. These energy savings requirements encourage states to invest in the construction of new, efficient buildings and retrofit projects, lowering energy bills and promoting economic development in the energy services and construction sectors.

To earn points, energy savings targets must commit state government facilities to a specific energy reduction goal over a distinct time period. We gave 0.5 points to states that adopted efficiency requirements for public facilities that exceeded the statewide building energy code. Leadership in Energy and Environmental Design (LEED) standards, while partially focused on energy savings, are not primarily focused on active energy management. The result is that some LEED buildings do not have energy performance that matches their design intentions (Turner and Frankel 2008). Thus, states with above-code LEED requirements for public buildings received credit only if they specifically emphasized energy efficiency in their policy.

BENCHMARKING REQUIREMENTS FOR PUBLIC BUILDINGS

Proper building energy management is a critical element of successful energy efficiency initiatives in the public sector. Benchmarking energy use in public-sector buildings through tailored or widely available tools such as ENERGY STAR Portfolio Manager ensures a comprehensive set of energy-use data that can drive cost-effective energy efficiency investments.[55] Comparing building energy performance across agencies can also help prioritize energy efficiency projects.

Through benchmarking policies, states and cities require that all buildings undergo a regular energy audit or have their energy performance tracked using a recognized tool such as Portfolio Manager. These policies were awarded 0.5 points. Large-scale public-sector energy benchmarking programs could also qualify for the 0.5 points.

ENERGY SAVINGS PERFORMANCE CONTRACTING POLICIES AND PROGRAMS

If state governments have the necessary support, leadership, and tools in place, they can help projects overcome information and cost barriers to implementation by financing energy improvements through energy savings performance contracts (ESPCs). The state may enter into an ESPC with an energy service company (ESCO), paying the company for its services with

[55] Some states have their own databases of public building energy use that integrate with the ENERGY STAR Portfolio Manager. For example, Maryland's EnergyCap database compiles the energy use (based on utility bills) of all public buildings in the state and provides a means of comparing buildings owned by different state agencies.

money saved by installing energy efficiency measures. A designated state agency may serve as the lead contact for implementing the contract.[56]

We based scores for ESPC activities on three metrics: support, leadership, and tools. To promote performance contracting, states must provide an enabling framework (support), in addition to the guidance and resources (leadership and tools) to get these projects off the ground. ACEEE considered limiting credit in this category to states that have provided both the framework and the tools but ultimately decided to maintain last year's methodology by awarding 0.5 points to a state if it satisfied at least two of the three criteria. Table 34 describes qualifying actions.

Table 34. Scoring of ESPC policies and programs

Criterion	Qualifying action
Support	The state explicitly promotes the use of ESPCs to improve the energy efficiency of public buildings through statutory requirements, recommendations, or explicit preference for using ESPCs; executive orders that promote or require ESPCs; and/or financial incentives for agencies seeking to use ESPCs.
Leadership	The state houses a program that directly coordinates energy savings performance contracting, or a specific state agency serves as lead contact for implementing ESPCs.
Tools	The state offers documents that streamline and standardize the ESPC process, including a list of prequalified service companies, model contracts, and/or a manual that lays out the procedures required in order for state agencies to utilize ESPCs.

States must satisfy at least two of the three criteria above to receive credit.

EFFICIENT FLEETS

In addition to lead-by-example initiatives in state government buildings, many states also enact policies encouraging or requiring efficient vehicle fleets to reduce fleet fuel costs and hedge against rising fuel prices. Collectively, state governments own approximately 500,000 vehicles, with a median fleet size of about 3,500. Operation and maintenance costs for these fleets every year exceed $2.5 billion nationwide, ranging from $7 million to $250 million per state (NCFSA 2007). In response to this cost, states often adopt an efficiency standard specifically for state vehicle fleets, not only reducing fuel consumption but avoiding GHG emissions as well.

For this category, states received credit only if the plan or policy for increasing the efficiency of the state's fleet contained a specific, mandatory requirement. For example, states could qualify for 0.5 point if fleet policies specified fuel economy improvements that exceeded existing corporate average fuel economy (CAFE) standards. Other policies that earned the half point include binding goals to reduce petroleum use by a certain amount over a given time frame, meaningful GHG reduction targets for fleets, and procurement requirements for hybrid-electric or all-electric vehicles. This metric may need revisiting because state adoption of such targets does not guarantee they will be achieved. We will continue to seek data on state progress toward meeting these goals. We did not credit requirements for the procurement of alternative-fuel vehicles because they may not result in improved fuel economy.

[56] For a full discussion of ESPCs, the ESCO market, and actual implementation trends, see Satchwell et al. 2010 and the National Association of Service Companies' website, www.naesco.org/.

SCORES FOR LEAD BY EXAMPLE

We based our review of states' lead-by-example initiatives on information from the Database of State Incentives for Renewables and Efficiency (DSIRE 2015), a survey of state energy officials, and independent research. As outlined above, states could earn up to 2 points in the lead-by-example category: 0.5 points each for energy savings targets in new and existing state buildings, benchmarking requirements for public facilities, energy savings performance contract activities, and fleet fuel efficiency mandates.

Many states demonstrate leadership in energy efficiency policy through the development of state energy plans. Often a governor will issue an executive order or form a planning committee to evaluate state energy needs, goals, and opportunities. Sometimes a legislature will initiate this process. These actions are an important part of establishing a statewide vision for energy use. Recently Virginia, Massachusetts, Michigan, Missouri, Nebraska, New York, and Utah completed such plans or began the process for their development.[57] We do not award points purely on the basis of the development of a state energy plan, but we do consider the formal executive orders and policies arising from them within our scoring categories. Table 35 presents states' scores for lead-by-example initiatives.

Table 35. State scoring on lead-by-example initiatives

State	New and existing state building requirements	Benchmarking requirements for public buildings	ESPC policies and programs	Efficient fleets	Score (2 pts.)
Alabama	•	•	•	•	2
California	•	•	•	•	2
Connecticut	•	•	•	•	2
Delaware	•	•	•	•	2
Illinois	•	•	•	•	2
Massachusetts	•	•	•	•	2
Minnesota	•	•	•	•	2
Montana	•	•	•	•	2
New Hampshire	•	•	•	•	2
New Mexico	•	•	•	•	2
North Carolina	•	•	•	•	2
Texas	•	•	•	•	2
Utah	•	•	•	•	2
Vermont	•	•	•	•	2
Washington	•	•	•	•	2
Arkansas	•	•	•		1.5
District of Columbia	•	•		•	1.5
Georgia	•	•	•		1.5
Hawaii		•	•	•	1.5
Kansas	•	•	•		1.5

[57] For more information on states with active energy plans, visit the National Association of State Energy Officials' website, www.naseo.org/stateenergyplans.

State	New and existing state building requirements	Benchmarking requirements for public buildings	ESPC policies and programs	Efficient fleets	Score (2 pts.)
Kentucky	•	•	•		1.5
Maine	•		•	•	1.5
Maryland	•	•	•		1.5
Michigan	•	•	•		1.5
Mississippi		•	•	•	1.5
Missouri	•		•	•	1.5
Nevada	•	•	•		1.5
New York	•	•	•		1.5
Oregon	•	•	•		1.5
Puerto Rico	•	•	•		1.5
Rhode Island	•	•	•		1.5
South Carolina	•	•	•		1.5
Tennessee		•	•	•	1.5
Wisconsin	•		•	•	1.5
Alaska	•	•			1
Arizona	•		•		1
Colorado		•	•		1
Florida			•	•	1
Iowa	•	•			1
Louisiana	•		•		1
New Jersey		•	•		1
Oklahoma	•	•			1
Pennsylvania	•		•		1
Virginia		•	•		1
Guam		•			0.5
Idaho			•		0.5
Indiana	•				0.5
Nebraska		•			0.5
Ohio		•			0.5
South Dakota		•			0.5
US Virgin Islands			•		0.5
Wyoming			•		0.5
North Dakota					0
West Virginia					0

Lead-by-Example Initiatives: Leading and Trending States

Connecticut. Connecticut's energy reduction plan (CGS §16a-37u) requires state agencies to establish a baseline, identify energy savings opportunities, implement energy efficiency measures, and demonstrate a 20% energy reduction by 2018. Since 2014 the state has required the Department of Energy and Environmental Protection (DEEP) to benchmark energy and water consumption of state-owned or -operated buildings of 10,000 square feet or greater and to make these data public. To help with these efforts, the Institute for Sustainable Energy runs a benchmarking help desk, providing towns, state agencies, and schools training and technical assistance on benchmarking and the use of ENERGY STAR Portfolio Manager. Additionally, in 2015, Connecticut tightened its High Performance Building Performance Standard, requiring state construction and renovation projects to achieve a score of 75 or greater on EPA's ENERGY STAR Target Finder tool.

Massachusetts. Massachusetts has several green building programs targeting state buildings. All public buildings must reduce energy consumption 35% by 2020, relative to a 2004 baseline (Executive Order 484). The state is in the process of revamping its Enterprise Energy Management System (EEMS), which enables it to measure real-time energy use and compare buildings across a large portion of the state's portfolio. Another tool, MassEnergyInsight, provides localities monthly energy consumption data and helps them identify savings opportunities. Massachusetts's Green Communities Act requires 50% of the state's fleet to consist of hybrid or alternative-fuel vehicles by 2017.

Minnesota. Over the past decade, the state of Minnesota has shown its commitment to sustainable buildings by providing leadership, setting high performance standards, and implementing an integrated framework of programs that provide a comprehensive system for designing, managing, and improving building energy performance. Beginning with aggressive standards for state buildings based on the long-term goal of having a zero-carbon building stock by 2030, the state offers a complementary benchmarking program for tracking energy use and the Public Building Enhanced Energy Efficiency Program for helping to implement retrofits. Additionally, new on-road vehicles must also have a fuel efficiency rating that exceeds 30 mpg for city usage and 35 mpg for highway usage.

Mississippi. In 2013 the Mississippi Energy Sustainability and Development Act went into effect, requiring all state agencies to report energy consumption or face penalties. State agencies work with the Mississippi Development Authority Energy and Natural Resources Division to develop energy management plans. The state also set a goal of achieving 20% energy savings in public university facilities by 2020. To reach its energy savings goals, the state significantly upgraded its energy codes for both public and private buildings. Mississippi requires all state vehicles to meet fuel economy standards of at least 40 mpg.

Kentucky. With more than $750 million in ESPC investments since enabling legislation in 1996, Kentucky has one of the largest performance contracting industries in the nation. Through the Local Government Energy Retrofit Program, the Kentucky Department for Energy Development and Independence is working with the Kentucky Department for Local Government to facilitate energy efficiency in smaller municipalities through ESPC. All state-supported universities and colleges in the state community and technical college system have ESPCs. The state also tracks real-time energy savings in state buildings and makes these data publicly available through the Kentucky Energy Dashboard.

Research and Development

Research and development (R&D) programs drive advances in energy-efficient technologies, and states play a unique role in laying the foundation for such progress. By leveraging resources in the public and private sectors, state government programs can foster collaborative efforts and rapidly create, develop, and commercialize new energy-efficient technologies. These programs can also encourage cooperation among organizations from different sectors and backgrounds to further spur innovation.

Not only do state R&D efforts provide a variety of services to create, develop, and deploy new technologies for energy efficiency, but they address a number of failures in the energy services marketplace that impede the diffusion of new technologies (Pye and Nadel 1997). In response to the increasing need for state initiatives in energy-related R&D, several state institutions established the Association of State Energy Research and Technology Transfer Institutions (ASERTTI) in 1990. Members of ASERTTI collaborate on applied R&D and share technical and operational information with a strong focus on end-use efficiency and conservation.

Aside from those institutions affiliated with ASERTTI, numerous other state-level entities (including universities, state governments, research centers, and utilities) fund and implement R&D programs to advance energy efficiency throughout the economy. Such programs include research on energy consumption patterns in local industries and development of energy-saving technologies at state or university research centers and through public–private partnerships.

Individual state research institutions provide expertise and knowledge policymakers can draw from in order to advance successful efficiency programs. These institutions enable valuable knowledge spillover to other states through the sharing of information—facilitated through membership in ASERTTI—allowing states to benefit from one another's research. States without R&D institutions can use this shared information as a road map to begin or advance their own efficiency programs. Even leading states can improve or add to their R&D efforts by drawing from the programs and best practices of other states.

SCORES FOR RESEARCH AND DEVELOPMENT

We reviewed state energy efficiency R&D institutions based on information collected from a survey of state energy officials and other, secondary research. This research complemented information we previously collected from the *National Guide to State Energy Research Centers* (ASERTTI 20123). In our scoring of this metric, we awarded 0.5 point for each major state government-funded R&D program dedicated to energy efficiency, including programs administered by state government agencies, public–private partnerships, and university programs, and a maximum of 1.5 points.[58] Because R&D funding often fluctuates and it is difficult to determine the dollar amount that specifically supports energy efficiency, we do not currently score R&D based on program funding or staffing levels. We recognize that the presence of an R&D institution does not guarantee the deployment of technologies being

[58] Institutions that focus primarily focus on renewable energy technology or alternative-fuel RD&D do not receive credit in the *Scorecard*. In addition, programs that serve primarily an educational or policy development purpose also do not receive points.

developed or the achievement of actual energy savings. In future *Scorecard*s we will seek ways to refine this metric through additional quantitative data.

Table 36 presents the results. For expanded descriptions of state energy efficiency R&D program activities, visit ACEEE's State and Local Policy Database (ACEEE 2015).

Table 36. State scoring on R&D programs

State	Major R&D programs	Score (1.5 pts.)
California	California Energy Commission's Electric Program Investment Charge (EPIC) and Natural Gas Research and Development Program; University of California–Davis's Center for Water–Energy Efficiency and Energy Efficiency Center; University of California–Berkeley's Center for the Built Environment; University of California–Los Angeles's Center for Energy Science and Technology Advanced Research and Smart Grid Energy Research Center	1.5
Colorado	Colorado State University's Engines and Energy Conversion Lab and Institute for the Built Environment; University of Colorado–Boulder's Renewable and Sustainable Energy Institute; Colorado School of Mines' Research in Delivery, Usage, and Control of Energy; Center for Renewable Energy Economic Development; Colorado Energy Research Collaboratory	1.5
Florida	University of Central Florida's Florida Solar Energy Center; Florida State University's Energy and Sustainability Center; University of Florida's Florida Institute for Sustainable Energy; University of South Florida's Clean Energy Research Center; University of Florida's Florida Energy Systems Consortium; Renewable Energy and Energy Efficient Technologies Grant Matching Program; University of West Florida's Community Outreach, Research and Education	1.5
Illinois	University of Illinois at Chicago's Energy Resources Center; Illinois Sustainable Technology Center; University of Illinois Urbana–Champaign's Department of Urban and Regional Planning and Smart Energy Design Assistance Center	1.5
Minnesota	Conservation Applied Research and Development Program; University of Minnesota's Center of Diesel Research; Center for Sustainable Building Research; Center for Energy and Environment's Innovation Exchange	1.5
Nebraska	Nebraska Center for Energy Sciences Research; Energy Savings Potential program; University of Nebraska Utility Corporation	1.5
New York	New York State Energy Research and Development Authority; State University of New York's Center for Sustainable & Renewable Energy; Syracuse University's Building Energy and Environmental Systems Laboratory; City University of New York's Institute for Urban Systems; Albany State University's Energy and Environmental Technology Application Center (E2TAC)	1.5
North Carolina	North Carolina Solar Center; North Carolina A&T State University's Center for Energy Research and Technology; Appalachian State University's Energy Center	1.5
Oregon	Oregon Built Environment and Sustainable Technologies Center; University of Oregon's Energy Studies in Building Laboratory and Baker Lighting Lab; Portland State University's Renewable Energy Research Lab; Energy Trust of Oregon; Oregon Transportation Research and Education Consortium	1.5
Pennsylvania	Lehigh University's Energy Research Center; Penn State University's Indoor Environment Center; Consortium for Building Energy Innovation	1.5

State	Major R&D programs	Score (1.5 pts.)
Wisconsin	Energy Center of Wisconsin; Wisconsin Focus on Energy; University of Wisconsin's Solar Energy Lab	1.5
Connecticut	University of Connecticut's Fraunhofer Center for Energy Innovation; Connecticut Center for Advanced Technology	1
Arizona	Sustainable Energy Solutions Group of Northern Arizona University; Arizona State University's LightWorks Center	1
Georgia	Southface Energy Institute; Georgia Institute of Technology's Brook Byers Institute for Sustainable Systems	1
Iowa	Iowa Energy Center; research support through the Iowa Economic Development Authority	1
Kansas	Studio 804, Inc.; Wichita State University's Center for Energy Studies	1
Maryland	University of Maryland's Energy Research Center; Maryland Clean Energy Technology Incubator	1
Massachusetts	Massachusetts Energy Efficiency Partnership; University of Massachusetts–Amherst's Center for Energy Efficiency and Renewable Energy	1
Missouri	Midwest Energy Efficiency Research Consortium; National Energy Retrofit Institute	1
Tennessee	University of Tennessee's partnerships with Oak Ridge National Laboratory and the Electric Power Research Institute; Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks (CURENT)	1
Texas	Texas A&M's Engineering Experiment Station; University of Texas–Austin's Center for Energy and Environmental Resources	1
Utah	Utah State University; Alliance for Computationally-Guided Design of Energy Efficiency Electronic Materials (CDE3M)	1
Virginia	Southern Virginia Product Advancement Center; R&D Center for Advanced Manufacturing and Energy Efficiency	1
Kentucky	University of Louisville's Conn Center for Renewable Energy Research; Kentucky–Argonne Battery Manufacturing Research and Development Center	1
Alabama	University of Alabama's Center for Advanced Vehicle Technologies	0.5
Alaska	Cold Climate Housing Research Center	0.5
Delaware	University of Delaware's Center for Energy and Environmental Policy	0.5
District of Columbia	Green Building Fund Grant Program	0.5
Hawaii	Hawaii Natural Energy Institute at the University of Hawaii	0.5
Idaho	Center for Advanced Energy Studies	0.5
Indiana	Purdue University Energy Efficiency and Reliability Center	0.5
Maine	Maine Technology Institute (MTI)	0.5
Mississippi	Mississippi State University's Energy Institute	0.5
Nevada	Center for Energy Research at the University of Nevada–Las Vegas	0.5
New Jersey	Edison Innovation Clean Energy Fund	0.5
Ohio	Ohio State University's Center for Energy, Sustainability, and the Environment	0.5
Puerto Rico	Puerto Rico Energy Center	0.5
Rhode Island	Sustainable Energy Program at the University of Rhode Island Outreach Center	0.5

State	Major R&D programs	Score (1.5 pts.)
Vermont	University of Vermont's Smart Grid Research Center	0.5
Washington	Northwest Building Energy Technology Hub	0.5
West Virginia	West Virginia University Energy Institute	0.5

We describe several successful research and development initiatives in greater detail below. Refer to ACEEE's State and Local Policy Database for more information on all the programs listed above.

State Research and Development Initiatives: Leading and Trending States

Colorado. The state of Colorado demonstrates leadership in several areas of energy efficiency. Colorado State University, the University of Colorado, and the Colorado School of Mines have displayed a commitment to energy efficiency by dedicating research centers and facilities to the development of energy efficiency and clean energy technologies. The Center for Renewable Energy Economic Development also plays a major role in Colorado's energy efficiency activities by promoting and supporting new clean-tech companies throughout the state.

New York. The New York State Energy Research and Development Authority (NYSERDA) is a model of an effective and influential research and development institution. Its R&D activities include a wide range of energy efficiency and renewable energy programs organized into seven areas: energy resources, transportation and power systems, energy and environmental markets, industry, buildings, transmission and distribution, and environmental research.

Oregon. Oregon boasts an impressive array of organizations committed to energy efficiency. The Oregon Built Environment and Sustainable Technologies Center promotes cutting-edge technology related to energy efficiency and green buildings, the Energy Trust of Oregon provides funding for the testing of emerging technologies specifically related to utilities, and the Oregon Transportation Research and Education Consortium supports innovation geared toward energy efficiency in land use and transportation.

Florida. Florida's universities host a wide array of energy efficiency research. The University of Florida's Florida Institute for Sustainable Energy performs research on efficient construction and lighting and has more than 150 faculty members at 22 energy research centers. The University of Central Florida's Florida Solar Energy Center focuses on energy-efficient buildings, schools, and standards and has a similarly large faculty. The state created the Florida Energy Systems Consortium to bring universities together to share their energy-related expertise. Eleven universities participate in the working group, conducting research and development on innovative energy systems that lead to improved energy efficiency and expanded economic development for the state.

POSSIBLE NEW METRICS

During the data collection process for the *2015 State Scorecard,* we examined a variety of new metrics that could more accurately and comprehensively reflect state efforts to improve energy efficiency across sectors. This year we attempted to refine our analysis of financial incentives by collecting data on state budgets for incentives and financing programs, participation rates,

verified energy savings, and the leveraging of private capital. To collect these data, we relied on our requests to state energy offices. We tried to collect enough information for each potential metric to include it in our analysis, but the data we received were not robust enough to include. For example, 14 states provided data on savings from incentives and financing programs, but savings data were generally program specific rather than portfolio wide, and in several cases savings were projected rather than verified. States often provided budget data at the agency level and reported participation rates without including the number of eligible customers.

We will continue to investigate the data collection issues surrounding these potential metrics and refine our financial incentives scoring methodology in the future based on data availability.

Green Banks

Green banks are financing institutions that leverage public, private, and/or ratepayer funds to support energy efficiency projects. Green banks and other financing mechanisms that focus increasingly on utilizing private capital are emerging across the country, in states such as California, Connecticut, Maryland, New Jersey, New York, and Rhode Island. At the moment, ACEEE does not capture green bank activities in our financial incentives metric, but we acknowledge the opportunities they present. As energy savings data from these programs become more robust, we welcome feedback from states on the use of green banks to reduce energy use.[59]

[59] For a more detailed discussion of green banks and the states in which they are in development, see the Coalition for Green Capital's website, www.coalitionforgreencapital.com/whats-a-green-bank.html.

Green Banks: Leading and Trending States

Connecticut. Connecticut Green Bank (CGB), formerly the Clean Energy Finance and Investment Authority, is a quasi-public organization created by the state legislature in 2011 as the nation's first green bank. Funding for energy efficiency comes primarily from a system benefit charge, Regional Greenhouse Gas Initiative (RGGI) auction proceeds, and ARRA funds. CGB deployed or approved almost $25 million for projects in 2014. Programs include a loan for energy efficiency and renewable energy home improvement projects. CGB has been a model for green banks in other states and at the national level.

New York. In 2013 Governor Andrew Cuomo launched the $1 billion New York Green Bank (NYGB), placing it within the New York State Energy Research and Development Authority. Initial funding came from RGGI proceeds and repurposed utility surcharges. NYGB leverages private sector funds to address sectors and technologies that lack attractive capital or demand for energy efficiency and renewables.

Rhode Island. The Rhode Island Infrastructure Bank (RIIB), part of Governor Gina Raimondo's FY2016 Jobs Budget, was approved by the state legislature in June 2015. The RIIB proposal renames the state's Clean Water Finance Agency and adds programs dedicated to energy efficiency, such as an Efficient Buildings Fund for improvements to public buildings and a PACE program for commercial and residential properties.

Hawaii. In 2013 the Hawaii legislature authorized the Hawaii Green Energy Market Securitization (GEMS) Program. Hawaii's Department of Business, Economic Development, and Tourism administers GEMS, along with the Hawaii Green Infrastructure Authority, and has issued $150 million in revenue bonds to fund the program. GEMS targets underserved consumers including renters, nonprofits, and people with below-average credit scores.

State Policies to Enable Local Energy Efficiency

Regions, counties, and municipalities have increasingly become active in energy efficiency program development. The energy efficiency policy and program efforts of the largest municipalities are captured in ACEEE's *City Energy Efficiency Scorecard* (Ribeiro et al. 2015). Local efforts to increase efficiency in communities can be supported, and in many cases already have been, through effective collaboration between state and local governments. By working with local governments and stakeholders, state governments can make a strong impact on land use and transportation, residential and commercial buildings, schools, and local government buildings and facilities through technical assistance, financial assistance, and legislative or regulatory mandates (Sciortino 2011). We include a sample of currently enacted policies that enable energy efficiency at the local level in the text box below.[60]

Some metrics in the *State Scorecard* capture non-state efforts, but due to the significant impact state governments can have in enabling local actions, we will explore creating a metric that awards points to states based on the policies and programs they have enacted to assist local governments. The criteria may include any of the following:

[60] For more information on state government programs and policies aimed at local governments, see Sciortino 2011.

- *Technical assistance.* Resources—including guidebooks, online resources, and state staff—dedicated to assisting local government with increasing efficiency in municipal buildings and schools
- *Financial assistance.* Incentives aimed at local governments to increase the efficiency of public facilities
- *Legislative or regulatory requirements.* Requirements promulgated by the state requiring municipal fleets or buildings to achieve specific energy reductions

State Policies that Enable Local Energy Efficiency

Maryland. The Maryland Energy Administration runs the Maryland Smart Energy Communities program, which incentivizes local governments to adopt policies related to the energy efficiency of their buildings and fleets. By participating in this program, local governments set the goal of reducing their fleets' petroleum consumption by at least 20%. More than 50 local governments participate, including the state's largest cities and counties.

Colorado. SB 13-279, passed in 2013, holds K–12 schools to very high efficiency standards. This school efficiency bill aims to create resource-efficient schools that use 33% less energy and 32% less water than their conventional counterparts. Any school receiving state funding must meet the highest energy efficiency standards practicable, including ENERGY STAR or other high-efficiency performance certifications. In addition to new facilities, redesign or renovation projects also must meet these high efficiency standards. Through the Energy Management Assistance Program (EMAP), the Colorado Energy Office provides free technical and programmatic assistance to help Colorado K–12 schools reduce energy use and costs.

Connecticut. In January 2014, the Connecticut Department of Energy and Environmental Protection implemented a new lead-by-example initiative that extends the Small Business Energy Advantage program to state agencies and municipalities interested in installing energy efficiency measures in their buildings. The initiative allows them to pay for these investments on their utility bills, which removes a barrier for the government sector.

Minnesota. In late 2012, the state of Minnesota and the St. Paul Port Authority launched the Energy Savings Partnership (ESP) program to provide local units of government and school districts with low-cost lease purchase agreement (LPA) financing. Using ESP, local government entities and school districts can access LPA financing to invest in energy efficiency projects by leveraging the energy and operational savings attained through the improvements to fund the LPA repayment, thereby allowing projects to be implemented on a budget-neutral basis via the state's Guaranteed Energy Savings Program (GESP) or the Public Buildings Enhanced Energy Efficiency Program (PBEEEP).

Puerto Rico. Municipalities in Puerto Rico must reduce their electrical energy consumption by 5% annually for three years, computed from the average of the highest three consumption years from 2004 to 2014, for a total reduction of 15%.

Nebraska. Nebraska public school districts are eligible for 1% loans of up to $750,000 from the Nebraska Energy Office. They are required to benchmark all school buildings for the term of the loan.

Massachusetts. The Green Communities Grant Program offers funding for communities investing in energy efficiency upgrades and policies, renewable energy technologies, energy management systems and services, and demand-side reduction programs. The program has helped 136 cities and towns earn a Green Community designation, making these energy leaders eligible for state grants.

Chapter 7. Appliance and Equipment Efficiency Standards

Author: Annie Gilleo

INTRODUCTION

Every day in our homes, offices, and public buildings, we use appliances and equipment that are less energy efficient than other available models. While the energy consumption and cost for a single device may seem small, the extra energy consumed by less efficient products collectively adds up to a substantial amount of wasted energy. For example, a battery charger for just one device may waste a small percentage of the electricity it draws. However there are more than 1.7 billion battery chargers in the United States. Real and persistent market barriers, however, inhibit sales of more-efficient models to consumers. Appliance efficiency standards overcome these barriers by initiating change in the manufacturer's—not the consumer's—actions, requiring manufacturers to meet minimum efficiency levels for all products and thereby removing the most inefficient products from the market.

States have historically led the way when it comes to establishing standards for appliances and other equipment. California was the first state to introduce appliance standards, in 1976. Many others, such as New York and Massachusetts, followed soon after. The federal government did not create any national standards until it passed the National Appliance Energy Conservation Act of 1987, whose standards were based on those that had been adopted by California and several other states. Congress enacted additional national standards in 1988, 1992, 2005, and 2007. In general, these laws set initial standards for products and require DOE to review and strengthen standards for specific products. All told, about 60 products are now subject to national efficiency standards.

In June 2013 President Obama set a goal to reduce carbon dioxide (CO_2) emissions by 3 billion metric tons by 2030 through appliance standards. Standards set by DOE since the start of the Obama administration are on track to reduce CO_2 emissions by 2.1 billion metric tons by 2030, with more reductions on the way. Historically we've seen an inverse relationship between standards activity at the federal and state levels. When federal activity picks up, the impetus for states to set standards decreases, and vice versa. We find ourselves in the former position today with a busy DOE schedule and only a handful of states proposing or adopting standards. However California remains the most active in this regard, with emergency legislation updating toilet, faucet, and urinal standards in 2015 and a full slate of standards and labelling regulations in process, pending, or on deck. Colorado also updated its plumbing products standards, having adopted new standards for toilets in 2014. Other states have also begun taking new steps. Massachusetts, New York, Rhode Island, and Washington filed bills this year to add standards for products such as faucets, toilets, urinals, commercial dishwashers, and air purifiers. The legislative process is ongoing in each of the states. We expect more states to consider the adoption of standards once the products in the California pipeline are finalized.

Federal preemption generally prevents states from setting standards stronger than existing federal requirements for a given product. Under the general federal preemption rules applied by the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007, states that set standards prior to federal enactment may enforce their state standards until federal standards become effective; states that have not yet set standards are preempted immediately.

States that wish to implement their own standards after federal preemption must apply for a waiver; however, states remain free to set standards for any products that are not subject to national standards. These additional standards can have significant energy efficiency benefits and set precedents for adopting new standards at other levels of government.

SCORING AND RESULTS

A state could earn up to 2 points for adopting appliance efficiency standards, based on the potential savings in billion British thermal units (BBtus) generated through 2030 by appliance efficiency standards not presently preempted by federal standards. Using a methodology developed by the Appliance Standards Awareness Project (ASAP) and ACEEE (as used in Lowenberger et al. 2012), we normalized the savings estimates, based on the number of residential electricity customers in each state so that the state was ranked on the amount of savings generated per customer. We scored states in 0.5-point increments up to a maximum of 2 points. Table 37 shows the scoring methodology and table 38 shows the results.

Table 37. Scoring of savings from appliance standards

Energy savings per customer through 2030 (BBtu/customer)	Score
100 or more	2
50.0–99.9	1.5
10.0–49.9	1
0.1–9.9	0.5
No energy savings	0

Table 38. State scoring for appliance efficiency standards

State	Energy savings per customer through 2030 (Bbtu/customer	Date most recent standards adopted	Score (2 pts.)
California	150.0	2015	2
Oregon	37.1	2013	1
Connecticut	25.8	2011	1
Washington	8.7	2009	0.5
Arizona	8.5	2009	0.5
District of Columbia	0.7	2007	0.5
Maryland	0.7	2007	0.5
Rhode Island	0.6	2006	0.5
New Hampshire	0.6	2008	0.5
Colorado	NA	2014	0.5
Georgia	NA	2010	0.5
Texas	NA	2010	0.5

Georgia and Texas adopted standards on plumbing products in 2010, as did Colorado in 2014. Since no analysis has yet been completed that estimates savings, we awarded Colorado, Georgia, and Texas 0.5 points since the savings would at least be greater than zero. California was awarded points for plumbing products based on California Energy Commission analysis of associated energy savings. *Sources:* Lowenberger et al. 2012; ASAP website as of July 2015; CEC Docket 15-AAER-01.

Scoring the maximum of 2 points, California continues to lead on appliance efficiency standards, most recently updating standards for plumbing products and fluorescent dimming ballasts, with rulemaking proceedings ongoing for LEDs and small directional lamps, computers, monitors, signage displays, and additional plumbing products. Not only has California adopted the greatest number of standards, but many other states' standards are based on California's, such as the battery charger standards passed in Oregon in 2013. Provided that the standards adopted by the legislature or administrative body are implemented, states will continue to receive points for standards set in earlier years until the product is preempted by federal standards.

It is worth noting that the standards adopted for plumbing products by California, Colorado, Georgia, and Texas, which include standards for toilets, urinals, faucet aerators, showerheads, and commercial prerinse spray valves, will generate a significant volume of water savings. The energy savings come from the reduced need for hot water as well as the energy required to pump and treat both water and wastewater. These standards are particularly important in these four states, which have been experiencing frequent and persistent droughts in their regions at an increasing rate over the past decade.

Leading States: Appliance and Equipment Efficiency Standards

California. California was the first state in the country to adopt appliance and equipment efficiency standards. The authority to adopt appliance and equipment efficiency standards was bestowed upon the California Energy Commission as stipulated under the Warren–Alquist Act, which was enacted in 1974. Over the years, California has adopted standards on more than 50 products, and many have subsequently become federal standards. California's 2006 Appliance Efficiency Regulations became effective on December 30, 2005, replacing all previous versions of the regulations and creating standards for 21 categories of appliances, including both federally regulated and nonregulated appliances. Recent extreme drought conditions prompted Governor Jerry Brown to issue an executive order instructing the California Energy Commission (CEC) to speed up adoption of efficiency standards for faucets, toilets, and urinals. The state has also made progress in the adoption of other standards. In March 2015 the CEC issued a draft proposal for standards for computers, monitors, and displays. In May 2015 the CEC approved a new package of standards and labeling and reporting requirements for HVAC air filters, fluorescent dimming ballasts, and heat pump water chilling packages.

Oregon. Beginning in 2002, Oregon has introduced a number of its own standards, concentrating on some of the most energy-intensive appliances and equipment such as hot tubs, televisions, and other consumer electronics. On June 13, 2013, with the signing of Senate Bill 692, Oregon added three new standards to its books for consumer battery chargers, televisions, and double-ended quartz halogen lamps. This new legislation brings the number of non-preempted standards in the state to seven, second only to California.

Chapter 8. Conclusions

THIS YEAR AND LOOKING AHEAD

The past year has been a time of transition and experimentation for states. Energy efficiency policies and programs have continued to advance at the state level, and a group of leading states remain committed to pursuing the more efficient use of energy in transportation, buildings, and industry. In doing so they are fostering economic development in the energy efficiency services and technology industries and saving money for consumers to spur growth in all sectors of the economy.

At the same time, many states—including both leading states and those in the middle tiers—have been experimenting with new ways to deliver energy efficiency on a wide scale. The capacity of private market forces to deliver energy efficiency has become an increasingly hot topic, as has the role and structure of the monopoly investor-owned utility. States like New York and Minnesota are undergoing dramatic utility restructuring, while Connecticut and Hawaii increasingly look to financing through green banks to deliver energy efficiency.

Amid this experimentation, we have continued to see the role of energy efficiency amplified. Energy savings continue to rise, with states in the Northeast proving that electricity savings of 2%—even upwards of 3%—are possible. California, meanwhile, continues to find new ways to drive funding into its energy efficiency programs, spurred both by state leadership and by state residents. And across the country, states are increasingly emphasizing the role that energy efficiency can play in resiliency efforts, be it through combined heat and power, lower peak load, or more durable and sustainable buildings.

This year's *State Scorecard* also emphasizes the need to consistently update energy efficiency policies and programs to both embrace advancements and bolster existing policy goals. Only a few states have taken major steps toward adopting the most recent iteration of building codes, for example. Over the course of the next several years, it is likely that other states will follow suit, but adoption of these codes sooner rather than later will ultimately increase the resulting energy savings.

With each year comes new challenges. Changing markets for energy have caused utilities in many states to propose high fixed charges that can dim the price signals leading consumers to want to save energy. While regulators in many states have worked to address the concerns of utilities while keeping fixed charges low, this trend points to the need for comprehensive new business models for utilities.

In this year's *State Scorecard*, a wide gap remains between states near the top and those at the bottom of the rankings. A regulatory environment that levels the playing field for energy efficiency—the fastest, cheapest, cleanest energy resource—is critical to capturing the full range of its benefits for states and for consumers.

Several states recommitted to energy efficiency programs in 2015, finalizing long-term visions that will ensure large-scale savings in future years. For example, although legislation in Maryland requiring utilities to meet energy savings goals expired in 2015, the state public service commission issued new savings targets for future years. Pennsylvania, similarly,

finalized its next five-year phase of energy efficiency programs. Delaware took meaningful steps toward establishing energy savings goals led by the newly established Energy Efficiency Advisory Council. Virginia's governor also established a vision for decreasing energy consumption in his State Energy Plan and has convened an advisory committee to develop specific actionable steps to achieve energy savings.

While states have led many of these increased pushes for energy efficiency through the utility sector, there are clear signs that state governments will increasingly look to leverage private capital to fund and deliver energy efficiency programs to consumers. Green banks are now well established in Connecticut and New York, and many other states are following suit. Other financing options, like residential and commercial PACE, are also continuing to gain traction. Over the next few years, states are looking to find the balance between these financing programs and more traditional, ratepayer-funded programs. Ultimately, both private financing solutions and ratepayer-funded energy efficiency programs deliver important energy savings options to the market.

We see signs that many states will continue to raise the bar on their energy efficiency program and policy commitments in 2015 and beyond. Going forward, national policies will have an even greater effect on state-level energy planning. In summer of 2015, the EPA released a final version of its Clean Power Plan, calling on states to reduce emissions under flexible frameworks (EPA 2015). While a few states have made public claims that they will not comply with these rules, many others have begun to plan for their cleaner energy futures. Energy efficiency programs are likely to offer the most cost-effective way of complying with the proposed rules.

Energy efficiency can save consumers money, drive investment across many sectors of the economy, and create jobs. While several states are consistently leading the way on energy efficiency and many more are notably increasing their efforts, there are still many opportunities to sustain current efforts and to continue to scale up. Energy efficiency is a resource that is abundant in every state. Reaping its full economic, energy-security, and environmental benefits will require continued leadership from all stakeholders, including legislators, regulators, and the utility industry.

DATA LIMITATIONS

The scoring framework we used in this report is our best current attempt to represent the myriad efficiency metrics as a quantitative score. Any effort to convert state spending data, energy savings data, and adoption of best-practice policies across six policy areas into one state energy efficiency score has obvious limitations. Here we suggest a few areas for future research that will help refine the *State Scorecard* scoring methodology and more accurately represent the changing landscape of energy efficiency in the states.

One of the most pronounced limitations is access to recent, reliable data on the results of energy efficiency work. Since many states do not gather data on the performance of energy efficiency policy efforts, we have used a best-practices approach to score some policy areas. As an example, it is difficult to score states on building energy code compliance rates because the majority of them do not collect the relevant data. This year we attempted to gather this information during the data collection process, but only about half of the states were able to

provide quantitative data, and many of the results were only rough estimates. The current *Scorecard* expands our best-practices approach in this category, but performance metrics would allow for more objective and accurate assessment. While states should be applauded for adopting stringent building energy codes, the success of these codes in reducing energy consumption is unclear without a way to verify actual implementation.

As in the past, we face a similar difficulty in scoring state-backed financing and incentive programs for energy efficiency investments. Though many states have seemingly robust programs aimed at residential and commercial consumers, few are able to relay information on program budgets or energy savings resulting from such initiatives. As a result, we can offer only a qualitative analysis of these programs. This lack of quantitative data is becoming increasingly pronounced as many states begin pouring financial resources into green banks. Without comparable results on dollars spent and energy saved, it is impossible to judge these programs under the same scrutiny as utility programs are judged.

We would also like to see spending and savings data for energy efficiency programs targeting home-heating fuel and propane. We continue to expand our research on natural gas efficiency programs, and if data were available, we could also examine metrics for fuel oil and propane efficiency.

POTENTIAL NEW SCORECARD METRICS

We have described relevant potential future metrics or revisions to existing metrics in several chapters of this year's *State Scorecard*. While we believe our data collection and scoring methodology are comprehensive, there is always room for modifications. As the energy efficiency market continues to evolve and data become more available, we will continue to adjust each chapter's scoring metrics. Here we present some additional metrics that currently fall outside the scope of our report but that nonetheless indicate important efficiency pathways.

State efficiency programs that fall outside the realm of utility-sector and public benefits programs are one area we hope to assess more comprehensively and quantitatively in future versions of the *State Scorecard*. We hope to recognize state government and regulatory efforts to enable home and business owners to finance energy efficiency improvements through on-bill financing and other innovative incentive programs. As discussed in Chapter 6, one possible metric by which to compare state financial incentives is the level and sustainability of budgets for these programs. This information is available in some cases, but gathering it for all programs will continue to present challenges. We may also be able to compare state energy efficiency R&D efforts on the basis of budgets and staffing levels, but data availability is again an issue.

Internet-connected devices, smart meters, and other intelligent efficiency technologies are proliferating in many states. These devices help overcome informational and motivational barriers to consumer uptake of energy efficiency. Similarly, a new industry is emerging that uses social marketing and social media to encourage consumers to save energy, for example by giving frequent feedback on customer energy use and tailored energy savings tips. Data-focused policies can enable the growth of this promising area of energy efficiency, including state data privacy policies, disclosure policies for building energy use, and data-access policies such as the industry-led Green Button standard. This year, we collected information on data-

access policies for the first time. However we present these data without associated scores. We will continue to consider including these enabling policies in future versions of the *State Scorecard*.

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Appendix A. Respondents to Utility and State Energy Office Data Requests

State/Territory	Primary state energy office data request respondent	Primary public utility commission data request respondent
Alabama	Terri Adams, Division Chief, Alabama Energy Office	Patricia Smith, Manager, Electricity Policy Section, Alabama Public Service Commission
Alaska	Katie Conway, Assistant Manager, Energy Efficiency and Conservation Program, Alaska Energy Authority	---
Arizona	Olivia Doherty, Senior Policy Coordinator, Arizona Energy Office	Ellen Zuckerman, Senior Associate, Southwest Energy Efficiency Project
Arkansas	Mitchell Simpson, Director, Arkansas Energy Office	Eddy Moore, Legal Adviser, Arkansas Public Utility Commission
California	Bill Pennington, Deputy Division Chief, Efficiency and Renewable Energy Division, California Energy Commission	Amy Reardon, Senior Regulatory Analyst, California Public Utility Commission
Colorado	Michael McReynolds, Policy Adviser, Colorado Governor's Energy Office	Data from 2015 Report to the Colorado General Assembly on Demand-Side Management.
Connecticut	Michele Melley, Associate Research Analyst, Connecticut Department of Energy and Environmental Protection	Michele Melley, Associate Research Analyst, Connecticut Department of Energy and Environmental Protection
Delaware	Jessica Quinn, Evaluation, Measurement, and Verification Project Manager, Delaware Department of Natural Resources and Environmental Control	Jessica Quinn, Evaluation, Measurement, and Verification Project Manager, Delaware Department of Natural Resources and Environmental Control
District of Columbia	Edward Yim, Associate Director of Policy & Compliance, District Department of the Environment	Edward Yim, Associate Director of Policy and Compliance, District Department of the Environment
Florida	Kelley Smith Burk, Director, Florida Department of Agriculture and Consumer Services	Shevie Brown, Deputy Executive Director, Division of Economics, Florida Public Service Commission
Georgia	Kristofor Anderson, Energy Assurance Program Manager, Georgia Environmental Finance Authority	Jamie Barber, Energy Efficiency and Renewable Energy Manager, Georgia Public Service Commission
Hawaii	---	Joe Simpkins, Program Operations Manager, Hawaii Energy
Idaho	Jennifer Pope, Senior Energy Specialist, Idaho Office of Energy Resources	Stacey Donohoe, Technical Analyst, Idaho Public Utilities Commission
Illinois	Deirdre Coughlin, Acting Energy Division Manager, Illinois Department of Commerce and Economic Opportunity	Jim Zolnierek, Director of Policy, Illinois Commerce Commission
Indiana	Megan Ottesen, Deputy Director, Energy Efficiency, Renewables, EVs and Nuclear, Indiana Office of Energy Development	Colleen Shutrump, Electric Utility Analyst, Indiana Utility Regulatory Commission

State/Territory	Primary state energy office data request respondent	Primary public utility commission data request respondent
Iowa	Adrienne Ricehill, Program Manager, Iowa Energy Office	Brenda Biddle, Utility Specialist, Iowa Utilities Board
Kansas	---	---
Kentucky	Lee Colten, Assistant Director, Kentucky Department for Energy Development and Independence	Lee Colten, Assistant Director, Kentucky Department for Energy Development and Independence
Louisiana	Paul Miller, Assistant Director, Energy, Louisiana Dept. of Natural Resources	---
Maine	Lisa Smith, Senior Planner, Governor's Energy Office	Laura Martel, Research and Evaluation Manager, Efficiency Maine
Maryland	Lauren Swiston Urbanek, Energy Policy Manager, Maryland Energy Administration	Amanda Best, Regulatory Economist, Energy Analysis and Planning Division, Maryland Public Service Commission
Massachusetts	Sue Kaplan, Director of Marketing and Stakeholder Engagement, Massachusetts Department of Environmental Resources	Sue Kaplan, Director of Marketing and Stakeholder Engagement, Massachusetts Department of Environmental Resources
Michigan	Robert Jackson, Director, Michigan Energy Office	Karen Gould, Staff, Energy Efficiency Section, Michigan Public Service Commission
Minnesota	Jessica Burdette, Supervisor, Conservation Improvement Program, Minnesota Department of Commerce	Jessica Burdette, Supervisor, Conservation Improvement Program, Minnesota Department of Commerce
Mississippi	Larissa Williams, Technical Assistance Manager, Mississippi Development Authority	Brandi Myrick, Director, Electric, Gas & Communications Division, Mississippi Public Utilities Staff
Missouri	Brenda Wilbers, Program Director, Division of Energy	John Rogers, Manager, Energy Unit, Resource Analysis Section, Missouri Public Service Commission
Montana	Bonnie Rouse, Program Manager, Recycling, Energy & Compliance Assistance, Montana Department of Environmental Quality	Margo Schurman, Utility Policy Analyst, Montana Public Service Commission
Nebraska	Danielle Jensen, Public and Legislative Liaison, Nebraska Energy Office	Danielle Jensen, Public and Legislative Liaison, Nebraska Energy Office
Nevada	Kevin Hill, Energy Efficiency Program Manager, Governor's Office of Energy	Cristina Zuniga, Economist, Nevada Public Utility Commission
New Hampshire	Molly Connors, Energy Analyst, New Hampshire Office of Energy and Planning	Jim Cunningham, Utility Analyst, New Hampshire Public Utility Commission
New Jersey	Sherri Jones, Marketing Administrator, New Jersey Board of Public Utilities	Sherri Jones, Marketing Administrator, New Jersey Board of Public Utilities
New Mexico	Jeremy Lewis, Program Development and Management Bureau Chief, New Mexico Energy Office	Heidi Pitts, Utility Economist, New Mexico Public Regulatory Commission

State/Territory	Primary state energy office data request respondent	Primary public utility commission data request respondent
New York	Becky Gagnon, Project Manager, NYSERDA, and Colleen Smith-Lemmon, New York State Department of Transportation	Kanchana Paulraj, Utility Engineer, New York State Department of Public Service, and Rebecca Gagnon, Project Manager, Reporting and Quality Assurance, NYSERDA
North Carolina	Russell Duncan, Program Manager, North Carolina Department of Environment and Natural Resources	Jack Floyd, Engineer, Electric Division, Public Staff, North Carolina Utilities Commission
North Dakota	Andrea Holl Pfennig, Energy Outreach Program Administrator, North Dakota Department of Commerce, and Norlyn Schmidt, Business Planner, North Dakota DOT	Mike Diller, Director, Economic Regulation, North Dakota Public Service Commission
Ohio	Preston Boone, Energy Program Analyst, Ohio Department of Development	---
Oklahoma	Kylah McNabb, Program Manager, Oklahoma State Energy Office	Kathy Champion, Regulatory Analyst, Oklahoma Corporation Commission
Oregon	Diana Enright, Oregon Department of Energy	Elaine Prause, Energy Efficiency Program Manager, Oregon Public Utility Commission
Pennsylvania	Libby Dodson, Energy Efficiency Programs, Office of Pollution Prevention and Energy	Joseph Sherrick, Supervisor, Technical Utility Supervisor, Pennsylvania Public Utility Commission
Rhode Island	Rachel Sholly, Chief, Program Development, RI Office of Energy Resources	Todd Bianco, Principal Policy Associate, Rhode Island Public Utility Commission
South Carolina	Jacob Scoggins, Energy Specialist, South Carolina Energy Office	Stephen Williamson, Electric Utilities Specialist, South Carolina Office of Regulatory Staff
South Dakota	Michele Farris, State Energy Manager, South Dakota Office of the State Engineer	Brian Rounds, Utility Analyst, South Dakota Public Utilities Commission
Tennessee	Molly Cripps, Director, Tennessee Department of Environment and Conservation	Kyle Lawson, Manager, Tennessee Valley Authority
Texas	---	Amy Martin, Manager of Program Design and Evaluation, Frontier Associates
Utah	Jennifer Gardner, Programs and Planning Manager, Utah Office of Energy Development	Jamie Dalton, Commission Utility Economist, Utah Public Service Commission
Vermont	Asa Hopkins, Director of Energy Policy and Planning, Vermont Public Service Department	Asa Hopkins, Director of Energy Policy and Planning, Vermont Public Service Department
Virginia	Barbara Simcoe, Acting Director, Virginia Division of Energy, Department of Mines, Minerals, and Energy	David Eichenlaub, Deputy Director, Division of Energy Regulation, Virginia State Corporation Commission
Washington	Keith Cotton, Demand Management Program Lead, Washington DOT	Juliana Williams, Regulatory Analyst, Conservation and Energy Planning, Washington Utilities and Transportation Commission

State/Territory	Primary state energy office data request respondent	Primary public utility commission data request respondent
West Virginia	Kelly Bragg, Development Specialist, West Virginia Division of Energy	Karen Hall, Public Information Specialist, West Virginia Public Service Commission
Wisconsin	Amber Gray, State Energy Program Manager, Wisconsin Division of Energy Services	Joe Fontaine, Program and Policy Analyst, Public Service Commission of Wisconsin
Wyoming	Sherry Hughes, Energy Efficiency Program Manager, Wyoming State Energy Office, Mineral, Energy & Transportation Division	---
Virgin Islands	---	---
Puerto Rico	---	---
Guam	---	---

Appendix B. Electric Efficiency Program Spending per Capita

State	2014 electric efficiency spending ($million)	$ per capita
Rhode Island	81.1	77.13
Vermont	48.1	76.76
Massachusetts	503.8	75.27
Maryland	319.3	53.86
Connecticut	180.6	50.22
Oregon	159.8	40.65
Washington	279.5	40.09
Iowa	108.5	35.11
California	1237.6	32.29
Minnesota	135.6	25.02
Arkansas	72.2	24.39
Hawaii	33.3	23.74
New Jersey	201.5	22.64
New Hampshire	28.3	21.40
District of Columbia	13.5	20.88
Illinois	265.1	20.58
Utah	57.2	19.72
Idaho	31.7	19.66
Oklahoma	71.9	18.67
Arizona	120.1	18.12
Colorado	95.1	18.05
Michigan	178.2	18.01
Nevada	49.2	17.62
Indiana	111.7	17.00
Maine	22.0	16.56
New York	314.0	15.98
Pennsylvania	197.6	15.47
Montana	15.5	15.27
Wisconsin	75.0	13.06
New Mexico	24.9	11.94
Missouri	67.0	11.09
North Carolina	106.6	10.82
Florida	202.8	10.37
Wyoming	5.3	9.09
Kentucky	39.5	8.98
Tennessee	51.9	7.99
South Carolina	36.5	7.64
Texas	201.3	7.61
Ohio	86.4	7.47
West Virginia	11.0	5.93
South Dakota	4.9	5.80
Nebraska	8.9	4.76
Georgia	36.3	3.63
Alabama	15.1	3.12
Mississippi	8.1	2.71
Delaware	1.9	2.05
North Dakota	0.7	0.92
Louisiana	2.2	0.48
Kansas	0.9	0.30
Virginia	0.8	0.10
Alaska	0.0	0.00
Guam	0.0	0.00
Puerto Rico	0.0	0.00
Virgin Islands	0.0	0.00
US total	$5,920	
Median	$50.53	$15.37

Appendix C. Summary of Large Customer Self-Direct Programs by State

State	Availability	Description
Arizona	Customers of Arizona Public Service Company (APS), Tucson Electric Power Company (TEP), and Salt River Project (SRP)	APS: Large customers using at least 40 million kWh per calendar year can elect to self-direct energy efficiency funds. Customers must notify APS each year if they wish to participate, after which 85% of the customer's demand-side management contribution will be reserved for future energy efficiency projects. Projects must be completed within two years. Self-direction funds are paid once per year once the project is completed and verified by APS. TEP: To be eligible for self-direction, a customer must use a minimum of 35 million kWh per calendar year. SRP: SRP makes self-direction available only to very large customers using more than 240 million kWh per year. For all utilities, a portion of the funds they would have otherwise contributed to energy efficiency is retained to cover the self-direction program administration, management, and evaluation costs.
Colorado	Customers of Xcel Energy and Black Hills	Xcel: The self-direct program is available to commercial and industrial (C&I) electric customers who have an aggregated peak load of at least 2 MW in any single month and an aggregated annual energy consumption of at least 10 GWh, and who are not allowed to participate in other conservation products offered by the company. Rebates are paid based on actual savings from a project, up to $525 per customer kW or $0.10 per kWh; rebates are given for either peak demand or energy savings but not both and are limited to 50% of the incremental cost of the project. Xcel uses raw monitoring results and engineering calculations to demonstrate actual energy and demand savings. Black Hills: To participate in the C&I self-direct program, customers must have an aggregated peak load greater than 1 MW in any single month and aggregated annual energy usage of 5,000 MWh. Rebates and savings are calculated on a case-by-case basis; rebate values are calculated as either 50% of the incremental cost of the project or $0.30 per kWh savings, whichever is lower.
Idaho	Customers of Idaho Power	Idaho Power offers its largest customers an option to self-direct the 4% energy efficiency rider that appears on all customers' bills. Customers have three years to complete projects and have 100% of funds available to fund up to 100% of project costs. Self-direct projects are subject to the same criteria as projects in other efficiency programs.

State	Availability	Description
Illinois	Statewide for natural gas customers based on NAICS code; pilot program for ComEd electric customers	The self-direct provisions in Section 8-104(m) of the Illinois Public Utilities Act are applicable for gas customers that have a North American Industry Classification System (NAICS) code number of 22111 or any number beginning with the digits 31, 32, or 33 and (i) annual usage in the aggregate of 4 million therms or more within the service territory of the affected gas utility or aggregate usage of 8 million therms or more in the state and that are complying with the provisions of item (I) of this subsection (m); or (ii) using natural gas as feedstock and meeting the usage requirements described in item (i) of this subsection (m), to the extent that such annual feedstock usage is greater than 60% of the customer's total annual usage of natural gas. Participants' energy-efficient funds are set aside for their own use, and participants are subject to the oversight of the Illinois Department of Commerce and Economic Opportunity. Currently, self-directing customers make up about 18% of total regulated retail gas sales. There was an additional program being piloted by electric utilities under their Section 8-103 programs that would create similar opportunities for large electric customers, but no customers chose to self-direct in the first year. It is available to ComEd customers in 2015.
Massachusetts	Statewide	A self-direct option is available to the five largest customers in every service territory. Participant activities must meet statewide cost-effective criteria and are subject to EM&V standard practices. Mass Save® program administrators are responsible for program evaluation.
Michigan	Statewide	Self-direct is available to customers based on both aggregate peak demand and peak demand at individual sites. From 2011–2013, the customer must have had an annual peak demand in the preceding year of at least 1 MW at each site or 5 MW in the aggregate at all sites. In 2014 or any year thereafter, the customer must have had an annual peak demand in the preceding year of at least 1 MW in the aggregate at all sites to be covered by the self-directed plan. The customer may recover costs for implementation, review, and evaluation. A mechanism must be established to cover the costs of the low-income energy optimization program. Self-directed plans must be multiyear, must meet or exceed energy optimization performance standards based on annual usage, and are to be incorporated into the relevant provider's energy optimization plans. Once implemented, that customer is exempt from energy optimization charges and is not eligible to participate in the relevant provider's energy optimization programs. These programs are self-certified but subject to Michigan Public Service Commission review. The customer is responsible for self-evaluation, which is approved in the program plan. The information is reported to the utility provider and also subject to commission review. The number of customers electing to self-direct their energy efficiency programs dropped from 77 customers in 2009 to 29 in 2013. This reflects the flexibility and comprehensive program options being offered by the utility provider programs.

State	Availability	Description
Minnesota	Statewide	Minnesota offers a self-direct option, with a full exemption from assigned cost-recovery mechanism (CRM) fees, to customers with 20 MW average electric demand or 500,000 MCF of gas consumption. Customers must also show that they are making "reasonable" efforts to identify or implement energy efficiency and that they are subject to competitive pressures that make it helpful for them to be exempted from the CRM fees. Participating customers must submit new reports every five years to maintain exempt status. The utility is not involved in self-direct program administration; the state Department of Commerce functions as the manager of self-direct accounts and is the arbiter of whether a company qualifies for self-direct and is satisfying its obligations.
Montana	Statewide (all regulated public utilities)	Customers with average monthly demand of 1,000 kW can self-direct universal systems benefits (USB) funds. Self-directing customers are reimbursed for their annual energy efficiency expenditures up to the amount of their annual total of USB rate payments to their utility. The transaction occurs directly between customer and utility, and the utility tabulates and summarizes self-directed funds annually. This does not include specifics or evaluation of efficiency projects. Evaluation of savings claims is not required.
New Jersey	Statewide	Eligible customers must have made a minimum contribution of $300,000 toward New Jersey's Clean Energy Program (NJCEP). Participants are eligible for an incentive of up to 90% of the amount paid into the NJCEP. Applicants are required to include a plan for measurement and verification of energy savings. To date, about 12 customers have participated in the program.
New Mexico	Statewide in the territories of three IOUs	Eligible customers must have electricity consumption of greater than 7,000 MWh per year. Participants can receive credit for up to 70% of the annual energy efficiency rider. An independent program evaluator evaluates the savings using the same criteria and standards as used for the utility's EE programs.
Oregon	Customers of Portland General Electric, PacifiCorp, Idaho Power, and Emerald People's Utility District (PUD)	In the Portland General Electric (PGE) and PacifiCorp service territory, customers must have consumption of greater than 1 average MW (aMW) or 8,760 MWh. In Idaho Power service territory, any commercial and industrial customers can participate. At Emerald PUD the program is open to the two customers in its large customer class. In PGE, PacifiCorp, and Emerald PUD service areas, participants receive credits equal to the cost of completed and approved energy efficiency projects, which are applied against the public purpose charge on the electric utility bills. Emerald PUD customers can also use the credit to request reimbursement for "banked" public purpose charges. Self-direction sites in PGE, Pacific Power, and Emerald PUD service territories are evaluated for savings prior to project implementation. The Oregon Department of Energy conducts these analyses. The number of sites self-directing PGE and Pacific Power service territory are estimated at ~10% of eligible sites. The exact percentage is unknown due to the fact that multiple meters can be combined to create an "eligible site." The analysis of utility customer locations has not been conducted. At Emerald PUD, there are only two sites eligible in the particular customer class, and both are participating.

State	Availability	Description
Utah	Customers of Rocky Mountain Power	Rocky Mountain Power's self-direct program is a project-based rate credit program offering commercial/industrial customers up to an 80% credit for eligible project costs back to customers as a rate credit against the current DSM (Schedule 193) surcharge rate. Customers earn a credit of up to 100% of their CRM charge, but do pay a flat $500/project administrative fee for each self-directed project. Under the Questar Gas ThermWise Business Custom Rebates program, self-directed rebates are available for the installation of energy efficiency measures. Incentives are the lesser of (a) and (b): (a) $10/decatherm for first-year annual decatherm savings as determined solely by the company; (b) 50% of the eligible project cost as determined by the company. Customers can choose to engage in self-direct and more traditional CRM programs simultaneously, provided the different programs are used to deploy different projects.
Vermont	Statewide for both electric and natural gas customers	Electric: Vermont's Self-Managed Energy Efficiency Program (SMEEP) allows an eligible customer to be exempt from the [electric] energy efficiency charge (EEC) provided that the customer commits to spending an average of no less than $1 million per year over a three-year period on energy efficiency investments. SMEEP is open to transmission-class or industrial-class customers that paid an EEC of at least $1.5 million in calendar year 2008. Additionally, an eligible customer must demonstrate that it has a comprehensive energy management program with annual objectives, or demonstrate that it has achieved certification of ISO standard 14001. In addition, the Vermont Public Service Board has established an option for eligible Vermont business customers to self-administer energy efficiency through the use of an energy savings account (ESA) or the Customer Credit Program. The ESA option allows Vermont businesses that pay an EEC in excess of $5,000 total per year (or an average $5,000 total per year over three years) to use a portion of their EEC to support energy efficiency projects in their facilities. Natural gas: The SMEEP program has been extended to cover natural gas. It is available only to transmission and industrial electric and natural gas ratepayers. Customer efficiency charges for electric usage must be a minimum of $1.5 million. To receive the exemption from the natural gas efficiency bill charges, the customer must make an additional energy efficiency investment of not less than $55,000. For both electric and natural gas self-directing customers, the Department of Public Service and the Public Service Board provide the oversight and evaluation for SMEEP and ESA participants, as part of their overall EM&V of utility efficiency programs. There is one eligible SMEEP customer, and it participates in both electric and natural gas programs. There are two participants in the ESA program (out of more than 100 eligible firms) and one participant (which is likely the only eligible firm) in the similar Customer Credit Program.

State	Availability	Description
Washington	All utilities have the option to develop self-direct options for industrial and commercial customers, but of the IOUs, only Puget Sound Energy has developed a self-direct program	Puget Sound Energy's self-direct program is available only to industrial or commercial customers on electric rate-specific rate schedules. The self-direct program operates on a four-year cycle comprising two phases, noncompetitive and competitive. During the noncompetitive phase, customers have exclusive access to their energy efficiency funds, which are the funds collected over the four-year period. When this phase closes, any unused funds are pooled together and competitively bid on by the members of the self-directed program. Customers receive payment in the form of a check once the project is complete and verified. Participating customers do not receive any rate relief when they complete energy efficiency investments. One hundred percent of projects are pre- and post-verified by the utility. This includes review and revision of savings calculations by the utility to determine incentive levels. The program is included in the third-party evaluation cycle like all other utility conservation programs.
Wisconsin	Statewide	A self-direct option is open to a customer if it meets the definition of a large energy customer according to 2005 Wisconsin Act 141. Under the self-direct option, there is a true-up at the end of the year and the customer receives its contributions back to be used on energy efficiency projects. Evaluation is required under Public Service Commission (PSC) Administrative Code 137. PSC would review the evaluation plan. This option has been available since 2008, but no customers have participated to date.
Wyoming	Customers of Rocky Mountain Power	Rocky Mountain Power offers a self-direct option for customers. The self-direct program is a project-based rate credit program that offers up to an 80% credit of eligible project costs back to customers as a rate credit against the 3.7% CRM charge all customers pay. Customers earn a credit of up to 100% of their CRM charge, but do pay a flat $500 administrative fee for each self-directed project. Customers can choose to engage in self-direct and more traditional CRM programs simultaneously, provided the different programs are used to deploy different projects.

Appendix D. Details of States' Energy Efficiency Resource Standards

State Year enacted Authority Applicability (% sales affected)	Description	Avg. incremental electric savings target per year (2015 onward)	Stringency	Reference	Score
Arizona 2010 Regulatory Electric and nat. gas IOUs, co-ops (~59%)	Electric: Incremental savings targets began at 1.25% of sales in 2011, ramping up to 2.5% in 2016 through 2020 for cumulative annual electricity savings of 22% of retail sales, of which 2% may come from peak demand reductions. Natural gas: ~0.6% annual savings (for cumulative savings of 6% by 2020). Co-ops must meet 75% of targets.	2.5%	Binding	Docket No. RE-00000C-09-0427, Decision 71436 Docket No. RE-00000C-09-0427, Decision 71819 Docket No. RG-00000B-09-0428 Dec. No. 71855	3
Arkansas 2010 Regulatory Electric and nat. gas IOUs (~53%)	Electric: Annual reduction of 0.75% of total electric kWh sales in 2014 and 0.9% in 2015–2016. Natural gas: Annual reduction of 0.4% in 2014 and 0.5% in 2015–2016.	0.9%	Opt out	Order No. 17, Docket No. 08-144-U Order No. 15, Docket No. 08-137-U Order No. 1, Docket No. 13-002-U	1.5
California 2004 and 2009 Legislative Electric and nat. gas IOUs (~78%)	Long-term goals of ~0.9% incremental savings each year through 2020. However specific goals have been adjusted upward in recent years, to ~1.1% of sales in 2015. Demand reduction of 4,541 MW through 2020. Natural gas: 619 gross MMTh between 2012 and 2020. Utilities must pursue all cost-effective efficiency resources.	1.0%	Binding	CPUC Decision 04-09-060 CPUC Decision 08-07-047 CPUC Decision 09-09-047 CPUC Decision 14-10-046 AB 995	1.5

State Year enacted Authority Applicability (% sales affected)	Description	Avg. incremental electric savings target per year (2015 onward)	Stringency	Reference	Score
Colorado 2007 Legislative Electric and nat. gas IOUs (~57%)	Black Hills follows PSCo incremental savings targets of 0.8% of sales in 2011, increasing to 1.35% of sales in 2015. For the period 2015–2020, PSCo must achieve incremental savings of at least 400 GWh per year. Natural gas: Savings targets commensurate with spending targets (at least 0.5% of prior year's revenue).	1.3%	Binding	Colorado Revised Statutes 40-3.2-101, et seq. Docket No. 08A-518E Dec. R09-0542 COPUC Docket No. 12A-100E Dec. R12-0900 Docket 10A-554EG	2.5
Connecticut 2007 and 2013 Legislative Electric and nat. gas IOUs (~94%)	Targets equivalent to incremental savings of ~1.4% per year through 2015. Natural gas: Average annual savings targets of ~60 MMTherms through 2015. Utilities must pursue all cost-effective efficiency resources.	1.4%	Binding	Public Act 13-298 Public Act 11-80 Docket 12-11-04	2.5
Hawaii 2004 and 2009 Legislative Electric Statewide goal (100%)	In 2009, transitioned away from a combined RPS-EERS to a standalone energy efficiency portfolio standard (EEPS) goal to reduce electricity consumption by 4,300 GWh by 2030 (equal to ~30% of forecast electricity sales, or 1.4% annual savings).	1.4%	Binding	HRS §269-91, 92, 96 HI PUC Order, Docket 2010-0037	2
Illinois 2007 Legislative Electric and nat. gas utilities with over 100,000 customers, Illinois Department of Commerce and Economic Opportunity (DCEO) (~88%)	Electric: Legislative targets of 0.2% incremental savings in 2008, ramping up to 2% in 2015 and thereafter. Annual peak demand reduction of 0.1% through 2018. Energy efficiency measures may not exceed an established cost cap. As a result, regulators have approved lower targets in recent years, with incremental electric savings targets varying by utility from ~0.5% to 0.7% per year. Natural gas: 8.5% cumulative savings by 2020 (0.2% annual savings in 2011, ramping up to 1.5% in 2019).	0.7%	Cost cap	SB 1918 Public Act 96-0033 § 220 ILCS 5/8-103	1.5

State Year enacted Authority Applicability (% sales affected)	Description	Avg. incremental electric savings target per year (2015 onward)	Stringency	Reference	Score
Iowa 2009 Legislative Electric and nat. gas IOUs (75%)	Electric: Incremental savings targets vary by utility from ~1.1–1.2% annually through 2018. Natural gas: Incremental savings targets vary by utility, ~0.66–1.2% annually through 2018.	1.2%	Binding	Senate Bill 2386 Iowa Code § 476 Docket EEP-2012-0001	1.5
Maine 2009 Legislative Electric and nat. gas Efficiency Maine (100%)	Electric and natural gas savings of 20% by 2020, with annual savings targets of ~1.6% for electric and ~0.3% for natural gas. Efficiency Maine operates under an all cost-effective mandate.	1.6%	Opt out	Efficiency Maine Triennial Plan HP 1128 – LD 1559	2.5
Maryland 2008; 2015 Legislative through 2015, regulatory thereafter Electric IOUs (99%)	15% per capita electricity use reduction goal by 2015 (10% by utilities, 5% achieved independently). 15% reduction in per capita peak demand by 2015, compared to 2007. After 2015, targets vary by utility, ramping up by 0.2% per year to reach 2% incremental savings.	2.0%	Binding	Md. Public Utility Companies Code § 7-211	3
Massachusetts 2009 Legislative Electric and nat. gas IOUs, co-ops, munis, Cape Light Compact (~86%)	Electric: 1.4% in 2010, 2.0% in 2011, 2.4% in 2012, 2.5% in 2013, increasing to 2.6% by 2015. Natural gas: 0.63% in 2010, 0.83% in 2011, 1.0% in 2012, 1.1% in 2013, increasing to 1.15% by 2015. All cost-effective efficiency requirement.	2.6%	Binding	D.P.U. Order 09-116 through 09-128 D.P.U. Order 12-100 through 12-111	3
Michigan 2008 Legislative Electric and nat. gas Statewide goal (100%)	Electric: 0.3% incremental savings in 2009, ramping up to 1% in 2012 and each year thereafter. Natural gas: 0.10% annual savings in 2009, ramping up to 0.75% in 2012 and each year thereafter.	1.0%	Cost cap	M.G.L. ch. 25, § 21 Act 295 of 2008	1.5

State Year enacted Authority Applicability (% sales affected)	Description	Avg. incremental electric savings target per year (2015 onward)	Stringency	Reference	Score
Minnesota 2007 Legislative Electric and nat. gas Statewide goal (100%)	The nominal standard is 1.5% for both electric and natural gas utilities, adjustable to a minimum of 1% for IOUs. Interim targets of 0.75% were approved for gas utilities over 2010–2012. Gas utilities were approved at the 1% level for the 2013–2015 plans.	1.5%	Binding	Minn. Stat. § 216B.241	2.5
Nevada 2005 and 2009 Legislative Electric IOUs (~62%)	20% of retail electricity sales to be met by renewables and energy efficiency by 2015, and 25% by 2025. Energy efficiency may meet a quarter of the standard through 2014, but allowances phase out by 2025.	0.4%	Binding	NRS 704.7801 et seq.	0
New Mexico 2008 and 2013 Legislative Electric IOUs (68%)	5% reduction from 2005 total retail electricity sales by 2014, and an 8% reduction by 2020.	0.6%	Binding	N.M. Stat. § 62-17-1 et seq.	1
New York 2008 Regulatory Electric and nat. gas Statewide goal (100%)	Electric: Annual savings of ~1% per year through 2015. Under current REV proceedings, utilities have filed proposals for incremental targets varying from 0.4% to 1.2% for the period 2016–2018. No targets have been proposed for NYSERDA. Natural gas: Annual savings of ~0.5% per year through 2015.	0.8%	Binding	NY PSC Order, Case 07-M-0548 NY PSC Order, Case 07-M-0748 NY PSC Case 14-M-0101	1
North Carolina 2007 Legislative Electric Statewide goal (100%)	Renewable Energy and Energy Efficiency Portfolio Standard (REPS) requires renewable generation and/or energy savings of 6% by 2015, 10% by 2018, and 12.5% by 2021 and thereafter. Energy efficiency is capped at 25% of target, increasing to 40% in 2021 and thereafter.	0.4%	Opt out	N.C. Gen. Stat. § 62-133.8 04 NCAC 11 R08-64, et seq.	0

State Year enacted Authority Applicability (% sales affected)	Description	Avg. incremental electric savings target per year (2015 onward)	Stringency	Reference	Score
Ohio 2008, 2014 Legislative Electric IOUs (~89%)	Beginning in 2009, incremental savings of 0.3% per year ramping up to 1% in 2014. A "freeze" in 2015–2016 allows utilities who have achieved 4.2% cumulative savings to reduce or eliminate program offerings.	0.6%	Binding	SB 310 ORC 4928.66 et seq. SB 221	1
Oregon 2010 Regulatory Electric and nat. gas Energy Trust of Oregon (~70%)	Electric: Incremental targets average ~1.3% of sales annually for the period 2015–2019. Natural gas: 0.3% of sales annually for the period 2015–2019.	1.3%	Binding	Energy Trust of Oregon 2009 Strategic Plan	2.5
Pennsylvania 2004 and 2008 Legislative Electric Utilities with more than 100,000 customers (~93%)	Incremental electricity savings targets average ~0.77% per year through 2021. EERS includes peak demand targets. Energy efficiency measures may not exceed an established cost cap.	0.8%	Cost cap	66 Pa C.S. § 2806.1 PUC Order Docket No. M-2008-2069887 PUC Implementation Order Docket M-2012-2289411	1
Rhode Island 2006 Legislative Electric and nat. gas IOUs, munis (~99%)	Electric: Incremental savings of 2.5% in 2015, 2.55% in 2016, and 2.6% in 2017. EERS includes demand response targets. Natural gas: Incremental savings of 1% in 2015, 1.05% in 2016, and 1.1% in 2017. Utilities must acquire all cost-effective energy efficiency.	2.5%	Binding	RIGL § 39-1-27.7 Docket No. 4443	3
Texas 1999 and 2007 Legislative Electric IOUs (~73%)	20% incremental load growth in 2011 (equivalent to ~0.10% annual savings), 25% in 2012, 30% in 2013 onward. Peak demand reduction targets of 0.4% compared to previous year. Energy efficiency measures may not exceed an established cost cap.	0.1%	Cost cap, Opt out	Senate Bill 7 House Bill 3693 Substantive Rule § 25.181 Senate Bill 1125	0

State Year enacted Authority Applicability (% sales affected)	Description	Avg. incremental electric savings target per year (2015 onward)	Stringency	Reference	Score
Vermont 2000 Legislative Electric Efficiency Vermont, Burlington Electric (100%)	Average incremental electricity savings of about 2.1% per year from 2015–2017. EERS includes demand response targets. Energy efficiency utilities must set budgets at a level that would realize all cost-effective energy efficiency.	2.1%	Binding	30 V.S.A. § 209 VT PSB Docket EEU-2010-06	3
Washington 2006 Legislative Electric IOUs, co-ops, munis (~81%)	Biennial and 10-year goals vary by utility. Law requires savings targets to be based on the Northwest Power Plan, which estimates potential annual savings of about 1.5% through 2030 for Washington utilities. All cost-effective conservation requirement.	1.5%	Binding	Ballot Initiative I-937 WAC 480-109 WAC 194-37	2
Wisconsin 2011 Legislative Electric and nat. gas Statewide Goal (100%)	Electric: Savings of 0.66% of annual sales in 2011–2014 and 0.77% of annual sales in 2015–2018. Natural gas: Savings of 0.5% of sales in 2011–2014 and 0.6% in 2015–2018. Energy efficiency measures may not exceed an established cost cap.	0.7%	Cost cap	2005 Wisconsin Act 141 Order, Docket 5-GF-191 Order 9501-FE-120	1.5

Appendix E. Tax Incentives for High-Efficiency Vehicles

State	Tax incentive
Arizona	EV owners in Arizona pay a significantly reduced vehicle license tax—$4 for every $100 in assessed value—as part of the state's Reduced Alternative Fuel Vehicle License Tax program.
California	AB 118 targets medium- and heavy-duty trucks in a voucher program whose goal is to reduce the up-front incremental cost of purchasing a hybrid vehicle. Vouchers range from $6,000 to $45,000, depending on vehicle specifications, and are paid directly to fleets that purchase hybrid trucks for use within the state. California also offers tax rebates of up to $2,500 for light-duty zero-emission EVs and plug-in hybrid EVs on a first-come, first-served basis, effective until 2023.
Colorado	In 2013, Colorado extended to 2021 its financial incentives available for purchasers of high-efficiency vehicles. Consumers can claim up to $6,000 for the purchase of a plug-in or hybrid vehicle. Individuals who convert a personal vehicle to plug-in hybrid technology can claim up to $7,500. Credits are also available for the purchase of all-electric or plug-in electric medium- and heavy-duty vehicles.
Connecticut	Connecticut's Hydrogen and Electric Automobile Purchase Rebate Program provides as much as $3,000 for the incremental cost of the purchase of a hydrogen fuel cell electric vehicle (FCEV), all-electric vehicle, or plug-in hybrid electric vehicle. Rebates are calculated on the basis of battery capacity. Vehicles with a battery capacity of 18 kWh or more earn $3,000, while those with capacities between 7 kWh and 18kWh earn $1,500. Vehicles with batteries smaller than 7 kWh are eligible for a rebate of $750.
Delaware	As part of the Delaware Clean Transportation Incentive Program, plug-in electric vehicles earn a rebate of $2,200.
District of Columbia	The District of Columbia offers a reduced registration fee and a vehicle excise tax exemption for owners of all vehicles with an EPA estimated city fuel economy of at least 40 miles per gallon.
Georgia	An income tax credit is available to individuals who purchase or lease a new electric vehicle. The amount of the tax credit is 10% of the vehicle cost, up to $2,500, and eligible vehicles must meet emissions criteria defined by the Georgia Department of Natural Resources.
Illinois	Residents of Illinois may claim a rebate for 80% of the incremental cost of purchasing an EV (up to $4,000) as part of the Illinois Alternate Fuels Rebate Program.
Louisiana	Louisiana offers an income tax credit equivalent to 50% of the incremental cost of purchasing an EV under the state's alternative-fuel vehicle tax credit program. Alternatively, taxpayers may claim the lesser of 10% of the total cost of the vehicle or $3,000.
Maryland	Purchasers of qualifying all-electric and plug-in hybrid-electric light-duty vehicles may claim up to $3,000 against the vehicle excise tax in the state of Maryland, depending on the battery weight of the vehicle.
Massachusetts	The Massachusetts Offers Rebates for EVs (MOR-EV) program offers rebates of up to $2,500 to customers purchasing plug-in EVs.
New Jersey	All ZEVs in the state of New Jersey are exempt from state sales and use taxes.
New York	The state of New York started the New York Truck Voucher Incentive Program in 2014. Vouchers of up to $60,000 are available for the purchase of hybrid and all-electric class 3–8 trucks.

State	Tax incentive
Pennsylvania	The state's Alternative Fuels Incentive Grant Program provides rebates of up to $3,000 for qualifying electric and plug-in hybrid vehicles.
Puerto Rico	In 2012 Puerto Rico amended the Internal Revenue Code to allow an excise tax reimbursement of up to 65% for buyers of hybrid and plug-in hybrid vehicles. The reimbursement ranges from $2,000 to $8,000 and is available until 2016. Buyers of all-electric vehicles are waived from paying excise tax altogether.
South Carolina	South Carolina offers up to $2,000 in tax credits for the purchase of a plug-in hybrid EV. The credit is equal to $667, plus $111 if the vehicle has at least 5 kWh of battery capacity, and an additional $111 for each additional kWh above 5 kWh.
Tennessee	Plug-in electric vehicles bought after June 2015 qualify for a rebate from the Tennessee Department of Environment and Conservation (TDEC). Dealerships will distribute rebates of $2,500 for all-electric vehicles and rebates of $1,500 for plug-in hybrid vehicles.
Texas	EVs weighing 8,500 pounds or less that are purchased after September 1, 2013, are eligible for a $2,500 rebate.
Utah	Through 2016, all-electric vehicles are eligible for an income tax credit of 35% of the vehicle purchase price, up to $1,500. Plug-in hybrids qualify for a tax credit of $1,000.
Washington	EVs are exempt from state motor vehicle sales and use taxes under the Alternative Fuel Vehicle Tax Exemption Program.

Source: DOE 2015 for all states except Puerto Rico. Data for Puerto Rico obtained by survey from the Puerto Rico Department of Transportation and Public Works.

Appendix F. State Transit Funding

State	FY 2013 funding ($million)	2013 population*	Per capita transit expenditure
Maryland	1,522.10	5,928,814	$256.73
Alaska	181.6	735,132	$246.98
New York	4,465.90	19,651,127	$227.26
Massachusetts	1,392.90	6,692,824	$208.11
Connecticut	474.3	3,596,080	$131.90
New Jersey	1,076.50	8,899,339	$120.96
Delaware	95.3	925,749	$102.91
District of Columbia	454.8	5,000,000	$90.96
Pennsylvania	1,161.10	12,773,801	$90.90
California	3,040.70	38,332,521	$79.32
Illinois	854.7	12,882,135	$66.35
Minnesota	307.7	5,420,380	$56.76
Rhode Island	51.6	1,051,511	$49.10
Virginia	262.3	8,260,405	$31.75
Michigan	271.8	9,895,622	$27.47
Wisconsin	106.5	5,742,713	$18.54
Vermont	7.5	626,630	$11.94
Oregon	40.4	3,930,065	$10.28
Florida	189.3	19,552,860	$9.68
Indiana	57.9	6,570,902	$8.81
North Carolina	84.6	9,848,060	$8.59
Washington	59.9	6,971,406	$8.59
North Dakota	5.3	723,393	$7.32
Tennessee	40.1	6,495,978	$6.17
Wyoming	2.7	582,658	$4.63
Iowa	12.9	3,090,416	$4.17

State	FY 2013 funding ($million)	2013 population	Per capita transit expenditure
New Mexico	7.6	2,085,287	$3.65
Colorado	14	5,268,367	$2.66
Kansas	6	2,893,957	$2.07
Nebraska	2.9	1,868,516	$1.55
West Virginia	2.8	1,854,304	$1.50
Oklahoma	5.8	3,850,568	$1.49
South Carolina	6	4,774,839	$1.26
Texas	31.9	26,448,193	$1.21
Arkansas	3.5	2,959,373	$1.18
Louisiana	5	4,625,470	$1.07
South Dakota	0.8	844,877	$0.91
Ohio	7.3	11,570,808	$0.63
Montana	0.5	1,015,165	$0.54
Mississippi	1.6	2,991,207	$0.53
Maine	0.5	1,328,302	$0.41
Kentucky	1.7	4,395,295	$0.40
Georgia	2.9	9,992,167	$0.30
Idaho	0.3	1,612,136	$0.19
Missouri	0.6	6,044,171	$0.09
New Hampshire	0.1	1,323,459	$0.04
Nevada	0	2,790,136	$0.01
Alabama	0	4,833,722	$0.00
Arizona	0	6,626,624	$0.00
Hawaii	0	1,404,054	$0.00
Utah	0	2,900,872	$0.00

*Population figures represent total area served by transit system. Source: AASHTO 2015.

Appendix G. State Transit Legislation

State	Description of transit legislation	Source
Arkansas	Passed in 2001, Arkansas Act 949 established the Arkansas Public Transit Fund, which directs monies from rental vehicle taxes toward public transit expenditures.	ftp://www.arkleg.state.ar.us/acts/2001/htm/ACT949.pdf
California	California's Transportation Development Act provides two sources of funding for public transit: the Location Transportation Fund (LTF) and the State Transit Assistance (STA) Fund. The general sales tax collected in each county is used to fund each county's LTF. STA funds are appropriated by the legislature to the State Controller's Office. Statute requires that 50% of STA funds be allocated according to population and 50% be allocated according to operator revenues from the prior fiscal year.	www.dot.ca.gov/hq/MassTrans/State-TDA.html
Colorado	Colorado adopted the FASTER legislation in 2009, which created a State Transit and Rail Fund that accumulates $5 million annually. The legislation also allocated $10 million per year from the Highway Users Tax Fund to the maintenance and creation of transit facilities. Colorado subsequently passed SB 48 in 2013, which allowed for the entire local share of the Highway Users Tax Fund (derived from state gas tax and registration fees) to be used for public transit and bicycle or pedestrian investments.	www.leg.state.co.us/clics/clics2009a/csl.nsf/billcontainers/636E40D6A83E4DE987257537001F8AD6/$FILE/108_enr.pdf www.leg.state.co.us/CLICS/CLICS2013A/csl.nsf/fsbillcont3/9D4690717C1FF9DC87257AEE00572392?Open&file=048_enr.pdf
Florida	House Bill 1271 allows municipalities in Florida with a regional transportation system to levy a tax, subject to voter approval, that can be used as a funding stream for transit development and maintenance.	www.myfloridahouse.gov/Sections/Bills/billsdetail.aspx?BillId=44036
Georgia	The Transportation Investment Act, enacted in 2010, allows municipalities to pass a sales tax for the express purpose of financing transit development and expansion.	gsfic.georgia.gov/transportation-investment-act
Hawaii	Section HRS 46-16.8 of the Hawaii Revised Statutes allows municipalities to add a county surcharge on state tax that is then funneled toward mass transit projects.	www.capitol.hawaii.gov/hrscurrent/Vol02_Ch0046-0115/HRS0046/HRS_0046-0016_0008.htm
Illinois	House Bill 289 allocates $2.5 billion for the creation and maintenance of mass transit facilities from the issuance of state bonds.	legiscan.com/gaits/text/70761
Indiana	House Bill 1011 specifies that a county or city council may elect to provide revenue to a public transportation corporation from the distributive share of county adjusted gross income taxes, county option income taxes, or county economic development income taxes. An additional county economic development income tax no higher than 0.3% may also be imposed to pay the county's contribution to the funding of the metropolitan transit district. Only six counties within the state may take advantage of this legislation.	legiscan.com/IN/text/HB1011/id/673339

State	Description of transit legislation	Source
Iowa	The Iowa State Transit Assistance Program devotes 4% of the fees for new registration collected on sales of motor vehicle and accessory equipment to support public transportation.	www.iowadot.gov/transit/funding.html
Kansas	The Transportation Works for Kansas legislation was adopted in 2010 and provides financing for a multimodal development program in communities with immediate transportation needs.	votesmart.org/bill/11412/30514/transportation-works-for-kansas-program%20%28T-Works%20for%20Kansas%20Program%29
Maine	The Maine legislature created a dedicated revenue stream for multimodal transportation in 2012. Through sales tax revenues derived from taxes on vehicle rentals, Maine's Multimodal Transportation Fund must be used for the purposes of purchasing, operating, maintaining, improving, repairing, constructing, and managing the assets of non-road forms of transportation.	www.mainelegislature.org/legis/statutes/23/title23sec4210-B.html
Massachusetts	Section 35T of Massachusetts general law establishes the Massachusetts Bay Transportation Authority State and Local Contribution Fund. This account is funded by revenues from a 1% sales tax.	malegislature.gov/Laws/GeneralLaws/PartI/TitleII/Chapter10/Section35t
Michigan	The Michigan Comprehensive Transportation Fund funnels both vehicle registration revenues and auto-related sales tax revenues toward public transportation and targeted transit demand-management programs.	www.legislature.mi.gov/(S(hlkm5k45i240utf2mb0odtzt))/mileg.aspx?page=getObject&objectName=mcl-247-660b
Minnesota	House File 2700, adopted in 2010, is an omnibus bonding and capital improvement bill that provides $43.5 million for transit maintenance and construction. The bill also prioritized bonding authorization so that appropriations for transit construction for fiscal years 2011 and 2012 would amount to $200 million.	wdoc.house.leg.state.mn.us/leg/LS86/CEH2700.1.pdf
Missouri	Chapter 26 of the Missouri Revised Statutes was passed in 2014 to create a State Transportation Fund to fund non-road and highway transportation projects (largely transit related) using 1% of state sales tax revenues.	www.moga.mo.gov/mostatutes/stathtml/22600002251.html
New York	In 2010 New York adopted Assembly Bill 8180, which increased certain registration and renewal fees to fund public transit. It also created the Metropolitan Transit Authority Financial Assistance Fund to support subway, bus, and rail.	www.ncsl.org/issues-research/transport/major-state-transportation-legislation-2010.aspx#N
North Carolina	In 2009 North Carolina passed House Bill 148, which called for the establishment of a congestion relief and intermodal transportation fund.	www.ncleg.net/sessions/2009/bills/house/pdf/h148v2.pdf
Oregon	Oregon has a Lieu of State Payroll Tax Program that provides a direct, ongoing revenue stream for transit districts that can demonstrate equal local matching revenues from state agency employers in their service areas.	www.oregonlegislature.gov/citizen_engagement/Reports/2008PublicTransit.pdf

State	Description of transit legislation	Source
Pennsylvania	Act 44 of House Bill 1590, passed in 2007, allows counties to impose a sales tax on liquor or an excise tax on rental vehicles to fund the development of their transit systems.	www.legis.state.pa.us/WU01/LI/LI/US/HTM/2007/0/0044..HTM
Tennessee	Tennessee Senate Bill 1471, passed in 2009, calls for the creation of a regional transportation authority in major municipalities. It allows these authorities to set up dedicated funding streams for mass transit either by law or through voter referendum.	state.tn.us/sos/acts/106/pub/pc0362.pdf
Virginia	House Bill 2313, adopted in 2013, created the Commonwealth Mass Transit Fund, which will receive approximately 15% of revenues collected from the implementation of a 1.5% sales and use tax for transportation expenditures.	lis.virginia.gov/cgi-bin/legp604.exe?131+ful+CHAP0766
Washington	In 2012, Washington adopted House Bill 2660, which created an account to provide grants to public transit agencies to preserve transit service.	apps.leg.wa.gov/documents/billdocs/2011-12/Pdf/Bills/Session%20Laws/House/2660.SL.pdf
West Virginia	On April 13, 2013, the West Virginia Legislature passed Senate Bill No. 103, the West Virginia Commuter Rail Access Act. It establishes a special fund in the state treasury to pay track access fees accrued by commuter rail services operating within West Virginia borders. The funds have the ability to roll over from year to year and are administered by the West Virginia State Rail Authority.	www.legis.state.wv.us/Bill_Status/bills_text.cfm?billdoc=SB103%20SUB1%20ENR.htm&yr=2013&sesstype=RS&i=103