THE 2010 STATE ENERGY EFFICIENCY SCORECARD

Maggie Molina, Max Neubauer, Michael Sciortino,
Seth Nowak, Shruti Vaidyanathan, Nate Kaufman, and Anna Chittum

Contributing Authors: Colin Sheppard, Margaret Harper,
Arne Jacobson, and Charles Chamberlin
(Schatz Energy Research Center, Humboldt State University),
and Yerina Mugica (Natural Resources Defense Council)

October 2010

Report Number E107

529 14th Street, N.W., Suite 600, Washington, D.C. 20045
(202) 507-4000 phone, (202) 429-2248 fax, aceee.org

CONTENTS

EXECUTIVE SUMMARY

Introduction

In 2010, states are again demonstrating their growing interest in energy efficiency as a means to bolster the economy, improve energy stability, and drive technology innovation. Governors, state legislators and officials, and citizens increasingly recognize energy efficiency—the kilowatt-hours and gallons of gasoline that we *don't* use thanks to improved technologies and practices—as the cheapest, cleanest, and quickest energy resource to deploy. While the national economy slowly recovers from a recession, Congress continues to move at a glacial pace on major energy and climate legislation, which numerous studies have shown could help to stimulate the economy. Other major national issues have also forced energy and climate into the back seat. In the face of federal inaction, states are adopting aggressive and innovative policies to encourage investments in energy efficiency. As they have over the past few decades, ***states will continue to guide our nation's direction toward a clean energy future to help save consumers money, boost local economies by creating jobs, and improve the environment.***

In this fourth edition of ACEEE's *State Energy Efficiency Scorecard*, we present a comprehensive state energy efficiency policy *Scorecard* to document best practices, recognize leadership among the states, and provide a roadmap for other states to follow. This *Scorecard* can serve as a means of benchmarking state efforts on energy efficiency policies and programs with the goal of encouraging states to continue to raise the bar in their efficiency commitments. While several states have been pursuing energy efficiency for decades and are leading the way, several new leaders are quickly emerging by adopting and implementing innovative new efficiency policies. Still, many states can accomplish much more to encourage energy efficiency and cannot afford to be left behind.

Key Findings

- Despite federal government inaction on climate and energy policy, states are moving forward and advancing energy efficiency policies and programs in an effort to create jobs and stimulate their economies during a period of considerable economic uncertainty.

- States' initiative is evident in our four most-improved states — Utah, Arizona, New Mexico, and Alaska — which have climbed at least eight spots since last year's *Scorecard.* The Southwest region of the U.S. has demonstrated considerable progress. For the first time, Utah and Arizona climbed into the top twenty states. These states and several more that have improved their rankings have made progress in increasing investments in utility energy-saving programs, expanding state government initiatives, and adopting better building codes.

- California has retained its #1 ranking for the fourth year in a row, outpacing all other states in its level of investment in energy efficiency across all sectors of its economy.

- Massachusetts has edged closer to the top spot after improvements in utility efficiency programs, transportation efficiency, availability of state-sponsored initiatives, and major plans to increase the breadth of its efficiency efforts in the next few years.

- State budgets for energy efficiency in 2009 are almost double the level of spending in 2007, increasing from $2.5 billion to $4.3 billion. Reported electricity savings across all states increased 8% between 2007 and 2008 (the most recent available data).

- Twenty-seven states have adopted or have pending Energy Efficiency Resource Standards (EERS) that establish long-term, fixed efficiency savings targets — double the number of states in 2006. These states account for two-thirds of electricity sales in the U.S.

- Twenty states have either adopted or have made significant progress toward the adoption of the latest energy-saving building codes for homes and commercial properties — double the number of states in our *2009 Scorecard*.

- While steady progress on energy efficiency is evident across most of the country, several leading states, including Connecticut, New Jersey, New York, New Hampshire, and the District of Columbia, have made plans to divert millions of dollars of energy efficiency funds to balance the budget or reduce deficits, robbing their citizens of future energy savings and a more secure energy future.

- While federal transportation efficiency policy has progressed significantly this year with the adoption of new fuel economy standards and plans to set standards out to 2025, states are taking the lead to fill in the gaps in transportation opportunities. California, Massachusetts and Washington have implemented transportation-specific greenhouse gas reduction targets while several other states have adopted policies to encourage the creation of compact and transit-oriented communities.

- The injection of more than $11 billion of American Recovery and Reinvestment Act funds directly to state energy efficiency has helped stimulate significant progress in funding and creating new energy-saving programs that are saving consumers' money and putting people to work.

Methodology

This report provides a comprehensive assessment of policy and programs that improve energy efficiency in our homes, businesses, industry, and transportation sectors. The *2010 Scorecard* examines six state energy efficiency policy areas and presents these results in six chapters (1) utility and public benefits programs and policies; (2) transportation policies; (3) building energy codes; (4) combined heat and power; (5) state government initiatives; and (6) appliance efficiency standards. States can earn up to 50 possible points in these six policy areas combined, with the maximum possible points in each area weighted by the magnitude of its potential energy savings impact.

The base year for policy assessment in the *2010 Scorecard* varies by the policy area examined. For example, utility ratepayer-funded energy efficiency programs in Chapter 1 are assessed on budgets for 2009 and energy savings performance in 2008 (the most recent years for which data is available from all states) along with enabling utility policies in place as of July 2010 and forward-looking energy savings targets. Most other categories are based on the current status of policies in 2010.

Readers should note that although we provide individual state rankings, in terms of measuring commitment to energy efficiency policies and programs, the difference between the rankings is most significant among bins of every ten ranks or so rather than among individual ranking. For example, the difference among states listed in the "top ten" is much less significant than the difference between the tier of top ten and the second or third quintile. Figure ES-1 and Table ES-1 sort the state rankings in five "bins," which is the best way for readers to interpret the results of the *2010 Scorecard*. The last column shows the state's change in ranking compared to the *2009 Scorecard*. Readers should note an important caveat: changes in state rankings are due to *both* changes in the scoring methodology as well as changes in state efficiency programs and policies.

To verify the accuracy and comprehensiveness of the policy information and data on which we score the states, we directly reached out to state-level stakeholders whose on-the-ground expertise is invaluable to the accuracy of our *Scorecard*. Officials at state energy offices and public utility commissions were given the opportunity in August to review the material concurrently on the ACEEE State Energy Policy

Database on our Web site[1] and the draft *2010 State Energy Efficiency Scorecard* report. Regional nonprofits and national-level organizations also contributed to the review process.

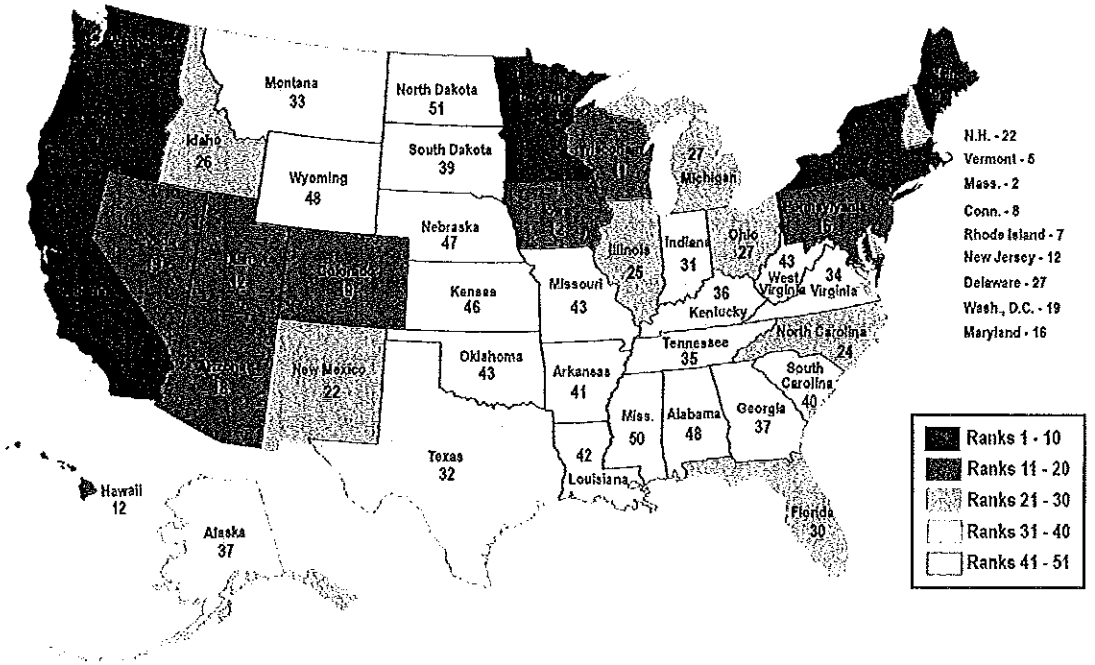
Summary of Rankings

Figure ES-1 shows the results of the state *Scorecard* rankings and classifies the states and the District of Columbia into five bins according to their ranks. Table ES-1 shows scores for each of the six policy areas, overall rankings, total scores out of a maximum possible 50 points, and change in a state's rank compared to last year's report.

The top ten states this year, shown in Table ES-2, score at least 27 points out of the possible 50 points, with California and Massachusetts taking the top two spots with 45.5 and 42.5 points, respectively. The next bin of ten states follows closely behind the top ten in total points, scoring between 22 and 26 points. The third bin of states scores at least 17 points and the fourth bin scores more than 8 points, while states in the lowest bin score 8 points or less.

This year's "top ten" states, based on their combined scores, are listed in Table ES-2, along with the "top ten" states from last year's *Scorecard*. These states lead the nation in encouraging their citizens to improve efficiency in homes, businesses, industry, and transportation systems. The 2010 top ten are mostly the same as in the *2009 Scorecard*. For the fourth year in a row, California has the top score. For the second year in a row, Massachusetts ranks second and this year edges closer to California. Oregon, New York, Vermont, Washington, Rhode Island, Connecticut, Minnesota, and Maine round out the top ten again this year.

Figure ES-1. Map of 2010 State Energy Efficiency *Scorecard* Results



Notes: Several states have the same score and tie for the same ranking, including: 8, 12, 15, 19, 22, 27, 37, and 43. We do not score the U.S. territories due to lack of data, though hope to include them in future rankings.

[1] See www.aceee.org/sector/state-policy.
[2] See www.nrel.gov/cepa for the *State of the States 2009: Renewable Energy Development and the Role of Policy*. A 2010 update is forthcoming.

Table ES-1. Summary of Overall State Scoring on Energy Efficiency

Rank	State	Utility and Public Benefits Fund Efficiency Programs and Policies Score	Transportation Score	Building Energy Code Score	Combined Heat and Power (CHP) Score	State Government Initiatives Score	Appliance Efficiency Standards Score	Total Score	Change in Rank from 2009 Results
	Maximum Possible Points:	*20*	*8*	*7*	*5*	*7*	*3*	*50*	
1	California	18.5	7	7	5	5	3	45.5	0
2	Massachusetts	15.5	6	7	5	7	2.5	42.5	0
3	Oregon	14.5	5	6.5	4	6	1	37	1
4	New York	12	5	6.5	5	4.5	1.5	34.5	1
5	Vermont	19.5	4	3.5	3	3	0	33	1
6	Washington	12.5	6	6	4	2.5	0.5	31.5	1
7	Rhode Island	16	4	5.5	2	1.5	0.5	29.5	2
*8	Connecticut	10.5	5	4	5	2.5	1	28	-5
*8	Minnesota	15	1	4	3	5	0	28	0
10	Maine	10.5	4	6	4	2.5	0	27	0
11	Wisconsin	13	1	4	4	4	0	26	0
*12	New Jersey	7	5	5.5	4	3	0	24.5	1
*12	Hawaii	12	2	4	3	3.5	0	24.5	7
*12	Iowa	12	0	6	2	4.5	0	24.5	6
↑*12	Utah	11.5	2	5	3	3	0	24.5	↑ 11
*16	Maryland	6	5	5.5	3	4	0.5	24	-5
*16	Pennsylvania	4.5	4	6	5	4.5	0	24	-1
↑ 18	Arizona	9	4	3	3	2.5	1.5	23	↑ 11
*19	Nevada	11	0	4	2	2.5	2.5	22	-3
*19	District of Columbia	5	4	6	4	2.5	0.5	22	1
*19	Colorado	10	1	2	4	5	0	22	-3
↑ *22	New Mexico	6.5	2	5.5	4	3.5	0	21.5	↑ 8
*22	New Hampshire	9	0	5.5	2	4.5	0.5	21.5	-9
24	North Carolina	5	0	5	5	5	0	20	2
25	Illinois	5.5	0	5.5	5	2.5	0	18.5	1
26	Idaho	8.5	0	5	2	2.5	0	18	-6
*27	Delaware	1.5	3	5.5	3	4.5	0	17.5	-7
*27	Ohio	4.5	0	3.5	5	4.5	0	17.5	1
*27	Michigan	8	0	4.5	2	3	0	17.5	7
30	Florida	4	2	5.5	3	2.5	0	17	-7
31	Indiana	5.5	0	5.5	3	2.5	0	16.5	1
32	Texas	3	0	3	5	3.5	0	14.5	-9
33	Montana	4	0	6	1	3	0	14	-2
34	Virginia	1.5	1	6.5	0	2.5	0	11.5	0
35	Tennessee	1.5	2	2	1	4.5	0	11	3
36	Kentucky	3.5	0	4	1	2	0	10.5	-3
↑ *37	Alaska	0	1	2	2	5	0	10	↑ 8
*37	Georgia	1.5	1	4.5	0	3	0	10	7
39	South Dakota	4	0	0.5	3	2	0	9.5	-3

Rank	State	Utility and Public Benefits Fund Efficiency Programs and Policies Score	Transportation Score	Building Energy Code Score	Combined Heat and Power (CHP) Score	State Government Initiatives Score	Appliance Efficiency Standards Score	Total Score	Change in Rank from 2009 Results
40	South Carolina	1.5	1	3	1	2	0	8.5	-4
41	Arkansas	1.5	0	3	1	2	0	7.5	0
42	Louisiana	0	0	4	0	3	0	7	-1
*43	Missouri	1.5	0	0	2	2.5	0	6	-2
*43	Oklahoma	1.5	1	1.5	0	2	0	6	-4
*43	West Virginia	0	0	3	1	2	0	6	2
46	Kansas	0.5	0	2	0	2.5	0	5	-7
47	Nebraska	0.5	0	2.5	0	1	0	4	0
48	Wyoming	2.5	0	0	0	1	0	3.5	3
49	Alabama	0	0	0	1	2	0	3	-1
50	Mississippi	0	0	0	1	1	0	2	-1
51	North Dakota	0.5	0	0	1	0	0	1.5	-2

Notes: ↑ denotes "most improved" states. *States with the same score tie for the same rank.

Table ES-2. Top Ten States for the 2010 and 2009 *Scorecards*

2010 Edition		2009 Edition	
1	California	1	California
2	Massachusetts	2	Massachusetts
3	Oregon	3	Connecticut
4	New York	4	Oregon
5	Vermont	5	New York
6	Washington	6	Vermont
7	Rhode Island	7	Washington
8 (tie)	Connecticut	8	Minnesota
8 (tie)	Minnesota	9	Rhode Island
10	Maine	10	Maine

Major Recent Developments

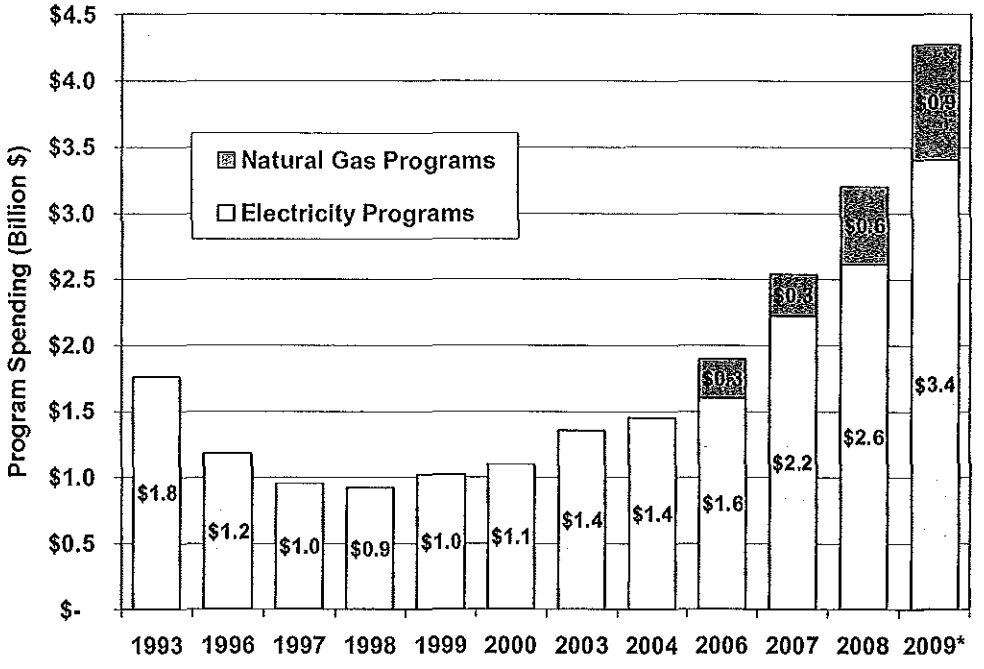
Overall, states have shown significant improvement in their efforts to encourage energy efficiency. For example, states budgeted about $4.3 billion for ratepayer-funded electricity and natural gas efficiency programs in 2009, up from expenditures of $2.5 billion in 2007 on efficiency programs (see Figure ES-3). In 2010, numerous new states adopted leading building energy codes to improve efficiency in all new residential and commercial building construction. Also, 27 states have adopted or have pending an Energy Efficiency Resource Standards (EERS) that establish long-term, fixed efficiency savings targets—double the number of states with this type of policy in 2006.

The American Recovery and Reinvestment Act (ARRA) included the largest single investment in energy efficiency in U.S. history and is a major recent development in state energy efficiency activity. ARRA allocated approximately $30 billion directly to energy efficiency programs and about $12 billion went to the states from the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE). Particularly in states minimally served by utility or public benefits programs, these programs provide an important first step to introduce consumers and decision-makers to the benefits of energy efficiency programs. Chapter 5 reviews state government initiatives, some of which have been spurred by ARRA

funding, that play unique and important roles to encourage energy efficiency. Chapter 2 on building energy codes also shows new activity due to provisions in ARRA on building energy code adoption and compliance efforts.

Despite significant new state budget commitments in energy efficiency, some states are raiding energy efficiency program funds to close gaps in budget shortfalls. For example, Connecticut, the District of Columbia, and New Jersey have approved plans to divert millions of dollars from dedicated energy efficiency funds to help balance state budgets. Also, New York and New Hampshire are both diverting energy efficiency funds from their Regional Greenhouse Gas Initiative (RGGI) auction proceeds. These raids undermine the progress of states that have been national leaders in energy efficiency. Energy efficiency funding can help drive economic recovery by lowering consumer energy costs and freeing up money for consumer spending, while raiding these energy efficiency funds will hurt consumers over the long term, forestall transition to a clean energy economy, and undermine state efforts to achieve aggressive energy efficiency goals. As a result, we will likely see these states drop in the rankings in our *2011 Scorecard.*

Figure ES-3. State-Level Energy Efficiency Program Spending or Budgets by Year, 1993–2009



*All values actual program spending except for 2009, which are budgets.
Notes: Includes ratepayer-funded programs. Natural gas efficiency program spending is not available for 1993–2004.
Sources: Nadel et al. (2000); York and Kushler (2002), (2005); Eldridge et al. (2008), (2009)

"Most Improved" States

This year several new states, particularly from the Southwest region, stand out as "most improved" in the rankings compared to last year. These include: Utah (23rd to tied for 12th); Arizona (29th to 18th); New Mexico (30th to 22nd); and Alaska (45th to 37th). Utah significantly increased its budgets for energy efficiency programs to help customers save electricity and natural gas in their homes and businesses. The state legislature also recently passed goals for energy efficiency and renewable energy. In 2010, Arizona adopted aggressive new electricity savings targets to achieve 2% annual savings beginning in 2014 and by 2020 to reach 20% cumulative savings, relative to 2005 sales. New Mexico climbed eight spots (30th to 22nd) thanks to several measures to improve energy efficiency, including adoption of more stringent building energy codes, performance incentives for utilities administering effective efficiency

programs, and financial incentives for combined heat and power systems. Alaska moved up 8 spots from the fifth to the fourth quintile. The state housing financing authority has recently implemented new initiatives to offer loans and rebates to residential customers and multi-family homeowners' associations for energy efficiency improvements. Several other states have made significant advances that improved the state's rank compared to last year, including Hawaii, Michigan, and Georgia.

Figure ES-3. Most Improved States since 2009 *Scorecard*

2010 Rank	State	Score	Change in Rank from 2009
12	Utah	24.5	↑ 11
18	Arizona	23	↑ 11
22	New Mexico	21.5	↑ 8
37	Alaska	10	↑ 8

Energy Efficiency Performance Metrics by Humboldt State University and the Natural Resources Defense Council (NRDC)

This is the second year that we include in the *Scorecard* a chapter prepared by Humboldt State University and NRDC. Chapter 7 presents and discusses a methodology for an aggregate, state-level metric of energy consumption intensity (ECI) in the residential sector and provides summary results. Whereas the *Scorecard* tracks policy and program actions and results, the methodology in Chapter 7 identifies changes in actual state energy consumption (i.e., energy consumption per capita) after adjusting for changes due to year-to-year variations in weather. The methodology has been revised since the *2009 Scorecard* to account for differences among states in the average heat rate applied to electricity sales to estimate primary energy consumption. This year we report summary results for the years 2006–2008 using the revised methodology.

This research confirms that it is possible to track trends in state energy consumption intensity, even with the imperfect data sets that are currently available. With improvements in the data collection process, the approach could be further strengthened into a powerful tool for evaluating states' progress in reducing energy consumption. The findings from this chapter are not factored into the overall rankings of this *Scorecard*, but serve as an exploratory exercise in measuring energy consumption trends as a means to understanding energy efficiency.

Conclusion

Energy efficiency—the energy we do not need thanks to better technologies and practices—is our cheapest, fastest, and cleanest energy resource. In 2010, states continued to guide our nation's path toward a cleaner energy future through more efficiency. Given this tremendous amount of activity at the state level, it is important to recognize best practices and leadership, both to encourage other states to follow and to lay the groundwork for strong federal policy in the future. This state energy efficiency policy *Scorecard* builds on this need to document and benchmark state best practices, recognize leadership, and provide a roadmap for other states to follow. Each year since 2008, the National Renewable Energy Laboratory (NREL) has completed a similar analysis of renewable energy development and policy best practices.[2] The results of that effort serve as an important complement to this review of energy efficiency policies, which together provide a robust roadmap for states to follow in paving a path toward a cleaner and more reliable energy future.

ACKNOWLEDGMENTS

We thank the Department of Energy (DOE) and the Environmental Protection Agency (EPA) for funding this project. We also thank the many contacts in states and regional organizations, too numerous to list here, who provided information on energy efficiency policies and feedback on a draft of the report. Thank you also to ACEEE colleagues Glee Murray, Suzanne Watson, Dan York, Marty Kushler, Steven Nadel, Neal Elliott, Melanie Feliciano, Renee Nida, and Eric Schwass for their assistance in the final review, production, and media release of the report.

INTRODUCTION

Faced with federal inaction on climate and energy efficiency policy, states are demonstrating leadership and innovation in developing and implementing energy efficiency policies. As long as federal clean energy policy remains unclear, the states will continue to guide our nation's direction in clean energy to save consumers money, boost local economies by creating new jobs, and improve our nation's energy security and the environment. In this report, we present a comprehensive state energy efficiency policy *Scorecard* to document best practices, recognize leadership among the states, and provide a roadmap for other states to follow. The *Scorecard* is an annual publication and can be used to benchmark state efforts on energy efficiency policies and programs each year, with the goal of encouraging states to continue to raise the bar in their efficiency commitments.

In 2007, ACEEE released *The State Energy Efficiency Scorecard for 2006* (Eldridge et al. 2007), the first of its kind to provide a comprehensive approach to scoring and ranking states on energy efficiency policies. Due to the broad interest in the 2007 report and the continued demand for a state-by-state comparison on energy efficiency, we have continued to update the report on an annual basis and present this report as its fourth edition.

ACEEE has a history of producing state *Scorecards* that highlighted utility-sector spending and savings data for energy efficiency programs. The first reports analyzed utility spending on energy efficiency programs in each state, including the *State Scorecard on Utility Energy Efficiency Programs* (Nadel, Kubo, and Geller 2000), a 2002 update (York and Kushler 2002), and 2005 update (York and Kushler 2005). The utility-sector research area constitutes Chapter 1 of this current, more comprehensive *Scorecard* report.

In the report, we first discuss the methodology for scoring states and some caveats. We then present the detailed results in six chapters, one for each policy area that we review:

1. Utility and Public Benefits Programs and Policies
2. Transportation Policies
3. Building Energy Codes
4. Combined Heat and Power (CHP)
5. State Government Initiatives
6. Appliance and Equipment Efficiency Standards

The report also includes a chapter prepared by Humboldt State University and the Natural Resources Defense Council on state energy consumption trends and efficiency performance metrics. The findings of that section are not incorporated into the overall scoring; however, they serve as an important complement to our policy *Scorecard*.

Finally, we present the Discussion and Conclusions. In these sections, we review how several states' rankings have changed compared to the *2009 Scorecard*. By comparing with last year's results, we hope to highlight the most improved states and thus present them as models for other states that are just beginning to implement energy efficiency strategies.

METHODOLOGY

Scoring

To score states on energy efficiency, we identified six overall policy areas pursued by states to encourage energy efficiency. The range of policies works to procure funding for efficiency, set long-term energy savings targets, reduce market and regulatory barriers, establish mandatory codes and standards, and increase public visibility of energy efficiency as an energy resource. We do not report scores for the U.S. territories because the data is unavailable, though we hope to include these in future editions of the *Scorecard*.

Table 1 below shows the six policy categories and the scoring system that assigns a maximum score for each policy category, weighting policy categories based on approximate energy savings impacts (i.e., state policies that are likely to result in the highest energy savings have the highest maximum score). The weighting of policy areas is mostly consistent with last year's scoring, and was informed by ACEEE staff, outside expert judgment, and recent state and regional studies that have evaluated the relative energy savings impacts from state-level policies (WGA 2006; Elliott et al. 2007a, 2007b; SWEEP 2007). For example, the energy efficiency potential studies we reviewed found that utility and public benefits programs could contribute about 40% of the total energy savings potential. Building energy codes, on average, could contribute about 15% of the total savings potential, and improved CHP policies about 10%. We thus attribute 40% of 50 possible points to utility and public benefits program and policy metrics, or 20 points. Similarly, we attribute about 15% of the points, or 7 points, to building energy codes, and 10%, or 5 points, to improved CHP policies. The other policy area points were estimated using the same methodology, then reviewed by expert judgment and adjusted according to review.

Table 1. Overall Methodology: Maximum Scores for each Policy Category

Policy	Maximum Score
1. Utility and Public Benefits Programs and Policies	**20**
Electricity Efficiency Program Budgets	5
Natural Gas Efficiency Program Budgets	3
Annual Savings from Electricity Efficiency Programs	5
Targets (Energy Efficiency Resource Standards)	4
Performance Incentives/Alternative Regulatory Business Models	3
2. Transportation Policies	**8**
3. Building Energy Codes	**7**
Level of Stringency	5
Enforcement/Compliance	2
4. Combined Heat and Power	**5**
5. State Government Initiatives	**7**
Financial and Information Incentives	3
Lead by Example in State Facilities and Fleets	2
Research, Development, and Demonstration	2
6. Appliance and Equipment Efficiency Standards	**3**
Maximum Total Score	**50**

Within each policy category, we then develop a scoring methodology based on a subset of criteria and assign a score for each state based on extensive review and communication with experts in the field. See each policy chapter for a discussion of its methodology.

Changes in Scoring

This 2010 update includes the overall same policy areas and methodology as last year's report. We have updated a few metrics in the utility and public benefits fund programs and policies (Chapter 1). First, we have moved from using actual spending data for electricity and natural gas efficiency programs, which has a two-year data lag, to program budgets, which has only a one-year data lag. For example, this year we score states on their 2009 budgets for energy efficiency programs rather than actual spending that occurred in 2008. By using budget data, we hope to more accurately reflect the fast-paced changes in state energy efficiency program portfolio budgets. While annual budgets have the obvious caveat of being interim values and are subject to change over the course of the year, we believe that inaccuracies in budgets compared to actual spending are more acceptable than two-year-old spending data that misrepresents recent trends in energy efficiency commitments. See Chapter 1 for a discussion of utility sector and public benefits programs.

Next, we increased our scoring thresholds for utility and public benefits energy efficiency program criteria to reflect the increasing scale of best practice programs. For example, last year states earned the maximum 5 points for electricity efficiency program spending if they spent at least 2% of total utility revenues in the state. This year, we updated that threshold so that state budgets have to be at least 2.5% of total utility revenues to receive the maximum points. Similarly, we updated scoring thresholds for the natural gas program budgets and also for electricity program energy savings.

Finally, we revised our scoring methodology for natural gas budgets. Last year, we normalized spending by state population, which tended to reduce the spending effect in states with small natural gas service territories that did not reach the entire state. This year we normalize program budgets to the number of residential natural gas customers, giving a "per customer" figure for natural gas efficiency program budgets.

State Feedback Methodology

This year we again reached out to state-level stakeholders to verify the accuracy and comprehensiveness of the policy information on which we score the states. Officials at state energy offices are given the opportunity in August to review the material concurrently on the ACEEE State Energy Policy Database[3] on our Web site and on the draft *2010 State Energy Efficiency Scorecard* report. Regional nonprofits and other state-level organizations also contribute to the review process.

Data Caveats

The scoring framework described above is our best 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 its obvious limitations. In that light, we present here several important caveats for the reader to note.

Program Budgets and Savings

When available, "hard" data on verified energy savings by state is one of the best metrics for scoring states on energy efficiency. As presented in Chapter 1, some of these data are available for utility-run and third-party-operated statewide programs designed to increase electricity end-use efficiency. An additional data set is spending on programs, which also shows actual commitments to program efforts, though it does not capture how successful programs are in converting dollars spent into actual energy saved. In the past, we reported actual spending data and electricity savings for programs delivered two years prior to the year of the *Scorecard* report because this is the most recent year with available data. We have received significant feedback that two-year-old data on energy efficiency programs is a serious limitation to our state rankings. To improve this limitation, this year we provide budget data for electricity and natural gas efficiency programs in 2009. We also report electricity savings data in 2008.

Readers should note that even this scoring update does not reflect any major changes states made to ratepayer-funded energy efficiency programs in 2010. Many states have plans to dramatically escalate program efforts in 2010. However, while the spending and savings data do not capture these plans, the energy savings targets (also known as Energy Efficiency Resource Standards or "EERS") category does capture aggressive state efficiency goals.

The Consortium for Energy Efficiency's (CEE) *Annual Industry Report*[4] on the energy efficiency industry is a primary source of information for state-level data on energy efficiency funding and it tracks budgets for electricity and natural gas budgets in the U.S. and Canada. This year the CEE data serves as our starting point for tracking state budgets for 2009 efficiency programs. See Chapter 1

[3] See www.aceee.org/energy/state.
[4] See www.cee1.org/ee-pe/2008/.

for further explanation of ACEEE methodology on utility and public benefits energy efficiency programs and how it differs from CEE's *Annual Industry Report.*

"Best Practice" Policy Metrics

Most of the energy efficiency policy areas, unlike the utility and public benefits programs, do not have reported savings or spending data that can be attributed to a particular policy action. For example, *potential* energy savings from building energy codes and appliance efficiency have been documented, although *actual* savings from these policies are rarely evaluated. Therefore, we must rely on "best practice" metrics for these policies. For building energy codes, we rank states according to the level of stringency of their residential and commercial codes. Similar legislation and regulations, however, do not always result in comparable energy savings. If two states have the same building energy code, but one state has twice the level of code compliance, then energy savings attributed to the policy would therefore be twice as great. This year's *Scorecard* attempts to capture some of these differences in building code compliance by reviewing state activity on code compliance surveys and training code officials to improve enforcement. This methodology does not compare actual compliance survey results, though the lack of data on building compliance forced us to develop this alternative approach. In doing so, we hope to encourage states to conduct streamlined compliance evaluations and training for code officials, builders, and contractors, and we hope to rely increasingly on such studies in the future for our scoring methodology. See Chapter 3 for a discussion of building energy codes and compliance.

How to Interpret the Results

Although we provide individual state scores and rankings, we note that the difference between rankings is most significant in "bins" of ten or fifteen, rather than differences between individual rankings. The tiers of ten, as presented in Figure ES-1, are therefore the best way to interpret the results of the *Scorecard.*

CHAPTER 1: UTILITY AND PUBLIC BENEFITS PROGRAMS AND POLICIES

Authors: Maggie Molina, Seth Nowak, and Michael Sciortino

Background

A wide range of energy efficiency programs are administered and delivered by utilities or statewide independent program administrators. Utility ratepayers fund these programs, either through utility cost recovery or statewide "public benefits funds." Utilities and third-party program administrators in some states have been delivering energy efficiency programs for decades, and offer various efficiency services for residential, commercial, industrial, and low-income customers. These services include a variety of financial incentives such as rebates and loans, technical services such as audits and retrofits, or broad scale education campaigns on the benefits of energy efficiency improvements.

For this policy area, we review performance metrics (i.e., 2009 program budgets and energy savings results from 2008-year programs) and enabling policies (energy savings targets and performance incentives as of July 2010). While budget and energy savings data provide a basis for the most recent energy efficiency program activities, enabling policies provide a measure of future commitments. Both types of criteria are important to more fully capture a state's commitment to energy efficiency services, and we thus rank states on both sets of criteria. The five subsets to this policy category are:

- Electricity Program Budgets for 2009
- Natural Gas Program Budgets for 2009
- Incremental Electricity Program Savings in 2008
- Energy Savings Targets, i.e., Energy Efficiency Resource Standards (EERS)
- Performance Incentives and Alternative Regulatory Business Models

Methodology

Combined, a state can earn up to 20 points in this category, or 40% of the total possible 50 points. Among efficiency programs, studies suggest that electric programs typically achieve three times as much primary energy savings as natural gas programs (Eldridge et al. 2009; SWEEP 2007). We thus allocate 10 points of this category to electric program metrics (annual budgets and savings data) and 3 points to natural gas program metrics (annual budgets). Energy savings data for natural gas programs are not tracked through a national clearinghouse and are not readily reported by states, so we therefore do not currently include these data in the scoring. Similarly, programs that save home heating fuel or propane do not systematically report energy savings. In future editions of the *Scorecard*, we plan to examine metrics for energy savings from natural gas, fuel oil, and propane efficiency.

We report 2009 program budgets for electricity and natural gas programs and electricity savings data for 2008-year programs because these are the most recent data available for all 50 states and the District of Columbia. Supporting policies, such as mandatory energy savings targets and utility incentives and removal of disincentives, are also critical to leveraging energy efficiency funding and encouraging savings over the near and long term. Data on Energy Efficiency Resource Standards and utility incentives and removal of financial disincentives (decoupling) are from ACEEE research that relies on several sources and selected state and utility program annual reports and related documents (AGA 2010; IEE 2010). Combined, seven points are allocated to these supporting state policies to emphasize their role in encouraging efficiency and to capture recent activity that is not otherwise covered by 2009 budget and 2008 savings data. See Table 2 for a summary of state scoring in the five subsets to this policy category.

Shift to Budget Data Instead of Spending Data

This year, we modified the way we score the states for this policy category to capture more recent program trends by ranking states on *their program budgets rather than actual spending.* The budget data comes from a number of sources, principally from The Consortium for Energy Efficiency's *Annual Industry Report* (CEE 2010) and ACEEE's recent national survey of utility and public benefits fund natural gas efficiency programs (Friedrich et al. 2010), and supplemented by information from individual contacts in several states. As we move to more current program budget data, readers should note several caveats as well as differences between our budget data and the CEE industry data. First, CEE includes load management program spending in its overall electric program budgets, whereas we exclude these program budgets.

Next, several states in the CEE budget data set were noted as missing data from at least one program administrator or had no administrator reporting data. ACEEE reached out to individual contacts in each of these states to seek additional data and therefore some program budgets may differ from those reported in the CEE report. During this feedback process with our state contacts, several states provided *revised budget data* that differed substantially from budget data in CEE's report because programs were delayed or for other reasons fell under budget. Readers should note, however, that we were not able to obtain revised budget from all states. We seek to provide the most accurate and current information on a state's financial commitment to energy efficiency programs, and we therefore choose to rank states on the revised budget data in these cases. See Tables 4 and 6 for detail on which states reported revised budget data.

Even with this updated approach to capture more recent program budget data, our methodology still does not fully capture energy efficiency program activity in 2010. Several states have recently enacted Energy Efficiency Resource Standards or approved major new program portfolios starting in 2010, but this increase in spending is not reflected here because we can only count 2009 budget data. Some states that fall into this category include Pennsylvania, Ohio, Michigan, Illinois, Arizona, and Massachusetts. In addition, several states have planned to divert energy efficiency funds to help reduce deficit or balance the state budget. Next year, we plan to look carefully at how these budget "raids" affect program spending.

Finally, readers should note that new types of funding for energy efficiency are broadening the scope of revenue sources for traditional ratepayer-funded programs. For example, revenues from the Regional Greenhouse Gas Initiative (RGGI) in 10 Northeastern and Mid-Atlantic states partially contribute to energy efficiency program portfolios. To the extent possible, we *excluded* funding from RGGI auction proceeds from ratepayer-funded efficiency program budget data in this chapter because they are generated from a market rather than directly from ratepayers, which is consistent with CEE's methodology. However, because proceeds are often earmarked for energy efficiency portfolios it is important to recognize the efforts that states are making to deliver energy efficiency programs with this new funding source. RGGI funds, however, can also be a target for budget raids as discussed in the next section. Chapter 5 on State Government Initiatives accounts for efforts funded through RGGI proceeds. Similarly, Chapter 5 accounts for applicable funding from the American Recovery and Reinvestment Act (ARRA) that is contributing to energy efficiency programs.

Table 2. Summary of State Scoring on Utility and Public Benefits Programs and Policies

State	Electricity Program Budgets for 2009	Electricity Program Savings for 2008	Gas Program Budgets for 2009	Targets (Energy Efficiency Resource Standards)	Utility Incentives and Removal of Disincentives	TOTAL SCORE	Ranking
Maximum Possible Points:	*5*	*5*	*3*	*4*	*3*	*20*	*NA*
Vermont	5	5	3	4	2.5	19.5	1
California	5	4.5	3	3	3	18.5	2
Rhode Island	5	3	2.5	3	2.5	16	3
Massachusetts	4	2.5	2	4	3	15.5	4
Minnesota	4	3	1.5	4	2.5	15	5
Oregon	4.5	2.5	2.5	3	2	14.5	6
Wisconsin	3	3	3	1	3	13	7
Washington	4.5	2.5	1.5	2	2	12.5	8
Hawaii	3	5	0	3	1	12	9
Iowa	3.5	2.5	3	3	0	12	9
New York	3	1	1	4	3	12	9
Utah	4.5	2.5	3	0	1.5	11.5	12
Nevada	2	4.5	0	2	2.5	11	13
Connecticut	2.5	4.5	1.5	0.5	1.5	10.5	14
Maine	2.5	2.5	2	3	0.5	10.5	14
Colorado	2	1.5	1	3	2.5	10	16
Arizona	1	2	0.5	4	1.5	9	17
New Hampshire	1.5	2.5	2.5	0	2.5	9	17
Idaho	4	3	0.5	0	1	8.5	19
Michigan	1	0	1	3	3	8	20
New Jersey	2	2	2	0	1	7	21
New Mexico	1.5	1	0.5	2	1.5	6.5	22
Maryland	0.5	0.5	0	3	2	6	23
Indiana	0	0	1	3	1.5	5.5	24
Illinois	1	0	0.5	3	1	5.5	24
North Carolina	1	0	0.5	1	2.5	5	26
District of Columbia	1.5	0	2	0	1.5	5	26
Ohio	0	0	1	2	1.5	4.5	28
Pennsylvania	1	0	0.5	3	0	4.5	28
Montana	2	1	0	0	1	4	30
Florida	1	0.5	1	1	0.5	4	30
South Dakota	0.5	0.5	0.5	0	2.5	4	30
Kentucky	0.5	0	0.5	0	2.5	3.5	33
Texas	0.5	0.5	0	1	1	3	34
Wyoming	0.5	0	0.5	0	1.5	2.5	35
Missouri	0.5	0	0.5	0	0.5	1.5	36
Delaware	0	0	0	1	0.5	1.5	36
Georgia	0	0	0	0	1.5	1.5	36
Oklahoma	0	0	0	0	1.5	1.5	36

State	Electricity Program Budgets for 2009	Electricity Program Savings for 2008	Gas Program Budgets for 2009	Targets (Energy Efficiency Resource Standards)	Utility Incentives and Removal of Disincentives	TOTAL SCORE	Ranking
South Carolina	0	0	0	0	1.5	1.5	36
Virginia	0	0	0	0	1.5	1.5	36
Arkansas	0	0	0.5	0	1	1.5	36
Tennessee	0.5	0	0	0	1	1.5	36
Kansas	0	0	0	0	0.5	0.5	44
Nebraska	0.5	0	0	0	0	0.5	44
North Dakota	0	0.5	0	0	0	0.5	44
Alabama	0	0	0	0	0	0	47
Alaska	0	0	0	0	0	0	47
Louisiana	0	0	0	0	0	0	47
Mississippi	0	0	0	0	0	0	47
West Virginia	0	0	0	0	0	0	47

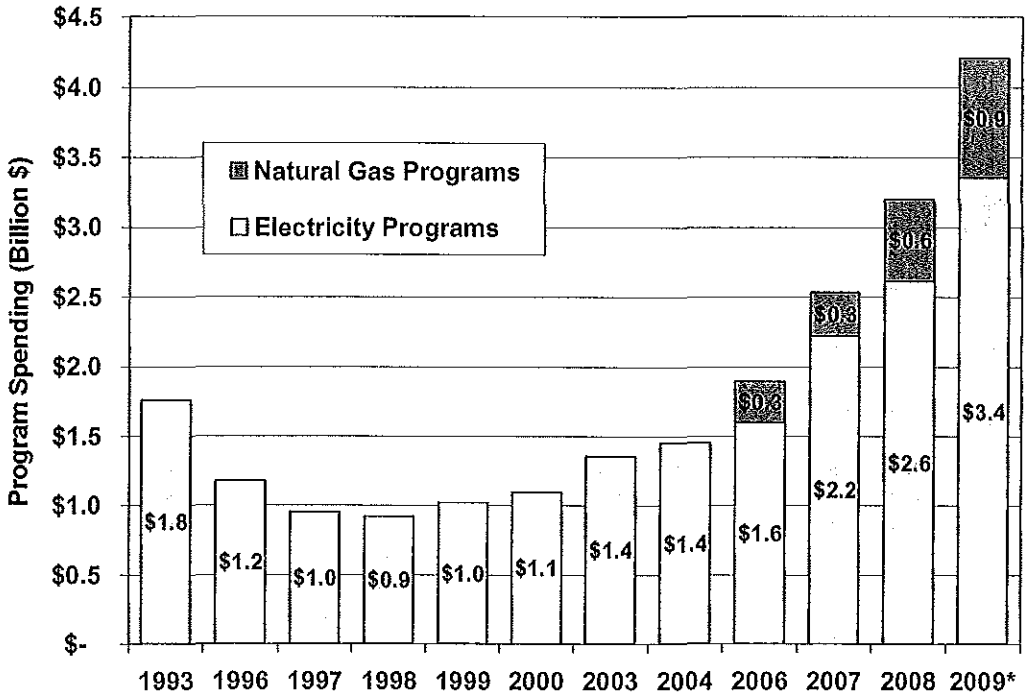
Electricity and Natural Gas Efficiency Program Budgets

The structure and delivery of ratepayer-funded electric energy efficiency programs[5] have changed dramatically over the past two decades, mostly in conjunction with restructuring efforts. In the 1980s and 1990s, such programs were almost the exclusive domain of utilities; they administered and implemented programs under regulatory oversight. With the advent of restructuring, however, numerous states enacted "public benefits" energy programs that in many cases established new structures and tasked new organizations with the responsibility of administering and delivering energy efficiency and related customer energy programs (including low-income energy programs and renewable energy programs). Not all public benefits programs are administered or delivered by non-utility organizations, however. In quite a few cases there is a public benefits funding mechanism, but the funds go to the utilities to administer and implement the programs.

Despite the enactment of public benefits programs in some states, restructuring resulted in a precipitous decrease in funding for ratepayer-funded electric energy efficiency programs, from almost $1.8 billion in 1993 to about $900 million in 1998 (nominal dollars). Principal reasons for this decline included uncertainty about newly restructured markets and the expected loss of cost recovery mechanisms for energy efficiency programs. Generally utilities did not see demand-side programs as being compatible with competitive retail markets. Since then, however, efficiency programs have entered a new era of renewed focus and importance. Since 1998, spending has increased more than three-fold from $900 million to about $2.6 billion in 2008 for electricity programs. And in 2009, total budgets for electricity efficiency programs reached about $3.4 billion. Combined with natural gas program budgets of about $870 million in 2009 (discussed later in this chapter), we estimate total budgets of about $4.3 billion on efficiency programs in 2009 (see Figure 1). And this growth will likely continue over the next decade.

[5] By "ratepayer-funded energy efficiency" programs, we mean energy efficiency programs funded through charges included in customer rates or otherwise paid via 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.

Figure 1. Annual Electricity and Natural Gas Energy Efficiency Program Spending or Budgets



*All values are actual program spending except for 2009, which are budgets. Notes: Includes ratepayer-funded programs. Natural gas efficiency program spending is not available for 1993–2004. Sources: Nadel et al. (2000); York and Kushler (2002), (2005); Eldridge et al. (2008), (2009); Friedrich et al. (2010)

An analysis of state-level energy efficiency policies estimates that ratepayer funding for electric and natural gas energy efficiency programs could rise from $3.1 billion in 2008 to $12.4 billion by 2020 (Barbose, Goldman, and Schlegel 2009). In addition to increased spending, the study also suggests a significant broadening of the national energy efficiency market, with a large portion of the projected spending increase coming from states that have been relatively minor players in the industry (e.g., Illinois, Michigan, North Carolina, Ohio, and Pennsylvania).

Budget Raids

While there is a clear upward trend in state-level energy efficiency program spending, the threat of state budget "raids" in several state capitals is imminent and undermines the progress of states that have been national leaders in energy efficiency. For example, the Connecticut legislature plans to move $30 million from the state's dedicated energy efficiency fund[6] in 2012, about 25% of the fund's total spending (Hartford Business 2010). The District of Columbia City Council voted to divert $6 million from its energy efficiency program to balance the budget (NEEP 2010) and New Jersey diverted $158 million from the state's overall Clean Energy Fund for FY2010 (Philadelphia Inquirer 2010). New Hampshire diverted $3 million of its dedicated efficiency public benefits fund to electrical assistance to low-income customers (NH State Legislature 2010a). While low-income assistance provides a necessary short-term financial support, it undermines the long-term, sustainable support that energy efficiency programs would provide the same customers and help lower their energy bills every month.

Also, New York, New Hampshire, New Jersey and Maryland are diverting energy efficiency funds from their Regional Greenhouse Gas Initiative (RGGI) auction proceeds. New Hampshire diverted

[6] The Connecticut Energy Efficiency Fund (CEEF) is overseen by the state's Energy Conservation Management Board.

$3.1 million (NH State Legislature 2010b), New Jersey diverted $65 million (Philadelphia Inquirer 2010), Maryland reduced the allocation of energy efficiency funding from 46% of RGGI funds to 17.5%[7] (MD Daily Record 2010), and New York has taken half of its RGGI proceeds through 2010 (about $90 million) for the general budget to reduce deficit (NYS 2009).

As the economy slowly recovers and state revenues remain low, states will continue to struggle to balance the budget. Energy efficiency programs, with adequate funding support, can in fact help speed up the economic recovery by lowering consumer energy costs and freeing up money for consumer spending, but raiding the funds will hurt consumers over the long term, forestall transition to a clean energy economy, and undermine states' ability to achieve aggressive energy efficiency targets. In next year's *Scorecard*, several of these states mentioned above could lose ground if the raids result in cuts in energy efficiency programs and services.

Electricity Program Budgets

For this section of the report, we score states on reported annual energy efficiency electricity program budgets for 2009. The data presented in this section are for "ratepayer-funded energy efficiency" programs, or energy efficiency programs funded through charges included in customer utility rates or otherwise paid via some type of charge on customer bills. This includes budgets for both utility-administered programs, which depending upon the state may include investor-owned utilities (IOUs), municipal utilities, cooperative utilities, other public power companies or authorities, and for ratepayer-funded "public benefits" programs administered by other entities. We do not include data on separately funded load management programs, or energy efficiency research and development. We did not collect data on the federal Weatherization Assistance Program (WAP), which gives money to states on a formula basis.

The data is for budgets, as described in the methodology section for this chapter, which may differ from actual expenditures for energy efficiency programs. Readers should note that for some states, we report *revised budget data* when in-state contacts provided updated data. In these cases, there was a significant difference between the original budget and the revised budget. We seek to provide the most accurate and current information on a state's financial commitment to energy efficiency programs, and we therefore choose to use the revised budgets for scoring. See Table 4 for more detail on data sources.

Readers should note that many states have plans to escalate program efforts in 2010 and beyond, such as Illinois, Massachusetts, Michigan, North Carolina, Ohio, and Pennsylvania. While the budget and savings data do not fully capture these plans, the energy savings targets category does capture these state efficiency goals and the resulting commitments that will follow.

States are scored on a scale of 0 to 5 based on levels of energy efficiency budgets as a percent of utility revenues. Budgets representing at least 2.5% of revenues earn the maximum 5 points. For every 0.25% less than 2.5%, a state's score decreases by 0.5 points. These scoring metric thresholds are higher than in previous years to reflect the rising standards for best practice because of increasing energy efficiency program budgets relative to utility revenues. Table 3 lists the scoring bins for each level of spending and Table 4 shows state-by-state results and scores for this category.

[7] The funds are diverted from energy efficiency programs to low-income energy bill assistance. While bill assistance is important, it does not help consumers reduce energy *usage* as energy efficiency upgrades would, yielding lower energy bills every month for consumers.

Table 3. Scoring Metrics for Electricity Efficiency Program Budgets

Range of Budgets as Percent of Revenues	Score
2.5% or greater	5
2.25% – 2.49%	4.5
2.00% – 2.24%	4
1.75% – 1.99%	3.5
1.50% – 1.74%	3
1.25% – 1.49%	2.5
1.00% – 1.24%	2
0.75% – 0.99%	1.5
0.50% – 0.74%	1
0.25% – 0.49%	0.5
Less than 0.25%	0

Table 4. 2009 Electricity Efficiency Program Budgets by State

State	2009 Budgets* (Million $)	Budgets as Percent of Revenues	Ranking	Score
Vermont	$30.7	4.40%	1	5.0
California	$998.3	2.86%	2	5.0
Rhode Island[1]	$29.5	2.66%	3	5.0
Washington	$146.5	2.48%	4	4.5
Utah[2]	$45.4	2.44%	5	4.5
Oregon	$84.7	2.34%	6	4.5
Massachusetts[3]	$183.8	2.20%	7	4.0
Minnesota[4]	$111.2	2.19%	8	4.0
Idaho	$31.5	2.13%	9	4.0
Iowa	$55.6	1.78%	10	3.5
New York	$378.3	1.73%	11	3.0
Hawaii	$35.5	1.65%	12	3.0
Wisconsin	$101.1	1.64%	13	3.0
Connecticut[5]	$73.4	1.36%	14	2.5
Maine	$20.8	1.30%	15	2.5
New Jersey[6]	$132.3	1.18%	16	2.0
Nevada	$41.9	1.18%	17	2.0
Montana[7]	$13.2	1.16%	18	2.0
Colorado	$46.7	1.11%	19	2.0
New Hampshire	$15.2	0.95%	20	1.5
New Mexico	$14.4	0.82%	21	1.5
District of Columbia[8]	$12.5	0.79%	22	1.5
Illinois[9]	$89.9	0.72%	23	1.0
Pennsylvania[10]	$96.9	0.70%	24	1.0
Arizona	$49.2	0.70%	25	1.0
North Carolina	$64.3	0.60%	26	1.0
Michigan	$50.1	0.53%	27	1.0
Florida	$132.6	0.52%	28	1.0

State	2009 Budgets* (Million $)	Budgets as Percent of Revenues	Ranking	Score
Maryland[11]	$38.0	0.46%	29	0.5
Missouri	$22.7	0.39%	30	0.5
Nebraska	$7.1	0.35%	31	0.5
South Dakota[12]	$2.7	0.34%	32	0.5
Kentucky[13]	$17.2	0.30%	33	0.5
Tennessee[13]	$24.2	0.29%	34	0.5
Texas	$98.7	0.29%	35	0.5
Wyoming	$2.6	0.26%	36	0.5
Arkansas	$7.7	0.23%	37	0.0
South Carolina	$14.6	0.23%	38	0.0
Mississippi[13]	$9.2	0.23%	39	0.0
Georgia[13]	$21.3	0.19%	40	0.0
Indiana	$13.6	0.18%	41	0.0
Ohio	$18.6	0.14%	42	0.0
Alabama[13]	$9.1	0.12%	43	0.0
Kansas[14]	$3.7	0.12%	44	0.0
Oklahoma	$3.8	0.10%	45	0.0
Louisiana	$2.3	0.04%	46	0.0
North Dakota	$0.1	0.01%	47	0.0
Virginia[13]	$0.4	0.00%	48	0.0
Alaska	$0.0	0.00%	49	0.0
Delaware[15]	$0.0	0.00%	49	0.0
West Virginia	$0.0	0.00%	49	0.0
U.S. Total	**$3,403**	**0.96%**		

NOTES: All data are based on CEE (2010) unless otherwise noted here. [1] RI OER (2010); [2] UT PUC (2010); [3] MA DOER (2010); [4] MN PUC (2010); [5] CT ECMB (2010); [6] We provide a revised budget figure including spending and commitments (per data from Applied Energy Group 2010) and estimate an allocation of electric programs here and natural gas programs in Table 6 based on past data from NJ programs. [7] MT PSC (2010) and NorthWestern Energy (2010); [8] We allocate a portion of the Sustainable Energy Trust Fund (per DC DDOE 2010) toward electric programs here and natural gas programs in Table 6. [9] IL DCEO (2010); [10] PA PUC (2010); [11] MD PSC (2010); [12] SD PUC (2010); [13] We add Tennessee Valley Authority (TVA) budgets for energy efficiency programs in these states (TVA 2010) to non-TVA program budgets, which are based on CEE (2010). [14] KCC (2010); [15] Delaware's Sustainable Energy Utility administers energy efficiency programs using RGGI funding and some state funding and had a budget of about $5.2 million in 2009 (DNREC 2010), which would be equivalent to 0.38% of utility revenues in the state. Because the programs use non-ratepayer funding, however, we reflect these efforts in Chapter 5 on State Initiatives.

Natural Gas Program Budgets

In addition to efficiency programs targeting electricity end-use consumption, we also score states on natural gas efficiency program budgets by assigning up to a maximum of 3 points based on 2009 program budget data. We rely on our state-by-state survey and CEE for natural gas program budget data. A number of states do not report data for natural gas efficiency program spending and we therefore assign them a zero for this category. In order to directly compare state spending data, we normalize spending to the number of residential natural gas customers by state, which reflects the fact that some states do not have natural gas service for customers throughout the state. Table 5 shows scoring bins for natural gas program spending and Table 6 shows state scoring results. For 2009, total budgets on natural gas programs are about $844 million, and combined with electric program spending of about $3.4 billion, we estimate national budgets of about $4.2 billion for ratepayer-funded efficiency programs in 2009.

Table 5. Scoring Metrics for Natural Gas Utility and Public Benefits Spending

Budget Range ($ per customer)	Score
$35 or greater	3
$28–34.99	2.5
$21–27.99	2
$14–20.99	1.5
$7–13.99	1
$1—6.99	0.5
Less than $1	0

Table 6. 2009 Natural Gas Program Budgets by State

State	2009 Program Budgets (Million $)	Budgets Relative to Residential Customers ($ per customer)	Ranking	Score
Utah	$47.4	$59.6	1	3.0
Vermont	$1.8	$50.1	2	3.0
Iowa	$34.8	$39.9	3	3.0
Wisconsin	$61.3	$37.2	4	3.0
California	$378.4	$36.0	5	3.0
Rhode Island	$7.6	$34.0	6	2.5
Oregon	$20.8	$30.8	7	2.5
New Hampshire	$3.0	$30.7	8	2.5
Massachusetts	$38.0	$27.3	9	2.0
Maine	$0.4	$22.6	10	2.0
New Jersey	$57.7	$22.2	11	2.0
District of Columbia	$3.1	$21.7	12	2.0
Connecticut	$9.4	$19.3	13	1.5
Washington	$18.9	$18.0	14	1.5
Minnesota	$22.3	$15.8	15	1.5
Florida	$7.2	$10.6	16	1.0
New York	$42.9	$10.0	17	1.0
Michigan	$30.8	$9.7	18	1.0
Indiana	$14.4	$8.6	19	1.0
Colorado	$13.3	$8.3	20	1.0
Ohio	$25.5	$7.8	21	1.0
South Dakota	$0.8	$4.9	22	0.5
Idaho	$1.6	$4.8	23	0.5
Arizona	$4.0	$3.5	24	0.5
Pennsylvania	$8.7	$3.3	25	0.5
Wyoming	$0.5	$3.3	26	0.5
Kentucky	$2.4	$3.2	27	0.5
New Mexico	$1.7	$3.1	28	0.5
Arkansas	$1.2	$2.2	29	0.5
North Carolina	$1.3	$1.2	30	0.5

State	2009 Program Budgets (Million $)	Budgets Relative to Residential Customers ($ per customer)	Ranking	Score
Missouri	$1.6	$1.2	31	0.5
Illinois	$4.1	$1.1	32	0.5
Nevada	$0.7	$0.9	33	0.0
North Dakota	$0.1	$0.8	34	0.0
Texas	$3.2	$0.8	35	0.0
Montana	$0.1	$0.4	36	0.0
Maryland	$0.1	$0.1	37	0.0
Alabama	$0.0	$0.0	38	0.0
Alaska	$0.0	$0.0	38	0.0
Delaware	$0.0	$0.0	38	0.0
Georgia	$0.0	$0.0	38	0.0
Hawaii	$0.0	$0.0	38	0.0
Kansas	$0.0	$0.0	38	0.0
Louisiana	$0.0	$0.0	38	0.0
Mississippi	$0.0	$0.0	38	0.0
Nebraska	$0.0	$0.0	38	0.0
Oklahoma	$0.0	$0.0	38	0.0
South Carolina	$0.0	$0.0	38	0.0
Tennessee	$0.0	$0.0	38	0.0
Virginia	$0.0	$0.0	38	0.0
West Virginia	$0.0	$0.0	38	0.0
U.S. Total	**$852**	**$13.1**		

NOTES: Data are based on CEE (2010); Friedrich et al. (2010).

Annual Savings in 2008 from Electricity Efficiency Programs

For this category we report annual incremental electricity savings (new savings achieved from measures implemented in the reporting year) in 2008 for electricity energy efficiency programs[8] from utility program data reported to the EIA or as they were reported to ACEEE. We acknowledge that states use different methodologies for determining program savings, and that this can produce some inequities when comparing states on this variable. However, absent more consistent methodology across states, we must rely upon the available reported electric energy savings. Although this is an imperfect metric, we believe this is an important component to include as part of a more robust analysis of state energy efficiency performance. The savings data is for 2008 and is reported as a percent of retail electricity sales in that year. Readers should 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, however, are the best way to directly compare state efforts due to the difficulty in tracking the duration of programs and their savings.

States are scored on a scale of 0 to 5 based on levels of energy savings as a percent of utility electricity sales. States that achieved savings of at least 1.2% as a percent of electricity sales earn 5 points and score assignments are then distributed evenly among the ten scoring bins, dropping 0.5

[8] We do not report natural gas energy savings data due to the difficulty of obtaining data and the uncertain nature of the data that is available.

points for every 0.12% of annual savings. Table 7 lists the scoring bins for each level of savings and Table 8 shows state-by-state results and scores for this category.

Table 7. Scoring Methodology for Utility and Public Benefits Electricity Savings

Percent Savings Range	Score
1.2% or greater	5
1.08% – 1.19%	4.5
0.96% – 1.07%	4
0.84% – 0.95%	3.5
0.72% – 0.83%	3
0.60% – 0.71%	2.5
0.48% – 0.59%	2
0.36% – 0.47%	1.5
0.24% – 0.35%	1
0.12% – 0.23%	0.5
Less than 0.12%	0

Table 8. 2008 Incremental Electricity Savings by State

State	2008 Total Incremental Electricity Savings (MWh)	Savings as Percent of Electricity Sales	Ranking	Score
Vermont	148,549	2.59%	1	5.0
Hawaii	204,596	1.97%	2	5.0
Connecticut	354,228	1.14%	3	4.5
Nevada	402,260	1.14%	4	4.5
California[1]	3,043,965	1.14%	5	4.5
Minnesota[2]	540,805	0.79%	6	3.0
Wisconsin	545,062	0.78%	7	3.0
Rhode Island[3]	60,053	0.77%	8	3.0
Idaho	182,127	0.76%	9	3.0
Massachusetts[4]	388,254	0.69%	11	2.5
Iowa	323,285	0.71%	10	2.5
Utah[5]	194,862	0.69%	12	2.5
Oregon	318,239	0.65%	13	2.5
New Hampshire	70,282	0.64%	14	2.5
Maine	74,341	0.64%	15	2.5
Washington	530,029	0.61%	16	2.5
Arizona	401,846	0.53%	17	2.0
New Jersey	405,462	0.50%	18	2.0
Colorado	203,344	0.39%	19	1.5
Montana	52,062	0.34%	20	1.0
New York[6]	471,108	0.33%	21	1.0
New Mexico	60,233	0.27%	22	1.0
Texas	734,494	0.21%	23	0.5
North Dakota	25,656	0.21%	24	0.5
South Dakota	18,845	0.17%	25	0.5

$30.7 mil budget

EM+V budget =
$2.3 mil
for 3 yrs =
$766,667/yr
= $766,667 / 30,700,000
= 2.5%

impact assessment of EM+V =
$314,605.68
over 3 yrs

State	2008 Total Incremental Electricity Savings (MWh)	Savings as Percent of Electricity Sales	Ranking	Score
Florida	348,360	0.15%	26	0.5
Maryland	85,030	0.13%	27	0.5
Arkansas	50,804	0.11%	28	0.0
Tennessee	97,862	0.09%	29	0.0
Georgia	61,914	0.05%	30	0.0
Kansas	13,936	0.04%	31	0.0
Ohio	54,573	0.03%	32	0.0
South Carolina	26,945	0.03%	33	0.0
Missouri	19,992	0.02%	34	0.0
Mississippi	11,234	0.02%	35	0.0
Kentucky	21,262	0.02%	36	0.0
Nebraska	5,210	0.02%	37	0.0
Alabama	14,494	0.02%	38	0.0
Alaska	864	0.01%	39	0.0
North Carolina	15,229	0.01%	40	0.0
Indiana	11,483	0.01%	41	0.0
Michigan	8,874	0.01%	42	0.0
Illinois	6,403	0.00%	43	0.0
Oklahoma	2,344	0.00%	44	0.0
Pennsylvania	2,715	0.00%	45	0.0
Virginia	14	0.00%	46	0.0
Wyoming	0	0.00%	47	0.0
Delaware	0	0.00%	47	0.0
District of Columbia	0	0.00%	47	0.0
Louisiana	0	0.00%	47	0.0
West Virginia	0	0.00%	47	0.0
U.S. Total	10,613,530	0.28%		

Notes: All savings data are as reported in EIA (2010a) unless noted otherwise below.

[1] We adjust California's gross electricity savings as reported to EIA (4,793 GWh) downward in order to provide an estimate of net savings, which we seek to report here as a more accurate way to compare states. According to the California Public Utilities Commission (CPUC 2010), programs administered by the California investor-owned utilities realized net (ex-post) savings of about 62% of gross (ex ante) savings during their 2006–2008 program cycle. We adjust IOU gross savings for 2008 programs as reported in CEC (2009) by 62% and add savings from public utilities for 2008, also as reported in CEC (2009). [2] MN PUC (2010); [3] RI OER (2010); [4] MA DOER (2010); [5] UT PUC (2010); [6] Savings data for New York are derived by combining utility savings data reported by EIA with the statewide program administrator's (NYSERDA) savings data (NYSERDA 2010).

Energy Savings Targets (Energy Efficiency Resource Standards)

An Energy Efficiency Resource Standard is a quantitative, long-term energy savings target for utilities. Under direction from this policy, utilities or other program administrators must procure a percentage of electricity and natural gas needs using energy efficiency measures, typically equal to a percentage of their load or projected load. Energy savings are typically achieved through customer, end-use efficiency programs run by utilities or third-party program operators, sometimes with the flexibility to achieve the target through a market-based trading system. Long-term energy savings goals are an important enabling policy to ensure steady commitments to energy efficiency programs. In 2009, Arizona, Indiana, and Florida each adopted an EERS, bringing the total to twenty-seven states that have adopted an EERS or similar policy or are on a clear path to adoption (see Table 10).

A similar policy mechanism to encourage renewable energy production, called a Renewable Portfolio Standard (RPS), has been adopted as a mandatory target in 29 states, plus Washington, D.C. and as a goal in 7 states (DSIRE 2010). Several states that implemented an RPS subsequently expanded it to include energy efficiency as an eligible resource to meet the targets, thus establishing an EERS. Examples of combined EERS–RPS policies are found in Nevada, Connecticut, and North Carolina.

A number of states have taken an approach similar to an EERS by establishing energy efficiency as the first priority resource in utility energy planning. Putting efficiency first in this "loading order" ensures states utilize cost-effective energy efficiency before other generation sources. States with this mandatory energy efficiency priority loading order include: California, Connecticut, Delaware, Maine, Massachusetts, Rhode Island, Vermont, and Washington.

Scoring

This scoring category is intended to be a forward-looking metric of state commitments to energy efficiency and to complement current budget data and energy savings performance data. A state can earn up to 4 points in this category based on a number of factors. The major considerations are the levels of aggressiveness of the efficiency targets, whether the targets cover both electric and natural gas, and if they are binding (see Table 9 for general scoring bins). Most state energy savings targets are set either as a cumulative percent target or as an annual percent target that ramps up. To directly compare the targets, we normalize savings targets to an estimated average annual savings target over the period that the target covers. For example, Arizona plans to achieve 20% cumulative savings by 2020, so the annual average target is 2%. Scores are adjusted downward by 1 point if the policy is not completely binding, meaning it either has an "exit ramp" for utilities to avoid meeting the target or a "cost cap" that limits a spending amount rather than a specific savings target (e.g., Illinois). Also, because the purpose of an EERS is to set a long-term vision of energy efficiency in the state, targets must be established for three or more years.

Energy savings goals may be passed through legislation, but in order to be considered an EERS, the goals must be codified in regulation by the state utility commission. Many states allow utilities to form savings targets in the integrated resource planning process, which are acceptable as long as the individual utility goals are for three or more years. Long-term, commission-approved goals for third-party program administrators may be considered an EERS as well.

States with pending targets must be on a clear path towards establishing a binding mechanism to earn points in this category. Examples of a clear path include draft decisions by Commissions awaiting approval within six months, or agreements among major stakeholders on targets. States with a pending EERS policy that have not yet established a clear path toward implementation include Alaska, Arkansas, Oklahoma, New Hampshire, New Jersey, Utah, and Virginia.[9]

See Table 10 for scoring results and policy details.

[9] 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. New Jersey set energy savings goals in its Energy Master Plan of 2008, which guided the Clean Energy Program's approved budget request for 2009–2011. However, these goals are advisory and lack consequence if they are missed. Furthermore, the $158 million diverted from the Clean Energy Fund by the Christie Administration demonstrates the uncertainty surrounding these goals (NJ.com 2010).

Table 9. Scoring Methodology for Energy Savings Targets

Percent Savings Target or Current Level of Savings Met	Score
1.5% or greater	4
1% – 1.49%	3
0.5% – 0.99%	2
0.1% – 0.49%	1
Less than 0.1%	0

Table 10. State Scores for Energy Savings Targets

State	Description	Approx. Annual Savings Target	Year of Implementation	Binding Target or "Exit Ramp"	Score
Massachusetts	Massachusetts has a legislative requirement enacted in 2008 for electric and gas utilities to acquire all cost-effective energy efficiency that costs less than new energy supply as the first priority resource. The Department of Public Utilities recently approved an annual electricity savings target of 2.4% and natural gas target of 1.15% by 2012.	Approx. 2.3% through 2020	2008	Binding	4
Arizona	On August 10, 2010, the Arizona Corporation Commission (ACC) ordered that all investor-owned utilities and certain electric cooperatives achieve 22% cumulative energy savings by 2020. Annual savings begin at 1.25% of prior year's sales in 2011, ramping up to 2.25% by 2014 and remaining at that level through 2020. The ACC also approved natural gas efficiency standards aiming to achieve 6% cumulative savings by 2020.	2.0%	2009	Binding	4
Vermont	Efficiency Vermont (EV), an independent "efficiency utility" that delivers efficiency programs for the state, is contractually required to achieve energy and demand goals. EV cumulatively met over 5% of Vermont's electricity requirements by the end of 2006. In 2009–2011, EV is planning to achieve an additional 360 million kWh of savings and 105 MW of peak demand reduction, or about 6% of 2008 sales.	2.0%	2000	Binding	4
New York	In June 2008, the New York State Public Service Commission approved the Energy Efficiency Portfolio Standard (EEPS), which sets a goal to reduce electricity usage 15% by 2015. The Commission currently has an open proceeding working with utilities and NYSERDA to develop and improve programs. NY PSC also approved natural gas efficiency targets. The targets aim to save 4.34 Bcf annually through the end of 2011 and 3.45 Bcf annually beyond 2011. The gas targets aim for 1.3% annual savings and are not binding.	1.9%	2011	Binding*	4
Iowa	In 2008, investor-owned utilities were required to submit plans to achieve a 1.5% annual electricity and natural gas savings goal. In March 2009, the Iowa Utilities Board (IUB) approved MidAmerican Energy Company's Energy Efficiency Plan, which calls for 1.5% electricity savings by 2010 and 0.85% natural gas savings by 2013. Although not required by legislation, once the board approves the multi-year utility plan, the goals are binding.	1.5%	2008	Binding	4
Minnesota	In December 2006, Governor Pawlenty announced his Next Generation Energy Initiative, calling for 1.5% annual energy savings of both electric and natural gas sales, at least 1% of which must come from utility energy efficiency programs. This plan was enacted in legislation in 2007 and requires utilities to meet the annual targets by 2010.	1–1.5%	2010	Binding	4
Maine	The Maine Public Utilities Commission approved the triennial plan of the Efficiency Maine Trust, which develops, plans, coordinates, and implements energy efficiency programs in the state. In the plan, the Trust commits to annual energy savings goals in FY2011 of around 1%, ramping up to 1.4% in FY2013. The plan also includes savings targets for other fuels.	1.25%	2010	Binding	3

State	Description	Approx. Annual Savings Target	Year of Implementation	Binding Target or "Exit Ramp"	Score
Rhode Island	The Comprehensive Energy Conservation, Efficiency, and Affordability Act of 2006 requires utilities to submit energy efficiency procurement plans. The Commission has approved the plan of the state's major utility, National Grid, which aims to save 1% in 2009, ramping up to 1.5% in 2011 based on 2008 retail sales.	1.25%	2006	Binding	3
Indiana	Indiana's Commission ordered all jurisdictional electric utilities to begin submitting three-year DSM plans in 2010 indicating their proposals and projected progress in meeting annual savings goals outlined by the Commission. The goals begin at 0.3% annual savings in 2010, increasing to 1.1% in 2014, and leveling at 2% in 2019.	1.2% (avg. through 2019)	2010	Binding	3
Hawaii	The state's new EEPS sets a goal of 4,300 GWh reduction by 2030, approximately 40% of 2007 electricity sales. The new law allows the PUC to change the 2030 goal, but also calls for penalties for non-compliance. Also, under the state's RPS requirements, energy efficiency qualifies as an eligible resource. Utilities must meet 40% of electricity sales by 2030 with eligible resources; however, efficiency minimums or maximums are not specified.	1.0%	2004	Binding	3
Colorado	In April 2007, the Colorado legislature adopted a bill that called on the Colorado Public Utilities Commission (CPUC) to establish energy savings goals and provide financial incentives for utilities. The CPUC established energy savings goals of about 11.5% by 2020 for its investor-owned utilities' DSM programs, or about 1% annually. The CPUC has also set varying natural gas savings targets for its utilities.	1.0%	2009	Binding	3
Maryland	In 2008, Governor O'Malley introduced legislation that requires the state to reduce per-capita electricity consumption 15% by 2015, relative to 2007 consumption. Utilities must meet 2/3^{rds} of the goal and the state must administer programs to reach 1/3rd of the goal.	1.5–1.8%	2008	Binding (utility portion only)	3
Pennsylvania	In 2008, Governor Rendell signed Act 129, requiring that each electric distribution company with at least 100,000 customers must reduce energy consumption by a minimum of 1% by May 31, 2011, increasing to 3% by May 31, 2013. Peak demand must be reduced by 4.5% by May 31, 2013.	1.0%	2009	Binding	3
Illinois	In July 2007, the Illinois legislature set energy efficiency and demand response program requirements for utilities. With help from the Illinois Department of Commerce and Economic Opportunity (IDCEO), utilities are to meet annual savings goals of 0.2% of energy delivered in 2008, 0.4% in 2009, and so on, rising to 2.0% annually for 2015 and subsequent years. The state passed natural gas savings targets in 2009 that begins with 0.2% savings by May 31, 2011, ramping up to 1.5% in 2019.	1.2% (avg. through 2020)	2008	Cost Cap	3
California	California's 2010–2012 Energy Efficiency Plan sets targets for its four major electric and gas utilities. The plan calls for 7,000 GWh to be saved over the three-year period, or about 1% of California's 2007 sales annually.	1.0%	2004	Binding	3

State	Description	Approx. Annual Savings Target	Year of Implementation	Binding Target or "Exit Ramp"	Score
Michigan	Electric utilities must achieve 0.5% savings in 2010, ramping up to 1.0% in 2012 and each year thereafter. Natural gas utilities must achieve 0.1%, ramping up to 0.75% in 2012 and each year thereafter. There is no specific penalty for not achieving the savings amounts, but incentives are allowed for exceeding the targets.	0.5% in 2010; ramp-up to 1% in 2012	2008	Binding	3
Oregon	In its first-ever long-range strategic plan, the Energy Trust of Oregon laid out energy savings goals between 2010 and 2014 of 256 average megawatts (2,242.6 GWh) of electricity and 22.5 million annual therms of natural gas. These goals include savings from Northwest Energy Efficiency Alliance programs. The electric targets are equivalent to 0.8% of 2009 electric sales in 2010, ramping up to 1% in 2013 and 2014. The natural gas targets ramp up from 0.2% of 2007 natural gas sales to 0.4% in 2014.	0.9% (avg. through 2014)	2010	Binding	3
Nevada	The state's RPS was expanded in 2009 to 25% of electricity sales by 2025. The law allows energy efficiency to meet up to 25% of the total portfolio standard. In 2008, the state achieved savings of about 1.1% of retail electricity sales.	Up to 0.6% per year	2007	Binding	2
New Mexico	In February 2008, Governor Richardson signed into law HB 305, which directs electric and gas utilities to acquire all cost-effective and achievable energy efficiency resources. Electric utilities must achieve 5% energy savings from 2005 electricity sales by 2014, and 10% by 2020. The Public Regulation Commission (PRC) can set alternative energy efficiency requirements if the electric utility demonstrates it cannot meet the minimum requirements.	0.7% (avg. through 2020)	2008	Exit Ramp	2
Ohio	In 2008, legislation was passed that requires a gradual ramp-up to a 22% reduction in electricity use by 2025. Starting in 2009, electric distribution utilities must achieve 0.3% savings, which ramps up to 1% per year by 2014, then jumps to 2% per year in 2019 through 2025.	1.3% (avg. through 2025)	2009	Exit Ramp	2
Washington	In 2006, ballot initiative I-937 was approved requiring utilities to acquire all cost-effective energy efficiency. The Northwest Power and Conservation Plan sets the basis for efficiency targets. The 6th and most recent NWPC plan identifies 5,900 average MW of cost-effective and achievable conservation savings in the Northwest by 2030. In January 2010, Washington's three IOUs submitted biennial conservation goals and identified achievable efficiency potential through 2019. Only one IOU, Avista, has had its goals approved, which aim for over 1% savings a year. Pacificorp has proposed similar goals. Puget Sound Energy submitted lower goals based on the 5th Power Plan, which have been challenged by the utilities commission.	Approx. 1.0%	2006	Binding	2

State	Description	Approx. Annual Savings Target	Year of Implementation	Binding Target or "Exit Ramp"	Score
North Carolina	In August 2007, the North Carolina legislature enacted a law requiring public electric utilities in the state to obtain renewable energy power and energy efficiency savings of 3% of prior-year electricity sales in 2012, 6% in 2015, 10% in 2018, and 12.5% in 2021 and thereafter. Energy efficiency is capped at 25% of the 2012–2018 targets, and at 40% of the 2021 target.	Up to 0.25% in 2012; no specific EE goal	2012	Cost Cap	1
Texas	Texas became the first state to establish an EERS in 1999, requiring electric utilities to offset 10% of load growth through end-use energy efficiency. In 2007 the legislature doubled the standard to 20% of load growth by 2010 and directed that higher targets be investigated. In 2010, the Public Utilities Commission approved an increase in the energy efficiency goal to 25% of electric demand growth by 2012 and 30% in 2013 and beyond.	Approx. 0.40%	1999, 2009 update	Cost Cap	1
Florida	In December 2009, the Florida Public Utility Commission set goals for its electric utilities at 3.5% energy savings over 10 years. The goal is less than half of the goal recommended by the Commission staff's own expert and intervening advocacy organizations.	0.35%	2010	Binding	1
Delaware	On July 29, 2009, Governor Markell signed SB 106, which sets goals for consumption and peak demand for electricity and natural gas utilities. The goals are 15% electricity consumption and peak demand savings and 10% natural gas consumption savings by 2015. A binding EERS is currently pending, however, as regulations outlining compliance standards and procedures have yet to be approved.	2.5%	2009	Pending	1
Wisconsin	An EERS will be established in Wisconsin this year. No specific goal has been discussed publicly, but the PSC is required by Act 141 to establish goals in the second phase of the Quadrennial Planning Process, which is underway.	None	2011	Pending	1
Connecticut	In compliance with its renewable portfolio standard, Connecticut's utilities had to procure a minimum 1% of electricity sales from energy efficiency and/or CHP, a class III resource, each year from 2007 through 2010. The Department of Public Utility Control (DPUC) did not adopt higher savings goals proposed by the utility program administrators and the Energy Efficiency Board in the last two Integrated Resource Plans, which were equivalent to about 20% energy savings over ten years. In its latest decision, the DPUC did not approve additional funding for energy efficiency programs that would be necessary to comply with the state's statute to acquire all cost-effective energy efficiency.	None (1% in 2010)	2007	Pending	0.5

Utility Financial Incentives and Removal of Disincentives (Decoupling)

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

Understanding this dynamic has led industry experts to devise ways of guaranteeing utilities' rates-of-return while removing the disincentive to promote energy efficiency among utilities' customers. There are two key regulatory mechanisms that address the removal of disincentives and implementation of positive incentives for reducing customer energy use through improved levels of energy efficiency. These mechanisms go beyond ensuring recovery of the direct costs associated with energy efficiency programs, which is a minimum threshold requirement for utilities and related organizations to fund and offer energy efficiency programs. We do not address such basic program cost recovery in our *Scorecard*.

The two key mechanisms are fixed cost recovery (decoupling and other lost revenue adjustment mechanisms) and performance incentives. Decoupling refers to the disassociation of a utility's revenues from sales, which makes the utility indifferent to maximizing sales. Although this does not necessarily make the utility more likely to promote efficiency programs, it removes the disincentive for them to do so. Performance incentives are financial incentives that reward utilities (and in some cases, non-utility organizations) for reaching or exceeding specified program goals. These mechanisms have received a great deal of attention recently with a number of states enacting them in order to support increased energy efficiency initiatives and programs.

It is important to note that these mechanisms stand to receive increased attention in coming years, resulting from the passage of the *American Recovery and Reinvestment Act of 2009* (ARRA), which was passed in February 2009.[10] Section 410 (a)(1) of this Act allows governors to receive additional state energy grants if they provide assurance that the applicable state regulatory authority has, in part, sought to implement a policy that aligns financial incentives for electric and natural gas utilities with helping its customers use energy more efficiently.

For this category, a state can earn up to 3 points for having adopted financial incentive mechanisms for utility electric and natural gas efficiency programs and for having implemented decoupling for its electric and natural gas utilities (see Table 11). States with at least one major utility program were given credit. For those states receiving less than the full 3 points, half points were added for mechanisms that are authorized but not yet implemented and also for lost revenue adjustment mechanisms.[11] Information about individual state decoupling policies and financial incentive mechanisms is available on ACEEE's State Energy Efficiency Policy Database[12].

[10] Public Law 111-5, http://www.gpo.gov/fdsys/pkg/PLAW-111publ5/content-detail.html

[11] A Lost Revenue Adjustment Mechanism (LRAM) is one way to reimburse the utility to the extent energy sales are reduced but it does not compensate the consumer if sales increase so the incentive for the utility to increase sales is still present.

[12] See http://www.aceee.org/sector/state-policy

Table 11. States Scoring Methodology for Utility Financial Incentives

Criteria	Points
Decoupling and performance incentives established for both electric and natural gas utilities for at least one major utility (or non-utility organizations).	3
Both decoupling and performance incentives established for electric or natural gas utilities (or non-utility organizations) OR Decoupling or performance incentives established for both electric and natural gas utilities (or non-utility organizations).	2
Decoupling or performance incentives established for at least one electric or natural gas utility or non-utility organization (performance incentives only possibly apply to non-utility organizations that administer programs)	1
The legislature has approved or recommended decoupling and/or performance incentives but the use of a given mechanism has not yet been implemented. OR Lost Revenue Recovery is in place for at least one electric and/or natural gas utility.	0.5

Table 12. Utility Financial Incentives

	Decoupling (or Related Mechanism)		Performance Incentives		
State	Electricity	Natural Gas	Electricity	Natural Gas	Score
California	Yes	Yes	Yes	Yes	3
New York	Yes	Yes	Yes	Yes	3
Wisconsin	Yes	Yes	Yes	Yes	3
Massachusetts	Yes	Yes	Yes	Yes	3
Michigan	Yes	Yes	Yes	Yes	3
Vermont	Yes	No	Yes	Yes	2.5
North Carolina	Yes^	Yes	Yes	No	2.5
Minnesota	Yes*	Yes	Yes	Yes	2.5
Kentucky	Yes^	No	Yes	Yes	2.5
Nevada	Yes^	Yes	Yes	Yes	2.5
Colorado	Yes^	Yes	Yes	Yes	2.5
Rhode Island	Yes*	Yes*	Yes	Yes	2.5
South Dakota	Yes*	Yes*	Yes	Yes	2.5
New Hampshire	Yes*	Yes*	Yes	Yes	2.5
Oregon	Yes	Yes	No	No	2
Maryland	Yes	Yes	No	No	2
Washington	No	Yes	Yes	No	2
Indiana	No	Yes	Yes*	Yes*	1.5
Arizona	Yes*	Yes*	Yes	No	1.5
Connecticut	Yes*	Yes*	Yes	No	1.5
Ohio	Yes^	No	Yes	No	1.5
Utah	Yes*	Yes	Yes*	Yes*	1.5
Virginia	No	Yes	Yes*	No	1.5
South Carolina	Yes^	No	Yes	No	1.5

State	Decoupling (or Related Mechanism)		Performance Incentives		Score
	Electricity	Natural Gas	Electricity	Natural Gas	
District of Columbia	Yes	No	Yes*	Yes*	1.5
Georgia	Yes^	No	Yes	No	1.5
Oklahoma	Yes^	No	Yes	No	1.5
New Mexico	Yes*	Yes*	Yes	Yes*	1.5
Wyoming	Yes^	Yes	No	No	1.5
New Jersey	No	Yes	No	No	1
Hawaii	Yes	No	No	No	1
Idaho	Yes	No	No	No	1
Arkansas	No	Yes	No	No	1
Illinois	No	Yes	No	No	1
Montana	Yes^	No	Yes*	Yes*	1
Tennessee	No	Yes	No	No	1
Missouri	No	No	Yes*	No	0.5
Kansas	No	No	Yes*	Yes*	0.5
Florida	No	No	Yes*	Yes*	0.5
Delaware	Yes*	Yes*	No	No	0.5
Maine	Yes*	No	Yes*	No	0.5
Alabama	No	No	No	No	0
Alaska	No	No	No	No	0
Iowa	No	No	No	No	0
Louisiana	No	No	No	No	0
Mississippi	No	No	No	No	0
Nebraska	No	No	No	No	0
North Dakota	No	No	No	No	0
Pennsylvania	No	No	No	No	0
West Virginia	No	No	No	No	0

* Decoupling for electric or gas utilities, or both, or performance incentives are authorized according to legislation or commission order but are not yet implemented.
^ No decoupling, but some other mechanism for lost revenue adjustment.
Sources: Kushler, York, and Witte (2006); AGA (2010); IEE (2010)

CHAPTER 2: TRANSPORTATION POLICIES

Author: Shruti Vaidyanathan

The transportation energy efficiency score is based on a review of state actions that go beyond federal policies to achieve a more energy-efficient transportation sector. At the federal level, major progress has been made recently in reducing car and truck fuel consumption. Federal Corporate Average Fuel Economy (CAFE) standards adopted in April require a fleet fuel economy of 34.1 miles per gallon (mpg) by 2016. The U.S. Environmental Protection Agency adopted companion greenhouse gas emissions standards for vehicles, matching California's vehicle greenhouse gas (GHG) emissions requirements in stringency. In May, the President announced plans to set light-duty standards out to 2025 and to adopt the first standards for medium- and heavy-duty vehicle fuel efficiency.

Additionally, the overall efficiency of the U.S. transportation system is receiving considerable attention. The American Power Act of 2010 (APA), sponsored by Senators John Kerry and Joseph Lieberman, includes comprehensive transportation planning and GHG reduction language. APA directs the Department of Transportation (DOT) and EPA to set national transportation-specific GHG reduction goals in accordance with economy-wide reduction targets outlined in the bill. States and metropolitan areas must then develop targets commensurate with these national goals, in addition to specific implementation strategies. APA allocates $6.25 billion to states and municipalities for planning and implementation, transportation infrastructure improvements, and other projects that promote the efficiency of the transportation system (Laitner et al. 2010).

Similarly, Senator Jeff Merkley's energy plan to solve America's oil vulnerability calls for local, regional, and national planning efforts that focus on providing residents with a variety of transportation options and increase investment in multimodal transportation (Merkley 2010).

Methodology

Federal energy and climate legislation has yet to pass, however. In the meantime, certain states have moved ahead with a variety of policies to reduce transportation energy usage. In this chapter, states could earn up to a maximum 8 points on their actions to improve transportation efficiency. Because policies to promote compact development and reduce the need to drive are among the most effective ways to reduce transportation energy use for state and local governments, states that have adopted such policies can score up to 4 points. These are called policies to reduce "vehicle miles traveled" in Table 13. States that have adopted the California GHG tailpipe emissions standard earned 2 points. States with relatively high investment in transit ($50 per capita or more) earned one point, as did those offering consumer incentives for the purchase of high-efficiency vehicles.

Table 13. Results from ACEEE's 2010 Scorecard: State Scoring on Transportation Policies

State	Policies to Reduce Vehicle Miles Traveled [a]	GHG Tailpipe Emissions Standards [b]	Transit Funding [c]	High-Efficiency Vehicle Consumer Incentives [d]	Score
California	●●●	●●	●	●	7
Massachusetts	●●●	●●	●		6
Washington	●●●	●●		●	6
Maryland	●●	●●	●		5
Connecticut	●●	●●	●		5
New Jersey	●●	●●	●		5
New York	●●	●●	●		5

Oregon	••	••		•	5
Arizona	••	••			4
District of Columbia		••	•	•	4
Maine	••	••			4
Pennsylvania	•	••	•		4
Rhode Island	••	••			4
Vermont	••	••			4
Delaware	••		•		3
Florida	••				2
Hawaii	•			•	2
New Mexico		••			2
Tennessee	••				2
Utah			•	•	2
Alaska			•		1
Colorado				•	1
Georgia	•				1
Minnesota	•				1
Oklahoma				•	1
South Carolina				•	1
Virginia	•				1
Wisconsin	•				1
Alabama					0
Arkansas					0
Idaho					0
Illinois					0
Indiana					0
Iowa					0
Kansas					0
Kentucky					0
Louisiana					0
Michigan					0
Mississippi					0
Missouri					0
Montana					0
Nebraska					0
Nevada					0
New Hampshire					0
North Carolina					0
North Dakota					0
Ohio					0
South Dakota					0
Texas					0
West Virginia					0
Wyoming					0

[a] Source: rankings based on criteria in NRDC (2009), updated for 2010 with ACEEE research
[b] Source: Clean Cars Campaign (2010)
[c] Source: AASHTO (2008); FTA (2010); see Table 1 in Appendix A for a complete ranking of state transit funding.
[d] Source: EERE Alternative Fuel and Advanced Vehicles Data Center (DOE 2010a)

Tailpipe Emission Standards

Vehicles' greenhouse gas (GHG) emissions are largely proportional to their fuel use. In 2002, California passed the Pavley Bill (AB1493), the first U.S. law to address GHG emissions from vehicles. The law required the California Air Resource Board (CARB) to regulate GHG as part of the California Motor Vehicle Program. In 2004, CARB adopted a rule requiring automakers to begin in the 2009 model year (MY) to phase in lower-emitting cars and trucks that will collectively emit 22% fewer greenhouse gases than 2002 vehicles in MY 2012 and 30% fewer in MY 2016. Fourteen states have adopted California's GHG regulations (see Table 14).

The GHG reductions are expected to be achieved largely through improved vehicle efficiency, so these standards are in effect energy efficiency policies. Several technologies stand out as providing significant, cost-effective reductions in emissions. Among others, these include the optimization of valve operation, turbocharging, improved multi-speed transmissions, and improved air conditioning systems.

In May 2009, President Obama issued an order to establish harmonized federal standards for fuel economy and greenhouse gas emissions for model years 2012 to 2016 matching California's standards in stringency. A joint rulemaking by EPA and DOT was issued on April 1, 2010 calling for a fleet-wide average fuel economy of 34.1 mpg by 2016.

Table 14. States that Adopted California's GHG Tailpipe Emission Standards

State
California
Arizona
Connecticut
District of Columbia
Massachusetts
Maine
Maryland
New Jersey
New Mexico
New York
Oregon
Pennsylvania
Rhode Island
Vermont
Washington

Source: Clean Cars Campaign

While federal emission standards will now match California's regulations in 2016, states that have adopted the California program will continue to drive fuel economy forward in the post-2016 period. Therefore, adopting states are awarded two points in the transportation energy efficiency scoring.

Incentives for High-Efficiency Vehicles

The high cost of advanced technology, fuel-efficient vehicles is a key barrier to their entry into the market place. To encourage consumers to purchase these vehicles, states can offer a number of financial incentives, including tax credits, rebates, and sales tax exemptions. Several states offer tax incentives to individual purchasers of alternative-fuel vehicles (AFVs), which typically include vehicles that run on compressed natural gas (CNG), ethanol, propane, or electricity, and in some cases hybrid vehicles (electric or hydraulic). While AFVs can provide substantial environmental benefits by reducing pollution, they do not generally improve vehicle fuel efficiency and policies to promote their purchase; therefore, they are not included in our *Scorecard*. Electric vehicles and hybrids, by

contrast, which incorporate technology that typically improves vehicle fuel efficiency, are included in our review of policies.[13] With the impending arrival of the Chevrolet Volt plug-in hybrid sedan and the Nissan Leaf all-electric vehicle, tax credits for electric vehicles will soon play an important role in spurring the adoption of high-tech vehicles. For now, however, we assign points only to those states with purchase incentives for hybrids or framed in terms of fuel economy. Table 15 below outlines the consumer incentives available by state.

A state feebate policy that provides a rebate or charges a fee for the purchase of a vehicle, depending on its fuel efficiency, would also receive credit in our scoring of transportation policies. However, although several states have considered feebates, none have such a policy in place as yet. Incentives for the use of High Occupancy Vehicle (HOV) lanes and preferred parking programs for high-efficiency vehicles are not included in our consideration of a state's transportation score, as they may promote driving and consequently bring no net energy benefit.

Table 15. State Purchase Incentives for High-Efficiency Vehicles

State	Tax Incentive
California	AB 118 funds a voucher program, targeted at medium- and heavy-duty trucks, whose goal is to reduce the upfront incremental cost of purchasing a hybrid vehicle. Vouchers range from $20,000 to $40,000, depending on vehicle specifications, and will be paid directly to fleets that purchase hybrid trucks for use within the state.
Colorado	In 2009, Colorado extended financial incentives available for purchasers of high-efficiency vehicles out to 2015. Consumers can claim up to $6,000 for the purchase of a plug-in or hybrid vehicle. Individuals that convert a personal vehicle to plug-in hybrid technology can claim up to $7,500.
District of Columbia	The DMV Reform Amendment act of 2004 exempts owners of hybrid electric and electric vehicles from vehicle excise tax and reduces the vehicle registration charge.
Hawaii	The state of Hawaii offers a rebate to residents, businesses, state and county agencies, and nonprofits for the purchase of electric vehicles. Vehicles must qualify for the federal Plug-In Electric Drive Motor Vehicle Credit in order to claim a rebate equal to the lesser of 20% of the vehicle purchase price or $4,500.
Oklahoma	Prior to January 1, 2015, a one-time tax credit is available to purchasers of light-duty electric or hybrid-electric vehicles for the lesser of $6,000 and 50% of the cost of the electric powertrain. Credits of up to $26,000 are available for heavy-duty hybrid vehicles, including hydraulic hybrids.
Oregon	Oregon residents can claim up to $1,500 in tax credits for the purchase of an HEV or electric vehicle. A tax credit for business owners is also available for the purchase of HEVs and electric vehicles. The tax credit is 35% of the incremental cost of the system or equipment and is taken over five years.
South Carolina	A state income tax credit equivalent to 20% of the federal tax credit is available to purchasers of hybrid vehicles.
Utah	Utah residents may claim $750 in non-refundable tax credits for purchasing a new gasoline vehicle achieving a combined city/highway label fuel economy of 31 mpg or a new diesel vehicle achieving 36 mpg. Residents that convert a personal vehicle to run on electricity can claim the lesser of $2,500 or 50% of the cost of conversion equipment.

[13] Several early hybrids provided little fuel economy benefit, because the technology was used to increase vehicle power rather than to improve fuel economy. These hybrids did not sell well and have mostly been discontinued, but this issue remains a concern for hybrid incentive programs.

Washington	Effective from January 2009 through January 2011, the state use tax and retail sales tax do not apply to sales of new passenger cars, light-duty trucks, and medium-duty passenger vehicles that utilize hybrid technology and have an EPA-estimated highway gasoline mileage rating of at least 40 mpg. Electric vehicles are also exempt from the state sales tax.

Source: DOE (2010)

State Transit Funding

In addition to receiving federal funds for public transit, states also pull funding 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 planning changes as well. This year, the transit funding score takes into account state-requested monies from the American Recovery and Reinvestment Act (ARRA). In addition to 2007 state transit funding data from the American Association of State Highway and Transportation Officials (AASHTO), last updated in 2007, we considered the amount of ARRA money awarded to state transportation departments by the Federal Transit Administration in 2009. ARRA spending data for each state was multiplied by a factor of 1.5 to account for the fact that the federal data is more recent and more reflective of a state's current efforts towards transit expansion. States that spent a combined $50 or more per capita on public transit with this weighting earned 1 point in the overall transportation *Scorecard.*

These are the District of Columbia, Connecticut, Massachusetts, Alaska, New York, Maryland, New Jersey, Delaware, California, Pennsylvania, and Utah.

Policies to Reduce Vehicle Miles Traveled

Raising fuel economy and emissions standards will not adequately address transportation sector energy use in the long term if growth in total vehicle miles traveled (VMT) goes unchecked. U.S. highway VMT is projected to grow by 44% by 2030, substantially outpacing population growth in the country (EIA 2010b). Reducing the rate of VMT growth requires the coordination of transportation and land use planning, which is typically under local or regional jurisdiction. This can give states a more important role than the federal government in slowing VMT growth.

Successful strategies for changing land use patterns to reduce the need to drive vary widely among states due to current infrastructure, geography, and political structure. However, core principles of smart growth should be embodied in state comprehensive plans. Energy-efficient transportation is inherently tied to the integration of transportation and land use policies, and an approach to planning that successfully addresses land use and transportation considerations simultaneously is critical to state-wide VMT reductions. This approach includes measures that encourage the creation of:

- Transit-oriented development (TOD), including mixed land uses (mix of jobs, stores, and housing) and good street connectivity that makes neighborhoods pedestrian-friendly;
- Higher residential density;
- High quality transit service; and
- Activity centers where destinations are close together.

States can earn a maximum of 4 points for the adoption of policies to reduce vehicle miles traveled. States with explicit VMT or transportation GHG reduction targets are awarded 2 points. States with codified growth management acts score 1 point, as do those with policy mechanisms in place to encourage coordinated land use and transportation planning.

Figure 3. Leading States: Transportation Policies

California: As part of its plans to implement AB 32, which requires a 25% reduction from 1990 levels in greenhouse gas emissions by 2020, California has identified several smart growth and VMT reduction strategies. In 2008, the state passed SB 375, which requires the Air Resources Board (ARB) to develop regional transportation-specific greenhouse gas reduction goals, in collaboration with Metropolitan Planning Organizations. These goals must subsequently be reflected by regional transportation plans that create compact, sustainable development across the state and thus reduce VMT growth. ARB released draft targets in June 2010 that recommend a 5–10% reduction in vehicle greenhouse gas emissions by 2020 for the four largest Metropolitan Planning Organizations in the state (ARB 2010a).

California also passed AB 118 in 2009, a clean transportation program that includes funding for a hybrid vehicle rebate program targeted at medium- and heavy-duty vehicles. The goal of the Hybrid Truck and Bus Voucher Incentive Project (HVIP) is to reduce the high upfront costs associated with the purchase of high-efficiency vehicles. The program is currently in its second year. Rebates range from $10,000 to $45,000 per vehicle depending on vehicle specification. HVIP has allocated approximately $18.5 million of its initial $19.5 million voucher fund (ARB 2010b).

Washington: The state of Washington has long been a leader in transportation planning energy efficiency measures. Washington was one of the first states to implement a specific vehicle miles traveled reduction target. The state mandates an 18% decline in annual VMT per capita by 2020, a 30% reduction by 2035, and a 50% reduction by 2050. The state also has a comprehensive Growth Management Act that requires state and local governments to manage Washington's growth by preparing comprehensive plans, designating urban growth areas, and creating development regulations.

***Massachusetts*:** In recent years, Massachusetts has taken several significant steps to improve transportation efficiency within the state. The state's 40-R program, the Smart Growth Zoning Law, provides financial incentives for municipalities to increase density and build affordable housing in areas with good access to transit. The Commonwealth Capital program, initiated in 2005, applies several smart growth criteria to municipalities' applications for state funding. This year, Governor Deval Patrick issued the GreenDOT directive, which calls on the Department of Transportation (DOT) to reduce in-state transportation greenhouse gasses by 7.3% by 2020 and 12.3% by 2035 from 1990 levels. To achieve these reductions in GHG, DOT will promote alternative modes of transport and support smart growth developments to reduce automobile travel within the state in addition to creating travel demand management programs and providing incentives for efficient fleets and eco-driving.

CHAPTER 3: BUILDING ENERGY CODES

Author: Max Neubauer

Background

Buildings consume 73% of electricity use and 40% of total energy use in the United States, while accounting for 40% of U.S. carbon dioxide emissions (DOE 2008). This makes buildings an essential target for energy savings. However, because buildings have long lifetimes and are not easily retrofitted, it is crucial to target building efficiency measures prior to construction. Mandatory building energy codes are one way to target energy efficiency by requiring a minimum level of energy efficiency for residential and commercial buildings.

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 developed its Model Energy Code (MEC), which was later renamed the International Energy Conservation Code (IECC). Today, most states use a version of the MEC or IECC for their residential building code, which requires a minimum level of energy efficiency in new residential construction. Most commercial building codes are based on ASHRAE 90.1, jointly developed by the American Society of Heating, Refrigerating and Air Conditioning (ASHRAE) and the Illuminating Engineering Society (IES). The IECC commercial building provisions also include prescriptive and performance requirements based primarily on ASHRAE requirements.

The most recent versions of the IECC and ASHRAE are the 2009 IECC and ASHRAE 90.1-2007. While several states have officially adopted the 2009 IECC and/or ASHRAE 90.1-2007, their updated codes did not become effective until late 2010 or beyond. Many other states are still in the process of adopting or updating to the more stringent versions.

Requirements in the 2009 IECC are estimated to generate energy savings in residential buildings of 15% above the 2006 IECC (ICF 2009). For commercial buildings, some groups estimate a 4% improvement over the 2006 IECC commercial provisions (SWEEP 2009). The commercial provisions in the IECC, however, consistently differ from those in ASHRAE 90.1, so that the ASHRAE 90.1 standard is generally considered to be more stringent.[14] For example, the latest version of ASHRAE 90.1, which is more commonly used as the standard for commercial buildings than the IECC, is estimated to achieve incremental savings of 8% above ASHRAE 90.1-2004 (PNNL 2009).

Building Codes and the American Recovery and Reinvestment Act (ARRA)

The impact of ARRA on building code adoption has shown that federal policy can catalyze tremendous progress among the states. The appropriation of stimulus funding through DOE's State Energy Program (SEP) spurred several dozen states to begin legislative or administrative processes leading to the statewide adoption of the 2009 IECC and ANSI/ASHRAE/IESNA Standard 90.1-2007. For many states with relatively older codes, the incremental increase in code stringency will be significant but the long-term benefits will far exceed the costs. ARRA also calls for states to achieve 90% compliance with the ARRA minimum standard building energy code (IECC 2009 for residential; ASHRAE 90.1-2007 for commercial) by 2017. While some states have made laudable progress in funding and training code officials to ensure enforcement, many will require greater commitment to meet this goal.

Although the adoption process has stalled in a few states, in 2008 those states that have to date made efforts to comply with ARRA accounted for around 60% of all new housing starts in the United

[14] Some prescriptive measures in the IECC are more rigorous than their ASHRAE equivalent, however. See PNNL (2009) for a detailed comparison of the latest versions.

States and many of them, such as Maine, Indiana, and Delaware, had either no mandatory statewide codes or codes that were considerably outdated. And because residential construction has been trending away from smaller homes towards larger ones, the incorporation of more stringent building codes in these markets has the potential to generate tremendous energy savings (Census 2009). For their efforts, especially in a period of considerable economic uncertainty, these states should be commended.

The Department of Energy's Building Code Determinations

Every ten years the DOE issues determinations on recent iterations of the IECC and ASHRAE codes to ascertain their relative impact when compared to older versions and, if justified, establish the more recent code as the base code with which all states must comply. While no enforcement mechanism is in place to address non-compliance, states are required to send letters either certifying their compliance, requesting extension, or explaining their decision not to comply. On December 30, 2008, the DOE issued a determination on ASHRAE 90.1-2004, noting that it would achieve greater energy efficiency in buildings than would the 90.1-1999 edition. States have two years after a determination to send letter regarding their compliance; hence, states have until December 30, 2010 to adopt the 90.1-2004 edition of the ASHRAE code or a more recent edition.

For residential codes, the DOE is currently assessing the relative impact of the 2003 IECC to the 2000 IECC, and the 2006 IECC to the 2003 IECC. For commercial codes, the DOE is also currently analyzing ASHRAE Standard 90.1-2007 relative to 90.1-2004.

Methodology

For this category, states earned scores on two measures of building energy codes: level of stringency of residential and commercial codes (up to 5 points) and level of efforts to enforce compliance of codes (up to 2 points), for a combined score of up to 7 points.

Our review of state building energy codes is based predominantly on publicly available information such as that provided by the Building Codes Assistance Project (BCAP), which maintains maps and state overviews of building energy codes, as well as the DOE's Building Energy Codes Program. The Database for State Incentives for Renewables and Efficiency (DSIRE) also collects and disseminates the status of state energy codes. We assigned each state a score of 0 to 5 for residential and commercial building energy codes, with 5 being assigned to the most stringent codes (see Table 16). We then averaged the two for an overall stringency score (see Table 17). In some cases, we adjusted state scores based on adoption of key standards that increase the stringency of a state's codes.

Because numerous states are in the process of updating their codes to meet the requirements mandated by ARRA, we awarded full credit to those states that have exhibited progress and show a clear path leading toward the adoption of the latest versions of the IECC and ASHRAE within the next year. In other words, we have not limited qualification to codes that have already become effective, as was the case in our *2008 Scorecard.* However, many states that have begun the process of updating their codes to meet the ARRA requirement have not yet officially adopted the latest IECC and ASHRAE codes 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. In Table 17, we denoted those states with a clear path toward adoption and implementation with an asterisk and awarded them full credit. Those states that have begun the adoption process but implementation has either stalled or the effective date is uncertain are denoted with a "+" and are awarded credit only for the code versions that are currently effective. Once their efforts have culminated in a clear path toward adoption and implementation of the new codes, the changes will be reflected in future editions of our *Scorecard* and those states will be awarded full credit.

In addition, we also scored states' level of efforts to have builders comply with state building codes. Scoring states on compliance is difficult due to the lack of data—very few states actually collect comprehensive data on residential and commercial compliance with state energy codes. States do not have enough funding to employ the number of code officials required to create samples that are large enough to properly represent the level of compliance within a state. In order to collect this information, we distributed a survey to individuals in each state requesting information regarding their efforts to measure and enforce code compliance, including: (1) published studies that have estimated statewide compliance; (2) enforcement methods; and (3) methods for code official and builder training. States were ranked on a scale of 0 to 2, in 0.5 increments, based on these metrics. States were given 2 points for making substantial efforts to achieve compliance such as training code officials and funding surveys; 1.5 point for making multiple, but not extensive, efforts; 1 point for some compliance efforts, such as training; 0.5 points for limited efforts; and 0 points for no or unverifiable efforts. See Table 17 for state scores on building energy codes. For more information on state compliance efforts, visit ACEEE's State Energy Efficiency Policy Database: http://www.aceee.org/sector/state-policy.

Table 16. Scoring Methodology for State Residential and Commercial Building Energy Codes: Stringency

Score	Residential Building Code	Commercial Building Code
5	Meets or exceeds 2009 IECC or equivalent	Meets or exceeds 2009 IECC or ASHRAE 90.1-2007 or equivalent
4	Exceeds 2006 IECC or equivalent	Exceeds 2006 IECC or ASHRAE 90.1-2004 or equivalent
3	Meets 2006 IECC or equivalent	Meets 2006 IECC or ASHRAE 90.1-2004 or equivalent
2	1998-2003 MEC/IECC (meets EPCA[15])	1998–2003 IECC or ASHRAE 90.1-1999/2001 or equivalent
1	No mandatory state energy code, but significant adoptions in jurisdictions	No mandatory state energy code, but significant adoptions in jurisdictions
0	No mandatory state energy code or precedes 1998 MEC/IECC (does not meet EPAct of 1992)	No mandatory state energy code or precedes ASHRAE 90.1-1999 or equivalent (does not meet EPAct of 1992)

Note: States that have adopted the 2009 versions of the IECC and ASHRAE 90.1 or are on a clear path toward their adoption within the next twelve (12) months are given full credit.

[15] Under the federal Energy Policy and Conservation Act, states are required to review and adopt the MEC/IECC and the most recent version of ASHRAE Standard 90.1 for which DOE has made a positive determination for energy savings (currently 90.1-2004) or submit to the Secretary of Energy its reason for not doing so.

Table 17. State Residential and Commercial Building Energy Codes: Stringency and Compliance Efforts Scoring

State	Stringency			Compliance Efforts* Score	Overall Score
	Residential State Energy Codes	Commercial State Energy Codes	Score (Average)		
California	5	5	5	2	7
Massachusetts	5	5	5	2	7
Oregon*	4	5	4.5	2	6.5
Virginia*	5	5	5	1.5	6.5
New York	5	5	5	1.5	6.5
Washington+	4	4	4	2	6
Montana	5	5	5	1	6
Iowa	5	5	5	1	6
Pennsylvania	5	5	5	1	6
District of Columbia	5	5	5	1	6
Maine*	5	5	5	1	6
Florida+	4	5	4.5	1	5.5
Maryland	5	5	5	0.5	5.5
New Hampshire	5	5	5	0.5	5.5
Rhode Island*	5	5	5	0.5	5.5
Illinois	5	5	5	0.5	5.5
Indiana*	5	5	5	0.5	5.5
New Jersey*	5	5	5	0.5	5.5
Delaware*	5	5	5	0.5	5.5
New Mexico*	5	5	5	0.5	5.5
Idaho	3	3	3	2	5
North Carolina+	4	4	4	1	5
Utah	3	5	4	1	5
Georgia	4	4	4	0.5	4.5
Michigan+	4	4	4	0.5	4.5
Hawaii	3	3	3	1	4
Wisconsin	3	3	3	1	4
Kentucky	3	3	3	1	4
Minnesota	3	3	3	1	4
Nevada	3	3	3	1	4
Connecticut	3	3	3	1	4
Louisiana	3	3	3	1	4
Vermont+	2	3	2.5	1	3.5
Ohio	3	3	3	0.5	3.5
South Carolina	3	3	3	0	3
Texas+	2	2	2	1	3
West Virginia	2	2	2	1	3
Arkansas	2	2	2	1	3
Arizona	2	2	2	1	3
Nebraska	2	2	2	0.5	2.5
Colorado	1	1	1	1	2

Kansas	0	3	1.5	0.5	2
Alaska	4	0	2	0	2
Tennessee	3	0	1.5	0.5	2
Oklahoma	1	1	1	0.5	1.5
South Dakota	0	1	0.5	0	0.5
Missouri	0	0	0	0	0
Alabama	0	0	0	0	0
Mississippi	0	0	0	0	0
North Dakota	0	0	0	0	0
Wyoming	0	0	0	0	0

Sources: Stringency scores derived from BCAP (2010) and DOE (2010b), as of September 2010. Compliance and enforcement scores based on information gathered through survey of state building code contacts. See ACEEE's State Energy Efficiency Policy Database for more information on state compliance efforts: http://www.aceee.org/sector/state-policy.

* These states have signed or passed legislation mandating compliance with the 2009 IECC and/or ASHRAE 90.1-2007, effective at a later date, or their rulemaking processes are far enough along that mandatory compliance with the most recent energy codes is imminent.

+ These states have signed or passed legislation mandating compliance with the 2009 versions of the IECC or ASHRAE 90.1, but have not demonstrated a clear path forward toward their adoption, so that the effective date remains uncertain.

California earned the maximum score of 7 points because its state-developed code is considered to be more stringent than the highest IECC standards and it has also been estimated to have one of the highest rates of compliance. States that have not adopted a mandatory state energy code, or have poor or unverifiable rates of compliance, earn a score of 0. Currently there are twelve states that do not have statewide, mandatory energy codes for either residential or commercial buildings. The twelve are Alabama, Alaska, Arizona, Colorado, Kansas, Mississippi, Missouri, North and South Dakota, Oklahoma, Tennessee, and Wyoming. Eleven states have zero or no verifiable rates of compliance, down from seventeen in our *2009 Scorecard*.

Figure 4. Leading States: Building Energy Codes

Massachusetts: As of June 1, 2010, the Massachusetts Board of Building Regulations and Standards (BBRS) requires use of the 2009 IECC with state-specific amendments for residential and commercial buildings. In 2009, Massachusetts was the first state to adopt a performance-based "Stretch Code" that is at least 20% more energy efficient than the mandated code. Municipalities may choose to adopt the Stretch Code in lieu of the base building energy code, but Stretch Code adoption is mandatory for designation as a "Green Community" under Massachusetts' Green Communities Act (GCA). Massachusetts is also required by the Green Communities Act of 2009 to adopt each new IECC edition within one year of its publication.

New York: On April 1, 2010, the State Fire Prevention and Building Code Council updated the Energy Conservation Construction Code of New York State, which will be based on the 2009 IECC and ASHRAE 90.1-2007, along with several state-specific enhancements. While most of the Northeast has adopted the latest versions of the IECC and ASHRAE 90.1, New York's efforts to maximize compliance are meritorious. NYSERDA is working on RFP's to estimate compliance in the state, while enforcement is overseen by around 1,500 municipalities. New York dedicates significant time and investment to training its code officials, requiring annual code update training. The influx of ARRA funding has allowed New York to increase the volume of training courses significantly statewide, and there is a push to introduce live training courses online as well.

CHAPTER 4: COMBINED HEAT AND POWER

Authors: Nate Kaufman and Anna Chittum

Background

Combined heat and power (CHP) systems, also known as cogeneration, generate electricity and useful thermal energy in a single, integrated system. In some existing generation systems, additional equipment can be installed to recover energy that would otherwise be wasted (this is known as recycled energy). CHP is more energy efficient than separate generation of power and thermal energy because heat that is normally wasted in conventional power generation is recovered as useful energy. That recovered energy is used to satisfy an existing thermal demand, such as the heating and cooling of a building or water supply. CHP systems can save customers money and reduce net overall emissions.

State policies and regulations can help mitigate or eliminate regulatory and market barriers that discourage or stymie the installation of CHP systems, especially barriers imposed by utilities that resist distributed generation. Financial incentives can play a role in promoting CHP development by mitigating the additional costs that result from these barriers.

Methodology

A state could earn up to 5 points based upon its adoption of regulations and policies that encourage the deployment of CHP systems. There are multiple ways in which states can actively encourage or discourage the deployment of CHP. Financial, technical, and regulatory factors all impact the extent to which CHP is deployed. The six factors considered when scoring CHP for the *2010 Scorecard*, in order of relative importance as determined by ACEEE, are:

- Standard interconnection rules
- Status of CHP-friendly standby rates
- Presence of CHP financial incentive programs
- Presence of output-based emissions regulations (OBR)
- Inclusion of CHP/waste heat recovery in a state RPS or EERS
- Net metering regulations

Many states are in the process of developing or improving a number of these policies for CHP. Generally, credit was not given for a policy unless it was in place—enacted by a legislative body or promulgated as an order from an agency or regulatory body. Some states that formerly had policies in place have since removed or in other ways nullified these policies; in these situations, we did not give credit for the policy in question. In general, we considered policies that were in place as of June 2010 in our review.[16] Our analysis is qualitative and our scoring methodology is based largely on discussions with many members of the CHP community regarding what policies are most helpful or detrimental to project development. Our methodology has changed slightly since 2009, with certain policies having a slightly modified relative importance than they previously held.

The most important regulatory policy with respect to CHP is the presence of an **interconnection standard** that explicitly establishes parameters and procedures for the interconnection of CHP systems. We relied upon secondary sources—such as the *Database for State Incentives for Renewable Energy* (DSIRE 2010) and the Environmental Protection Agency's *CHP Partnership* database (EPA 2010)—as well as primary sources such as public utility commission dockets and interviews with commission staff and utility representatives. Having multiple levels (or tiers) of interconnection is important to CHP deployment because smaller systems are usually offered a

[16] For an up-to-date list of the state policies we have reviewed, visit the ACEEE State Energy Efficiency Policy Database at http://aceee.org/sector/state-policy.

faster—and often cheaper—path toward interconnection compared to larger systems. Scaling these transaction costs to project size makes economic sense, because customers with larger projects—and thus larger potential economic gains—often have more incentive to spend time and money to interconnect their more complex systems than do customers with smaller projects facing smaller economic returns. Additionally, interconnection standards that have higher size limits are preferred by CHP developers, as are standards that are based upon widely accepted industry standards, such as the IEEE 1547 standard.[17] Other interconnection practices that are viewed favorably include the applicability to all utilities, not just IOUs; a maximum capacity of 10-20 MW or more; the prohibition of redundant external disconnect switches; and the prohibition of additional insurance requirements. Finally, having clearly delineated procedural steps toward interconnection and easily accessible information about the interconnection process is viewed favorably.

Next in importance are the **standby rates** used by the largest utilities in each state to charge for standby service provided to CHP systems. We relied upon secondary information that came from the Environmental Protection Agency's *CHP Partnership* (EPA 2009), as well as primary information from utilities and public utility commissions to score states for this category. Standby rates are generally composed of two elements: energy charges, which reflect the actual standby energy used by a CHP system; and demand charges, which are charges based upon either a single demand peak during a defined period, or a specific amount of contracted demand based upon the system's size. Generally, standby rates that base a larger percentage of their total standby charge on energy charges are viewed as more favorable to CHP than rates that are based heavily on demand charges. Energy charges reflect the true economics of CHP better than demand charges, because demand charges may often increase significantly based upon a single demand peak during a single 15-minute period. Demand charges can further discourage CHP when a "ratchet" is employed, which keeps the heightened demand charge high for a multi-month period. Some ratchets last for a year or longer.

Tied for the next most important policy is the presence of **incentives for CHP**. Tax incentives are generally more permanent than grant programs, which are generally not embedded in state legislation. Tax incentives for CHP take many forms, but are often credits taken against business or real estate taxes. Rebates, grants, bond financing, and favorable loan structures are all ways in which CHP can be encouraged at the state level, and the leading states have mixtures of multiple types of incentives. Financial incentives offered through state entities that apply to all CHP systems are viewed most favorably in this category, but some credit was also given to incentives for exclusively biomass CHP projects, and government *lead by example* CHP programs, as well as strong utility incentives that encourage CHP development. Additional information on incentives for CHP is available from EPA through its CHP Partnership (EPA 2010) and from the Database for State Incentives for Renewable Energy (DSIRE 2010).

Equal in importance to financial incentives is the presence of **output-based emissions regulations (OBR)**. These are air quality regulations that take the useful energy output of CHP systems into consideration when quantifying a system's criteria pollutant emissions. Many states employ emissions regulations for generators by calculating levels of pollutants based upon the fuel input into a system. For CHP systems, electricity *and* useful thermal outputs are generated from a single fuel input. Therefore, calculating emissions based solely on input ignores the additional power created by the system, using little or no additional fuel. Output-based emissions acknowledge that the additional useful energy output was created in a manner generally cleaner than the separate generation of electricity and thermal energy. Additional information for policies in this category is also available from EPA via its Partnership Web site.[18]

The next most important policy used to calculate states' overall CHP scores is the eligibility of **CHP for credit in a Renewable Portfolio Standard or Energy Efficiency Resource Standard**. RPS and EERS policies define a particular amount of a state's electric resources that must be derived from

[17] This standard establishes criteria and requirements for interconnection of distributed energy resources with electric power systems (EPS). It provides requirements relevant to the performance, operation, testing, safety considerations, and maintenance of the interconnection. For more information, visit http://www.ieee.org/portal/site.

[18] See http://www.epa.gov/chp/state-policy/output.html.

renewable energy or energy efficiency resources, respectively, as is discussed in Chapter 1. Most states with RPS or EERS policies set goals for future years. These goals are generally a percentage of total electricity sold that must be derived from renewable or efficiency resources, with the percentage of these resources increasing as a percentage of total electricity sold in future years. Not only are utilities required to meet the state goals, but these standards are often paired with financial incentives or support programs to implement and encourage eligible technologies. Thus, when CHP is explicitly listed as eligible for RPS or EERS credit, it creates a large incentive to deploy CHP systems.

The final state policy used to determine the favorability of CHP, and a new addition to the *2010 Scorecard*, is the presence of **net metering** regulations that apply to CHP. Net metering is most commonly applied to renewable energy systems, but can also be applicable to small combined heat and power systems, often those under 1 or 2 MW. Sound net metering regulations allow owners of small distributed generation systems to get credit for excess electricity that they produce on-site. Under net metering rules, distributed generation system owners are compensated for some or all excess generation either at the utility's avoided cost, or, less often, at higher retail rates. The levying of fees on net-metered systems, along with rules that set overly strict limits on individual system and aggregate capacity size, serve as barriers to deployment of CHP and other distributed generation systems. Limits on individual and aggregate system capacities can prevent system owners from installing the most efficient or cost-effective systems, and sometimes even prevent them from meeting onsite load requirements. Any size limits should be based only on objective engineering standards and facility load requirements. Other best practices for net metering include eligibility for all distributed generation technologies, including CHP; eligibility for all customer classes; system size limits that exceed 2 MW; indefinite net excess generation carryover at the utility's retail rate; and prohibition of special fees for net metering.

States are scored for CHP on a scale of 0 to 5 on their efforts to encourage CHP through the above regulatory and financial mechanisms, as listed in Table 18.

Table 18. State Scoring for CHP*

State	Interconnection	Standby Rates	Incentives	OBR	RPS or EERS	Net Metering	Overall Score
Connecticut	●	◔	◑	●	●	○	5
Ohio	●	◔	◑	◕	●	○	5
California	●	◑	◑	●	○	○	5
Texas	◕	◑	○	●	●	○	5
Massachusetts	◕	◔	◔	●	●	◑	5
New York	◕	◔	●	◕	◔	◑	5
North Carolina	◕	◔	●	○	●	●	5
Illinois	●	◑	◔	●	○	○	5
Pennsylvania	◕	◑	◑	○	●	●	5
Maine	○	●	○	●	●	◑	4
District of Columbia	●	●	○	○	○	●	4
Wisconsin	◕	◑	○	●	○	◑	4

* The "pies" in Table 18 are filled according to how well ACEEE feels each state has achieved each policy goal. While each CHP policy is assessed individually for each state, the overall score is not derived from a simple aggregation of each policy score. Instead, states are put into six bins, with scores of zero through five. With these overall scores we try to reflect how states compare to each other as opposed to how well they compare to what we consider ideal. Each bin, therefore, contains a similar number of states. We also look carefully at what score each state earned last year and whether strong CHP policies have been enacted or redacted since then, and try to reflect the relative importance of these changes in the overall score. The CHP team welcomes inquiries to learn more about our methodology.

State	Interconnection	Standby Rates	Incentives	OBR	RPS or EERS	Net Metering	Overall Score
Colorado	●	◑	○	○	●	◑	4
Oregon	◔	◑	●	◕	○	○	4
New Jersey	◔	◑	◕	●	○	○	4
Washington	◕	◔	○	◕	◕	◑	4
New Mexico	●	○	◕	○	○	●	4
Indiana	◕	◑	○	●	○	○	3
Maryland	●	◑	○	○	○	●	3
Vermont	◔	◔	●	○	◔	◑	3
Arizona	○	◔	◕	○	●	●	3
Utah	●	○	○	○	◔	●	3
Hawaii	◔	◕	○	○	●	○	3
Delaware	◔	◑	○	●	○	○	3
Minnesota	◕	◑	○	○	○	◑	3
Florida	◑	◔	◑	○	○	●	3
South Dakota	●	◔	○	○	◔	○	3
New Hampshire	◔	◑	◑	◔	○	○	2
Rhode Island	◕	◑	◔	○	◔	○	2
Idaho	○	◑	◕	○	○	○	2
Nevada	◔	◑	○	○	◕	○	2
Iowa	◕	○	○	○	○	○	2
Alaska	○	◑	◑	○	○	○	2
Missouri	○	◑	○	◑	○	○	2
Michigan	◑	○	◔	○	○	○	2
Montana	○	◑	◔	○	○	○	1
Mississippi	○	◔	◑	○	○	○	1
Tennessee	○	◔	◑	○	○	○	1
West Virginia	○	◑	○	○	○	○	1
Arkansas	○	◔	○	◔	○	○	1
Kentucky	○	◔	◔	○	○	○	1
North Dakota	○	◔	○	○	◔	○	1
Alabama	○	○	◑	○	○	○	1
South Carolina	◔	○	◔	○	○	○	1
Nebraska	○	◔	○	○	○	○	0
Oklahoma	○	○	◔	○	○	○	0
Georgia	○	○	○	○	○	○	0
Kansas	○	○	○	○	○	○	0
Louisiana	○	○	○	○	○	○	0
Virginia	○	○	○	○	○	○	0
Wyoming	○	○	○	○	○	○	0

While the policies covered above are important, there are other market factors that can also be important to realizing a favorable environment for CHP. In the fall of 2010, ACEEE will release a report on the practical realities and on-the-ground barriers in each state that face CHP project development. This report will assess what kind of impact CHP regulations and financial incentives have on development, and what hidden barriers exist that cannot be captured by analysis of regulatory policies alone. This forthcoming report will not only outline CHP development realities in each state, but will also examine CHP installation data and analyze its relationship with the qualitative findings. This data, compiled by ICF International, is presented in part in Table 19 below.

Table 19. New Installed Capacity of CHP, 2005–2009

State	2010 Overall Scorecard score	Number of Installations (2005–2010)	Total New Capacity (MW) (2005–2010)	Avg. Capacity (MW) per Installation
California	5	140	120.6	0.9
New York	5	101	102.8	1.0
Connecticut	5	62	186.4	3.0
Massachusetts	5	34	41.8	1.2
Pennsylvania	5	25	80.9	3.2
Wisconsin	4	20	83.0	4.2
New Jersey	4	18	14.1	0.8
North Carolina	5	13	17.6	1.4
Oregon	4	10	38.8	3.9
Vermont	3	10	3.2	0.3
Colorado	4	9	10.7	1.2
Illinois	5	9	104.8	11.6
Minnesota	3	9	12.2	1.4
Indiana	3	8	2.2	0.3
Ohio	5	8	94.6	11.8
Texas	5	8	380.8	47.6
Washington	4	8	97.6	12.2
Montana	1	7	23.3	3.3
Rhode Island	1	7	1.6	0.2
Georgia	0	4	2.9	0.7
Kansas	0	4	16.0	4.0
Michigan	2	4	3.2	0.8
New Hampshire	2	4	0.8	0.2
North Dakota	1	4	23.0	5.8
South Dakota	3	4	21.5	5.4
Alabama	1	3	47.0	15.7
Florida	3	3	43.9	14.6
Hawaii	3	3	1.9	0.6
Iowa	2	3	16.9	5.6
Mississippi	1	3	0.9	0.3
South Carolina	1	3	6.0	2.0
Virginia	0	3	0.1	0.0
West Virginia	1	3	0.6	0.2
Arizona	3	2	16.3	8.1

State	2010 Overall Scorecard score	Number of Installations (2005–2010)	Total New Capacity (MW) (2005–2010)	Avg. Capacity (MW) per Installation
Arkansas	1	2	5.3	2.7
Idaho	2	2	3.8	1.9
Maine	4	2	4.5	2.2
Maryland	3	2	7.0	3.5
Nebraska	0	2	72.0	36.0
Nevada	2	2	9.2	4.6
Utah	3	2	12.1	6.1
Wyoming	0	2	0.4	0.2
Alaska	2	1	0.4	0.4
Missouri	2	1	10.7	10.7
Delaware	3	0	0.0	0.0
District of Columbia	4	0	0.0	0.0
Kentucky	1	0	0.0	0.0
Louisiana	0	0	0.0	0.0
New Mexico	4	0	0.0	0.0
Oklahoma	0	0	0.0	0.0
Tennessee	1	0	0.0	0.0

Figure 5. Leading States: Combined Heat & Power

Connecticut: Connecticut has developed interconnection standards applicable to CHP systems as large as 10 MW, and has established multiple size tiers so that smaller systems may benefit from easier interconnection processes. Its emissions regulations provide credit for thermal output for highly efficient CHP systems, and CHP is explicitly listed as an integral part of the state's renewable portfolio standard. In the last five years, 62 CHP systems were installed in Connecticut, with a combined capacity of over 180 MW.

Massachusetts: While its interconnection standard is not as strong as those in some states, Massachusetts's energy policies are generally very favorable to CHP. With output-based emissions standards, explicit credit for CHP in its Alternative Energy Portfolio Standard, and net metering rules that apply to CHP (a new category in this year's *Scorecard*), Massachusetts has earned the role of a leading state in CHP regulations. In the last five years, 34 CHP systems were installed in the state, with a combined capacity of over 40 MW.

New York: New York was the second state to adopt uniform interconnection standards for distributed generation systems, and adopted modifications in 2002 to streamline the application process. In 2004, the maximum capacity of interconnected systems was increased from 300 kW to 2 MW and interconnections were expanded to the state's more complex distribution systems, or "networked" systems, which exist in large, urban areas including New York City. Through the New York State Research and Development Authority's Distributed Generation and Combined Heat & Power program, the state has provided significant financial incentives and technical assistance to encourage CHP deployment. Over the past five years, 101 CHP systems have been installed in New York, with a combined capacity of over 100 MW.

CHAPTER 5: STATE GOVERNMENT INITIATIVES

Author: Michael Sciortino

Background

A state government can directly advance energy efficiency in a number of ways, and this chapter focuses on the initiatives designed, funded, and implemented by state governments. The primary ways state governments commit to energy efficiency are by providing financial incentive programs for consumers, businesses, and industry; enacting policies to improve the energy efficiency of its facilities and fleets; and fostering research, development, and demonstration (RD&D) activities for energy efficiency technologies and practices. Unlike ratepayer-funded utility programs, which are covered in Chapter 1, the initiatives featured in this chapter are funded and administered by state governments. States may administer programs through numerous agencies and institutions, including state energy offices, and departments of general services or administration, and for RD&D initiatives, state universities. While there is some overlap of state and ratepayer funding, for example where state RD&D is funded through a systems benefits charge, this chapter is designed to capture energy efficiency initiatives not already covered in Chapter 1.

Particularly in light of new non-utility funding for energy efficiency from sources like the American Recovery and Reinvestment Act (ARRA), it is critical to recognize efforts by state governments to fund and implement energy efficiency programs. State government initiatives play unique and important roles in the advancement of energy efficiency. Financial incentives offered by state agencies can be a deciding factor for consumers or businesses to invest in energy-efficient technologies or services. "Lead by example" (LBE) policies and programs improve the energy performance of state-owned facilities and fleets, but equally important, these initiatives showcase cost-effective energy efficiency measures. State governments can also promote innovative energy efficiency solutions by funding RD&D initiatives through local universities or research centers. State-led programs complement the existing landscape of utility programs, leveraging the state's public and private resources to generate energy and cost savings to the benefit of its customers and taxpayers.

Methodology

States can earn a maximum of 7 points in this category in three categories: (1) financial and information incentives; (2) lead by example (LBE) policies and programs in government buildings and fleets; and (3) research, development, & demonstration (RD&D).

We rely on the *Database of State Incentives for Renewable Energy* (DSIRE 2010) to gather information on current state tax and other financial incentive programs for buildings and equipment efficiency. Points are not given for utility-sponsored or public benefit fund financial incentive programs (which are covered in Chapter 1), but rather state incentives only. If a state contributes non-utility funds to a public benefits fund, however, they may earn a point.

States earn points for each major incentive program, which are judged upon their relative strength, customer reach, and impact (see Table 20). Given their broader impact in most cases, for example, tax credits earn a full point, while financial incentives offered to a specific customer segment may earn a half-point. States are also given credit for energy use disclosure laws, which require commercial and residential building owners to disclose information about the energy efficiency of their building to prospective buyers, lessees, or lenders. Scoring for disclosure requirements is based on the strength of the policy, and whether both commercial and residential buildings are covered.[19]

[19] Assistance with identification of disclosure policies was given by the Institute for Market Transformation (www.imt.org).

Our review of state lead by example initiatives is largely based on EPA's policy review of LBE programs and policies (EPA 2009) as well as information from DSIRE[20] and additional research. States earn a maximum of 2 points in the LBE category: 1 point for energy savings targets in new and existing state buildings; 0.5 point for a benchmarking requirement for public facilities; and 0.5 point for fleet efficiency mandates. Legislation, plans, policies, and executive orders all count as LBE policies as long as specific action on the part of an identified agency is required (plans that promote, but do not require LBE action, are not included). A benchmarking policy refers to a requirement that all buildings undergo an energy audit or have their energy performance tracked using a recognized tool such as EPA ENERGY STAR Portfolio Manager. For state fleet initiatives, states only earn a point if the plan or policy makes a specific, mandatory requirement for increasing state fleet efficiency. State alternative-fuel vehicle procurement requirements that give a voluntary option to count efficient vehicles are thus not included.

The RD&D review is based on state participation in the Association of State Energy Research Technology and Transfer Institutions (ASERTTI) and the size of effort relative to population as assessed by ACEEE staff. The review also considers responses from state officials to an information request on state-level RD&D activities. A state can receive up to 2 points in this category.

Table 20. Summary of Scoring on State Government Initiatives

State	Financial and Information Incentives (3 points)	Lead by Example (2 points)	RD&D (2 points)	Total
Massachusetts	3	1.5	2	**6.5**
Oregon	3	1	2	**6**
Alaska	3	1	1	**5**
California	1	2	2	**5**
Colorado	3	2	0	**5**
Minnesota	2.5	1.5	1	**5**
North Carolina	2	1	2	**5**
Delaware	2	2	0.5	**4.5**
Iowa	1	1.5	2	**4.5**
New Hampshire	2.5	2	0	**4.5**
New York	1.5	1	2	**4.5**
Ohio	2	1.5	1	**4.5**
Pennsylvania	3	1.5	0	**4.5**
Tennessee	2.5	1.5	0.5	**4.5**
Maryland	3	1	0	**4**
Wisconsin	1	1	2	**4**
Hawaii	1	2	0.5	**3.5**
Texas	1.5	1	1	**3.5**
Georgia	1	1.5	0.5	**3**
Louisiana	1.5	1.5	0	**3**
Michigan	1.5	1.5	0	**3**
Montana	1.5	1.5	0	**3**
New Jersey	1	1	1	**3**
Utah	1	2	0	**3**

[20] www.dsireusa.org

State	Financial and Information Incentives (3 points)	Lead by Example (2 points)	RD&D (2 points)	Total
Vermont	1.5	1.5	0	3
Arizona	1	1.5	0	2.5
Connecticut	1	1.5	0	2.5
District of Columbia	1	1.5	0	2.5
Florida	0	1.5	1	2.5
Idaho	1.5	1	0	2.5
Illinois	1	1	0.5	2.5
Indiana	1	1	0.5	2.5
Kansas	1	1.5	0	2.5
Maine	1	1.5	0	2.5
Missouri	1.5	1	0	2.5
Nevada	1.5	1	0	2.5
New Mexico	1.5	1	0	2.5
Virginia	1	1.5	0	2.5
Washington	1	1.5	0	2.5
Alabama	0.5	1.5	0	2
Arkansas	0.5	1.5	0	2
Kentucky	1	1	0	2
Oklahoma	1	1	0	2
South Carolina	1	1	0	2
South Dakota	0.5	1	0.5	2
West Virginia	0	0	2	2
Rhode Island	0	1.5	0	1.5
Mississippi	1	0	0	1
Nebraska	1	0	0	1
Wyoming	1	0	0	1
North Dakota	0	0	0	0

The American Recovery and Reinvestment Act and State Governments

The American Recovery and Reinvestment Act passed in February 2009 included the largest single investment in energy efficiency in U.S. history. The law directed approximately $17 billion to improve the country's energy efficiency and a substantial share went to the states from the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE), as listed in Table 21.[21] Additional programs that may indirectly fund state and local government programs include the Advanced Research Projects Agency-Energy (ARPA-E), which funds numerous energy efficiency research projects at state universities. Particularly in states minimally served by utility programs, these programs can provide an important first step to introduce consumers and decision-makers to the benefits of energy efficiency programs.

[21] An additional $15 billion was allocated to programs and projects in which funding could be used for energy efficiency improvements among numerous other modernization or renovation measures.

Table 21. ARRA Energy Efficiency Funding to State and Local Governments

Program	FY 2008 Budget	Stimulus Funding
Weatherization Assistance Program	$227 million	$5 billion
State Energy Program	$33 million[22]	$3.1 billion
Energy Efficiency and Conservation Block Grant Program	N/A	$3.2 billion
Appliance Rebate Program	N/A	$300 million
Total	$260 million	$11.6 billion

ARRA-Funded Programs and Scoring

State programs funded solely through ARRA, or any other federal source, do not earn points in the *Scorecard*. Because of the even distribution of the funding, the existence of these programs does not necessarily reflect the efforts of the state, but rather the federal government. Completing an assessment of a state's handling of stimulus funds would rely on fluctuating spending data and rests outside the scope of this report. ACEEE does recognize, however, that some states are implementing these federal funds in an exemplary fashion by creating innovative and effective energy efficiency programs. Some of these examples are presented in a recent ACEEE repot (see Sciortino 2010) and many more examples are available through the National Association of State Energy Officials (NASEO).[23]

Financial and Information Incentives

State financial incentives for energy efficiency are an important instrument to spur the adoption of technologies and practices in homes and businesses. Building energy disclosure laws and other types of information incentives improve consumers' purchasing power by raising awareness of the energy usage of homes and commercial buildings on the market, which can have a significant impact on the economic value of a home from a retail perspective. Financial incentives can take many forms: rebates, loans, or bonds for energy-efficient improvements; direct income tax credits for individuals or businesses; exemptions or reduced sales tax on eligible products; and income tax deductions for individuals and businesses. Financial incentives lower the net cost of efficient products to consumers and businesses, reducing the additional costs relative to standard models. Incentives also raise consumer awareness of eligible products, encouraging manufacturers and retailers to market these products more actively. As sales increase, prices come down, eventually allowing the products to function in the market without the incentives.

Table 22. State Scoring on Major Financial and Information and Incentive Programs

State	Major State Financial Incentives Programs	Score
Alaska	Four loan programs; one rebate program; home energy disclosure policy	3
Colorado	Suite of residential, public, and commercial building incentive programs	3
Maryland	Income Tax Credit For Green Buildings (personal & corporate); four loan programs	3
Massachusetts	Alternative Energy and Energy Conservation Patent Exemption (personal & corporate); one grant and one rebate program	3
Oregon	Residential and business energy tax credit; two energy loan programs	3
Pennsylvania	State-led Alternative Energy Fund; six grant and four loan programs	3
Minnesota	Five loan programs	2.5
New Hampshire	Three loan programs	2.5

[22] Required states to contribute funds worth 20% of the DOE grant toward energy projects supported by the grant.
[23] naseo.org

State	Major State Financial Incentives Programs	Score
Tennessee	Small Business and Local Government Energy Loan Programs; Energy Efficient Schools Initiative (grants and loans); Pathway revolving energy efficiency loan program	2.5
Delaware	Two grant programs	2
North Carolina	One loan and one grant program; two rebate programs	2
Ohio	Advanced Energy Program Grants; one loan program; property tax incentives	2
Idaho	Insulation income tax deduction; low interest energy loan program	1.5
Louisiana	Home Energy Rebate Option Home Energy Loan Program	1.5
Michigan	Energy Efficient Home Improvements Tax Credit; two grant programs	1.5
Missouri	Tax deduction for home energy efficiency improvements; one loan program	1.5
Montana	Energy conservation installation tax credit; tax deduction for energy-conserving investment; one loan program	1.5
Nevada	Property tax abatement for green buildings; home energy disclosure policy	1.5
New Mexico	Sustainable Building Tax Credit (personal & corporate); bond program	1.5
New York	Green Building Tax Credit Program (personal & corporate); home energy disclosure policy	1.5
Texas	Texas LoanSTAR program; energy efficiency disclosure policy	1.5
Vermont	Two loan programs	1.5
Arizona	Income tax subtraction for sold energy-efficient residences	1
California	One grant program; energy disclosure policy (commercial)	1
Connecticut	One loan program; sales tax exemption for energy-efficient products	1
District of Columbia	Energy efficiency disclosure policy (commercial)	1
Georgia	Corporate and Personal Clean Energy Tax Credits	1
Hawaii	Home energy disclosure policy in place	1
Illinois	Two grant programs	1
Indiana	Corporate and Personal Energy Savings Tax Credits	1
Iowa	Iowa Building Energy $mart Program	1
Kansas	Kansas Energy Efficiency Program for Schools (KEEPS); home energy disclosure policy	1
Kentucky	Energy efficiency tax credits (personal & corporate)	1
Maine	Building disclosure policies (residential and commercial)	1
Mississippi	One loan program	1
Nebraska	Dollar and Energy Savings Loans	1
New Jersey	One loan/grant program	1
Oklahoma	Three loan programs	1
South Carolina	Tax credit for purchase of new energy-efficient manufactured homes; one loan program	1
Utah	Two loan funds for state-owned buildings and schools	1
Virginia	Energy Leasing Program for state-owned facilities	1
Washington	Manufacturing Efficiency Grant Program; energy efficiency disclosure policy	1
Wisconsin	One revolving loan program for manufacturing efficiency	1
Wyoming	One loan and one grant program	1
Alabama	Loan program for state-owned facilities	0.5
Arkansas	Loan program for small businesses	0.5
South Dakota	Home energy disclosure policy (new residential)	0.5

Source: Database of State Incentives for Renewables and Efficiency (DSIRE 2010)

Note: Utility (ratepayer) funded financial incentives, including those run through public benefits funds and third-party administrators, are included in scoring on utility spending in Chapter 1.

Figure 6. Leading States: State Financial and Information Incentives

Alaska: While the state lacks robust ratepayer-funded energy efficiency programs, Alaska uses a substantial amount of state appropriations to fund energy efficiency incentive programs. The Home Energy Rebate Program utilizes $160 million in state funding, a major investment relative to the small population of Alaska. 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 to provide expert advice and to track savings. Alaska also offers four separate loan programs through the Alaska Housing and Finance Corporation.

Maryland: The state government in Maryland is emerging as a leader in energy efficiency financial incentive programs. The state adopted cost-effective strategies such as revolving loan programs to reach customers in numerous sectors, including agriculture, small business, residential, and institutional. Along with its four loan programs, the state has personal and commercial income tax credits that apply to energy-efficient buildings.

Lead by Example

A state's own facilities, fleets, and operations offer a unique opportunity for state governments to lead by example, incorporating energy efficiency measures into their facilities and achieving significant energy cost savings. States may mandate action through legislation, strategic plans, or executive orders to put policies in place that improve efficiency in state-owned buildings and vehicles. As state governments seek to improve their operational efficiency, these policies strengthen the economic performance of states' assets, lower their negative environmental impact, and promote energy conservation to the broader public.

State and local governments operate many facilities, including office buildings, public schools, colleges, and universities, and the energy costs to run these facilities can account for as much as 10% of a typical government's annual operating budget (EPA 2008). State vehicle fleets require a considerable amount of resources, which can be targeted with LBE policies as well. State governments operate fleets of about 500,000 vehicles, ranging from about 1,000 to more than 50,000 per state. In doing so, states incur operation and maintenance costs of about $2.5 billion in total, ranging from $7 million to $250 million (NCFSA 2007). LBE initiatives reduce electricity in state buildings and fuel consumption in state vehicle fleets, providing benefits beyond cost savings. These initiatives demonstrate leadership, reduce air pollutants and greenhouse gases, and foster local economic development in vital technological and service sectors.

Only five states have yet to implement a significant energy efficiency policy for public facilities or fleets. The most widely adopted measure at the state level is a mandatory energy savings target for new and existing state government facilities. The building requirements encourage states to invest in efficient new building construction and retrofit projects, lowering energy bills and promoting economic development in the energy services and construction sectors. A less common policy, a benchmarking requirement, takes building efficiency a step further by requiring that all buildings undergo an energy audit or have their energy performance tracked using a recognized tool such as EPA ENERGY STAR Portfolio Manager. While many states have admirable voluntary benchmarking programs, such as Minnesota and Massachusetts, a binding requirement ensures a comprehensive set of data that result in cost-effective energy efficiency investments.

States that pursue efficient vehicle fleet policies reduce fuel costs and create a hedge against rising fuel prices. Some states require the purchase of a certain proportion of alternative fuel while others require a percentage of vehicles be hybrid or use alternative fuel. The presence of a definitive efficiency standard, however, is an optimal tool that ensures a reduction in fuel consumption and greenhouse gas emissions.

Energy Savings Performance Contracting

While state policies determine our rankings for Lead by Example Initiatives, it is important to note one type of process in which these policies translate into implementation. The primary way states implement building retrofits is through Energy Savings Performance Contracts (ESPCs), which allows a state to enter into a performance-based agreement with an Energy Service Company (ESCOs). The contract allows the state to pay the ESCO for its services with money saved from installed energy efficiency measures. The ESCO industry earned revenues of $28 billion from 1990 to 2006 and continues to expand, growing 7% per year between 2006 and 2008 (Bharvirkar et al. 2008). In 2008, the ESCO industry earned $4.1 billion and institutional markets—federal, state, and local governments, K-12 schools, universities, and colleges—accounted for 84% of these revenues. A recent report estimated that the industry could reach revenues of $7.1 to $7.3 billion by 2011, an expansion primarily driven by ARRA (Satchwell et al. 2010). While ACEEE recognizes the importance of states partaking in ESPCs, tracking spending on ESPCs state-by-state is beyond the scope of this report. It is known that twelve leading states spent $1.2 billion on ESPCs from 1980–2006, but annual spending data from all states is inconsistent and represents a research need in order to compare state ESPC efforts (Bharvikar et al. 2008).

Table 23. State Scoring on Lead by Example Initiatives

State	Building Requirements (1 point)	Benchmarking Requirements (0.5 points)	Efficient Fleets (0.5 point)	Score
California	•	•	•	2
Colorado	•	•	•	2
Delaware	•	•	•	2
Hawaii	•	•	•	2
New Hampshire	•	•	•	2
Utah	•	•	•	2
Alabama	•		•	1.5
Arizona	•	•		1.5
Arkansas	•	•		1.5
Connecticut	•		•	1.5
District of Columbia	•	•		1.5
Florida	•		•	1.5
Georgia	•	•		1.5
Iowa	•	•		1.5
Kansas	•		•	1.5
Louisiana	•		•	1.5
Maine	•		•	1.5
Massachusetts	•		•	1.5
Michigan	•	•		1.5
Minnesota	•		•	1.5
Montana	•		•	1.5
Ohio	•	•		1.5
Pennsylvania	•		•	1.5
Rhode Island	•		•	1.5
Texas	•	•		1.5
Vermont	•		•	1.5
Virginia	•		•	1.5
Washington	•	•		1.5
Alaska	•			1
Idaho	•			1
Illinois	•			1
Indiana	•			1

State	Building Requirements (1 point)	Benchmarking Requirements (0.5 points)	Efficient Fleets (0.5 point)	Score
Kentucky	•			1
Maryland	•			1
Missouri	•			1
Nevada	•			1
New Jersey	•			1
New Mexico	•			1
New York	•			1
North Carolina	•			1
Oklahoma	•			1
Oregon	•			1
South Carolina	•			1
South Dakota	•			1
Tennessee	•			1
Wisconsin	•			1
Mississippi				0
Nebraska				0
North Dakota				0
West Virginia				0
Wyoming				0

Figure 7. Leading States: Lead by Example Initiatives

Hawaii: Hawaii's Lead by Example program offers a comprehensive set of services to state agencies. Aggressive policies underpin the program, which include a benchmarking requirement that all state agencies evaluate the energy efficiency in existing buildings of qualifying size and energy characteristics. Each agency must identify opportunities for increased energy efficiency by setting benchmarks for these buildings using ENERGY STAR Portfolio Manager or another similar tool. As a result of Hawaii's LBE program, during fiscal year 2009, total state agency electric consumption dropped 5.8% from 2008 and 2.5% from the baseline year of 2005. It is estimated that the savings in 2009 electricity consumption translated to savings of $10 million in general funds.

Minnesota: Over the past decade, the state of Minnesota has shown its commitment to sustainable buildings by providing leadership, setting high performance standards, and putting forward 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 fleet by 2030, the state offers a complementary benchmarking program for tracking energy use, and the Public Building Enhanced Energy Efficiency Program that aids in the implementation of retrofits. Minnesota also requires on-road vehicles owned by state departments to reduce gasoline consumption by 25% by 2010 and by 50% by 2015. Also, at least 75% of purchases of new on-road vehicles must have fuel efficiency rating that exceeds 30 mpg for city usage and 35 mpg for highway usage.

Research, Development, and Demonstration (RD&D)

In 1990, several state energy research, development, and demonstration institutions established the Association of State Energy Research and Technology Transfer Institutions (ASERTTI) in response to the increasing need for state initiatives in energy-related RD&D. Members of ASERTTI collaborate on applied RD&D and share technical and operational information with a strong focus on end-use efficiency and conservation. In addition to providing a variety of services to promote the creation, development, and commercialization of new technologies for energy efficiency, state RD&D efforts

can address a number of market failures that exist in the energy services marketplace that impede the diffusion of new technologies (Pye and Nadel 1997).

Aside from those affiliated with ASERTTI, numerous other state-level entities conduct research, development, and demonstration programs. A diverse set of institutions (including universities, state governments, and utilities) fund and implement RD&D programs for the purpose of energy efficiency. Such programs include research on energy consumption patterns in local industries, development of energy-saving technologies at state or university research centers, and demonstration through public/private partnerships.

Individual state research institutions exist primarily to provide expertise and knowledge to their states from which policymakers can draw in order to advance successful efficiency programs. Through research and development, they also provide the impetus for commercial investment and manufacturing of the new technologies that these institutions conceive. Additionally, these research institutions provide valuable knowledge spillovers to other states through the sharing of information—which is facilitated through membership with ASERTTI, allowing states to benefit from other states' research. States without these institutions can then use this shared information as a roadmap in order to advance their own efficiency programs.

Table 24. State Scoring on RD&D Programs

State	Major RD&D Programs	Score
California	The California Energy Commission's Public Interest Energy Research (PIER)	2
Iowa	The Iowa Energy Center	2
Massachusetts	Massachusetts Energy Efficiency Partnership (MAEEP), deep energy retrofit and behavioral pilot programs; High Performance Green Building Grants	2
New York	New York State Energy Research and Development Authority (NYSERDA)	2
North Carolina	The North Carolina Green Business Fund and NC Solar Center	2
Oregon	The Oregon State University Energy Efficiency Center, University of Oregon Energy Studies in Building Laboratory, and The Energy Trust of Oregon	2
West Virginia	Energy Efficiency Center of West Virginia and the West Virginia University Building Energy Center	2
Wisconsin	Energy Center of Wisconsin and Wisconsin Focus on Energy	2
Alaska	The Cold Climate Housing Research Center and The Alaska Housing Finance Corporation Research Information Center (RIC)	1
Florida	Florida Solar Energy Center	1
Minnesota	The Conservation Applied Research & Development (CARD) Fund	1
New Jersey	The New Jersey Commission on Science and Technology (CST) administers the Edison Innovation Clean Energy Fund	1
New Mexico	The Energy Innovation Fund, managed by the Energy, Minerals and Natural Resources Department	1
Ohio	Ohio Air Quality Development Authority (AQDA) Advanced Energy Program Grants and Energy Industries of Ohio	1
Texas	The Texas A&M Energy Systems Laboratory (ESL)	1
Delaware	Two RD&D grant programs run through the Green Energy Fund	0.5
Georgia	Funded in part by Georgia Environmental Finance Authority, Southface conducts research and training on energy efficient housing and communities	0.5
Hawaii	The Transportation Energy Transformation Program	0.5
Illinois	The University of Illinois at Chicago Energy Resources Center	0.5
Indiana	The Indiana Office of Energy Development (OED)	0.5
South Dakota	South Dakota State University Energy Analysis Laboratory	0.5
Tennessee	Energy efficiency technologies eligible for Tennessee's emerging industry tax credit	0.5

Note: See Appendix B for expanded descriptions of state energy efficiency RD&D program activities.

Figure 8. Leading States: State Research, Development, and Demonstration Initiatives

New York: The New York State Energy Research and Development Authority is the epitome of an effective and influential research and development institution. Its RD&D activities are primarily funded through various charges on state ratepayers. The RD&D efforts include a wide range of energy efficiency and renewables programs, organized into seven primary program areas: Energy Resources, Transportation and Power Systems, Energy and Environmental Markets, Industry, Buildings, Transmission and Distribution, and Environmental Research. NYSERDA's 2009/10 RD&D budget was approximately $165 million.

Wisconsin: The Energy Center of Wisconsin conducts technology and field research, education programs, and market research. The Energy Center, funded through state, ratepayer, private, and other sources, features an award-winning program on building energy use in commercial new construction. Other research focuses on buildings and market characteristics, as well as bio-energy.

Wisconsin Focus on Energy operates an Emerging Technology (ET) program that promotes emerging industrial energy efficiency technologies. The program deploys and commercializes those emerging industrial technologies that have the potential for large, cost-effective energy savings and multiple installations in Wisconsin. The ET program uses an investment model to help first adopters overcome the risks associated with emerging technologies. Program investments may be shared savings loans, leases, or other shared risk models where the customer pays back the loan or lease based on a portion of the metered savings. This arrangement allows the adopter to always remain cash flow positive since the ET program is willing to risk repayment fluctuations due to changes in production.

CHAPTER 6: APPLIANCE AND EQUIPMENT EFFICIENCY STANDARDS

Author: Max Neubauer

Background

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 usage and energy cost for a single device may seem small, the extra energy consumed by less efficient products collectively adds up to a significant amount of wasted energy. Real and persistent market barriers, however, inhibit sales of more efficient models. Appliance efficiency standards overcome these barriers by requiring manufacturers to meet minimum efficiency levels for all products, therefore 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 states, such as New York and Massachusetts, followed soon after. The federal government did not institute any national standards until 1988 through the passing of the National Appliance Energy Conservation Act of 1987, which created national standards 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 the U.S. Department of Energy to review and strengthen standards on a specific standard. All told, about 45 products are now subject to national efficiency standards.

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 (EPAct) and the Energy Independence and Security Act of 2007 (EISA), states that have set standards prior to federal enactment may enforce their state standards up until the federal standards become effective; states that have not yet set standards are preempted immediately. States that wish to implement their own standard 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.

Methodology

A state can earn up to 3 points for adoption of appliance efficiency standards. We score states based on the potential savings in billion Btus (BBtu) generated through 2030 by appliance efficiency standards not presently preempted by federal standards. The savings estimates, which are based on an analysis by the Appliance Standards Awareness Project (ASAP) and ACEEE (Neubauer et al. 2009), are normalized based on the number of residential customers in the state so that each state is ranked on the amount of savings generated per customer. Each state earns a score of 0 to 3 in increments of half (0.5) points. See Table 25 for the scoring methodology.

Table 25. Scoring Methodology for Savings from Appliance Standards

Energy Savings per Customer through 2030 (BBtu/customer)	Score
≤ 100	3
50 ≤ x < 100	2.5
10 ≤ x < 50	2
5 ≤ x < 10	1.5
2 ≤ x < 5	1
0 < x < 2	0.5
0	0

Table 26. State Scoring for Appliance Efficiency Standards

States	Energy Savings per Customer through 2030 (BBtu/customer)	Date Most Recent Standards Adopted	Score
California	122	2010	3
Nevada	76	2007	2.5
Massachusetts*	7.3	2005	2.5
New York	9.4	2010	1.5
Arizona	7.7	2009	1.5
Oregon	3.1	2007	1
Connecticut	2.9	2007	1
Washington	1.2	2009	0.5
District of Columbia	0.6	2009	0.5
Maryland	0.5	2007	0.5
Rhode Island	0.5	2006	0.5
New Hampshire	0.4	2008	0.5
Vermont	0	2006	0
New Jersey	0	2005	0

Sources: Appliance Standards Awareness Project (Neubauer et al. 2009); DSIRE (2010), as of September 2010
* Note: In addition to standards enacted in Massachusetts, the state earns a point for having developed a waiver of federal standards for gas furnace minimum efficiency.

California, scoring a maximum of 3 points, continues to take the lead on appliance efficiency standards, most recently adopting the first-ever standards for televisions. Not only has California enacted the greatest number of standards, most other states' standards are based on California's. Many of the current state standards have now been included in pending federal legislation; thus, without future state initiative to develop and implement standards for additional products, the number of state standards preempted by federal standards will likely increase.

Figure 8. Leading States: Appliance and Equipment Efficiency Standards

California: California was the first state in the country to adopt appliance and equipment efficiency standards in 1976. 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 1976. California's 2009 Appliance Efficiency Regulations were adopted in December 2008 and became effective on August 9, 2009, replacing all previous versions. The regulations created standards for 23 categories of appliances, including standards for both federally-regulated and non-federally-regulated appliances. California is also the first state to introduce standards for televisions, which will become effective in 2011 for televisions smaller than 58 inches. A tighter standard will become effective in 2013.

Massachusetts: Massachusetts first enacted appliance efficiency standards in 1986. In 2005, the state expanded the standards to include additional products. The most significant recent development was the state's completion and application submission for a waiver from federal preemption to implement a state standard for home furnaces stricter than federal minimums. This task helped to spur manufacturer interest in a negotiated federal standard for gas furnaces.

CHAPTER 7: MEASURING PERFORMANCE IN STATE ENERGY EFFICIENCY: RESIDENTIAL SECTOR

Authors: Colin Sheppard, Margaret Harper, Arne Jacobson, and Charles Chamberlin (Schatz Energy Research Center, Humboldt State University), and Yerina Mugica (Natural Resources Defense Council).

Note: Findings from this chapter are not included in the overall state rankings of this report, but rather as an exploratory exercise in measuring energy consumption trends as a means to understanding energy efficiency.

Summary

In this chapter, we present and discuss a methodology for an aggregate, state-level metric of energy consumption intensity (ECI) in the residential sector and provide summary results for each of the lower 50 states. The methodology identifies changes in state energy consumption intensity (i.e., energy consumption per capita) after adjusting for changes due to year-to-year variations in weather. The methodology has been revised since the *2009 Scorecard* to account for differences between states in the average heat rate applied to electricity sales when estimating primary energy consumption. In addition, the *2009 Scorecard* contained summary results for the year 2006, this *Scorecard* contains summary results for the years 2006–2008 using the revised methodology. This research confirms that it is possible to track trends in state energy consumption intensity, even with the imperfect data sets that are currently available. With improvements in the data collection process, the approach could be further strengthened into a powerful tool for evaluating states' progress in reducing energy consumption.

Acknowledgements

This chapter is the result of an analysis completed by the authors and commissioned by the Center for Market Innovation at the Natural Resources Defense Council. A detailed report about a performance-based state energy efficiency metric that could be used to increase transparency and accountability of energy efficiency performance among states and potentially to reward states for improved performance can be downloaded at the following Web site: http://www.schatzlab.org/projects/psep.

Measuring Performance

Our approach for tracking ECI is based on per capita energy consumption data for the residential sector in each state over a period of 10 years. We use the results of a regression analysis to adjust ECI in a given year for changes in residential heating and cooling energy use due to annual variations in state weather. We call this corrected value the adjusted energy consumption intensity (aECI). In order to evaluate a state's performance in reducing aECI, we estimate the slope of a linear trend through the ten years preceding a given test year. States with a downward (negative) slope are considered to have achieved progress, while those with a flat or increasing slope are not. The following section describes this methodology in further detail.

Table 27 presents a ranking of states based on the slope of aECI for the three most recent periods for which data are available (1997–2006, 1998–2007, and 1999–2008). When the ten-year slope of aECI is recalculated on an annual basis, there is considerable overlap from period to period in the data used to create the metric. The three periods shown in Table 27 illustrate the variability and evolution of states' performance year over year.

Table 27. State Ten-Year Slopes of aECI from 1997–2006, 1998–2007, and 1999–2008 and Corresponding Rankings[24]

	2006		2007		2008*	
Rank	State	Slope of aECI	State	Slope of aECI	State	Slope of aECI
1	WA	-0.25	WA	-0.34	MA	-0.59
2	CA	-0.19	MA	-0.22	WA	-0.48
3	OR	-0.03	CA	-0.20	TX	-0.35
4	UT	0.00	OR	-0.19	OR	-0.35
5	TX	0.01	TX	-0.18	MI	-0.23
6	IL	0.11	NH	-0.12	ME	-0.23
7	MA	0.14	NY	-0.01	NY	-0.20
8	NY	0.15	KS	0.04	CA	-0.16
9	SD	0.20	UT	0.06	NH	-0.15
10	HI	0.21	MI	0.11	WI	-0.12
11	NE	0.25	RI	0.13	UT	-0.04
12	NJ	0.25	IL	0.15	RI	-0.04
13	NH	0.26	WI	0.15	VT	-0.04
14	ID	0.29	VT	0.16	PA	-0.03
15	RI	0.30	NE	0.16	MD	-0.01
16	KS	0.30	MD	0.17	KS	0.04
17	MD	0.30	ME	0.18	NE	0.06
18	NV	0.33	HI	0.19	AR	0.09
19	IA	0.34	AR	0.25	AK	0.09
20	MI	0.36	SD	0.26	CT	0.09
21	OH	0.36	ID	0.26	IL	0.10
22	WI	0.39	NC	0.26	DE	0.11
23	NC	0.40	NJ	0.27	NC	0.11
24	LA	0.42	PA	0.28	MN	0.11
25	AR	0.43	MS	0.28	MS	0.13
26	PA	0.43	IA	0.33	NJ	0.14
27	IN	0.46	GA	0.35	ID	0.14
28	TN	0.46	TN	0.35	GA	0.17
29	SC	0.48	OH	0.36	OH	0.20
30	OK	0.50	OK	0.36	HI	0.22
31	MS	0.51	LA	0.36	SC	0.23
32	GA	0.52	SC	0.36	FL	0.24
33	NM	0.53	NV	0.38	TN	0.24
34	KY	0.53	MN	0.42	NV	0.25
35	VT	0.54	FL	0.43	SD	0.26
36	MN	0.55	IN	0.44	IA	0.27
37	MO	0.55	DE	0.45	LA	0.28
38	AZ	0.56	NM	0.46	AL	0.28
39	VA	0.60	AL	0.46	IN	0.32
40	FL	0.61	MO	0.50	KY	0.34
41	AL	0.67	KY	0.51	NM	0.34
42	AK	0.71	AZ	0.53	OK	0.36
43	CO	0.76	VA	0.56	CO	0.38
44	DE	0.79	CT	0.59	VA	0.39
45	ME	0.79	CO	0.64	MO	0.39
46	MT	0.84	AK	0.66	AZ	0.47
47	CT	0.89	MT	1.08	WV	0.98
48	WY	0.97	WV	1.14	MT	1.01
49	WV	1.15	WY	1.19	WY	1.20
50	ND	1.49	ND	1.51	ND	1.29

* See Figure 9 for a graphical representation of the 1999–2008 ten-year slope data

[24] The results from 1997–2006 are based upon a revised methodology and therefore differ from the results over the same period that were included in Chapter 7 of the *2009 Scorecard*.

Figure 9 presents a graphical display of the results from 1999–2008. This metric allows the ranking of states to be based upon recent reductions in their aECI. In other words, states are rated relative to their own baseline; this approach gives every state the opportunity to rise in the rankings.

Figure 9. Ten-Year Slope of Adjusted ECI from 1999–2008 for U.S. States

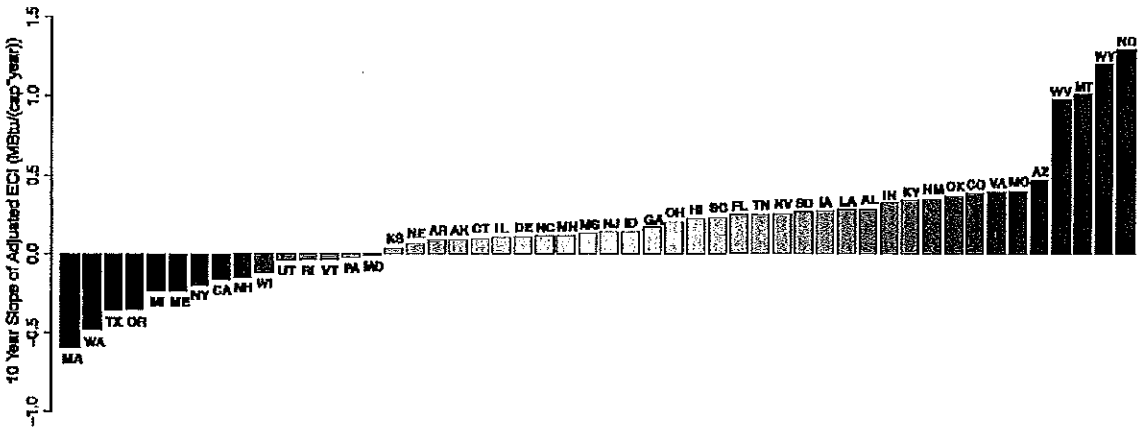
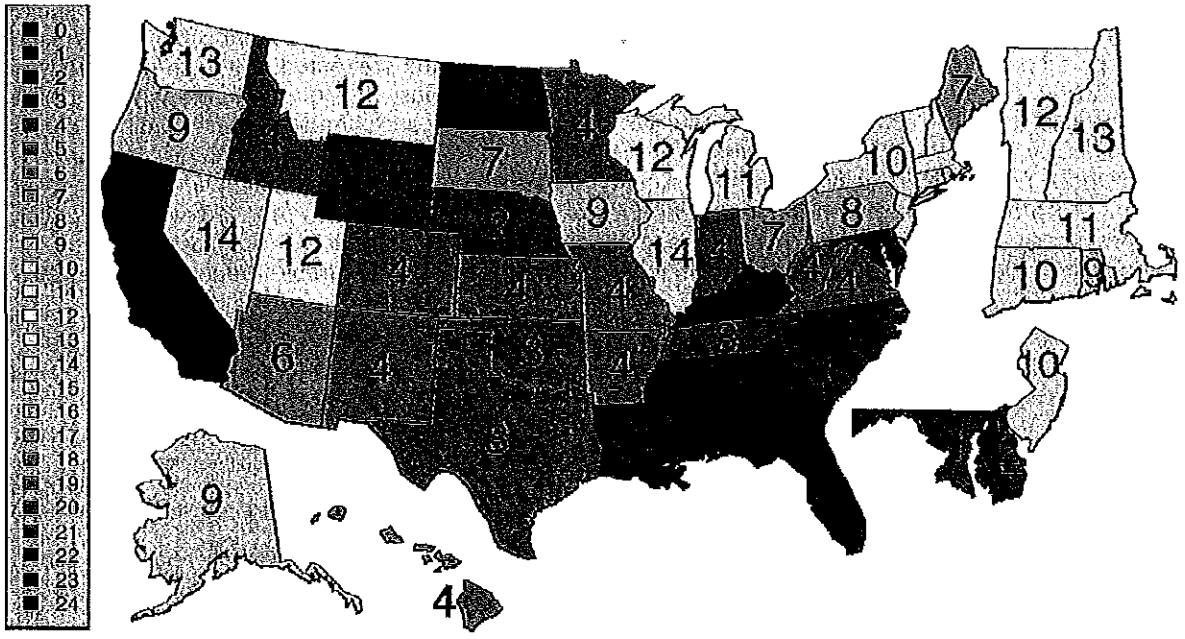


Figure 10 summarizes the *historical performance* of the states when this metric is applied to every ten-year period from 1976–1985 to 1999–2008; it presents the total number of years in which the ten-year slope of aECI was negative for each state. The states with the largest number of negative slopes are the ones that have consistently decreased their aECI over the time period. Figure 9 above represents a more recent snapshot of performance.

Figure 10. Summary of the Number of 10-Year Periods from 1985-2008 in which the Slope of aECI Was Negative



Methodological Approach

The approach that we recommend for tracking ECI begins with aggregate energy consumption data for the residential sector in each state over a period of 10 years.[25] These data are adjusted according to state population, yielding annual per capita residential energy consumption intensity (MBtu/capita/year). The data are also corrected for an unrealistic assumption made by the EIA that primary energy associated with electricity consumption should be estimated using a national averaged fossil fueled heat rate. Our analysis estimates a state specific heat rate based on the composition of electricity production, which assumes no conversion losses from renewable electricity,[26] hydropower, and nuclear power.[27]

While there are many causes for variation in energy consumption intensity, weather is most clearly beyond the influence of policy makers.[28] Therefore, adjusting for this factor is an important step in the evaluation of consumption trends that result from policy changes. We perform a fixed effect multiple linear regression to determine the response of ECI to heating and cooling degree days (HDD and CDD), both strong indicators of the impact of climate on building energy consumption. The regression includes dummy coefficients to model the fixed differences in ECI from state to state as well as differences from year to year across all states. The estimated weather coefficients are used to adjust ECI in a given year to a normal weather year based on the state's 30-year average HDD and CDD values.[29]

The result is an adjusted residential sector ECI (aECI) trend for each state that includes corrections for changes in residential heating and cooling energy use due to annual variations in state weather. In order to evaluate a state's performance in reducing aECI, we estimate the slope of a linear trend line through the ten years preceding a given test year. States with a downward (negative) slope, which indicates a decrease in aECI, are considered to have achieved progress, while those with a flat or increasing slope are not.[30] Figures 11 and 12 illustrate how this metric is determined using the states of California and South Carolina as examples.

The proposed performance-based metric for evaluating states' progress that is described in this chapter differs from the rest of the *Scorecard* for state energy efficiency policy in some important ways. First, there are differences in the sectors that are currently covered by the respective approaches. For instance, the *Scorecard* includes an evaluation of residential, commercial, and transportation sector policies, while the performance-based metric presented in this chapter focuses exclusively on the residential sector (although there are plans to expand the analysis to the commercial building sector). Additionally, while the rest of the *Scorecard* gives credit to states immediately for enacting efficiency-oriented policies, a performance-based approach gives credit only after those policies have delivered results in terms of reductions in energy consumption intensity over time. As a result, there is an inherent time lag between policy and performance-based evaluation approaches. Moreover, with a performance-based approach, states will not receive credit for enacting efficiency-oriented policies unless those policies result in measurable reductions in weather-

[25] The energy data are from the Energy Information Agency of the U.S. Department of Energy's State Energy Data System (SEDS). Population data are from census and annual intercensal estimates from the U.S. Department of Commerce, Bureau of the Census.

[26] We treat the following as renewable sources of electricity: wind, solar, wood, geothermal, and municipal waste.

[27] Because the grid mix in each state changes from year to year, the heat rate estimate also changes. However, we seek to separate the impact on consumption of energy efficiency measures from changes in grid mix or conversion efficiency. To address this issue, we use a constant state specific heat rate for any given evaluation period. For example, if our metric is concerned with ECI trends in California for the period 1999–2008, then we use the average heat rate over that period to make the adjustment to primary energy associated with electricity consumption.

[28] Other factors typically included in this kind of analysis include economic indicators and the price of energy. See our full report for a discussion of our decision not to adjust for these factors: http://www.schatzlab.org/projects/psep/psep.php

[29] State level, population-weighted HDD and CDD values are not currently published for Alaska and Hawaii by the NDCD. The methodology for estimating these values from 1975–2008 is described in Appendix D of our broader report: http://www.schatzlab.org/projects/psep/psep.php

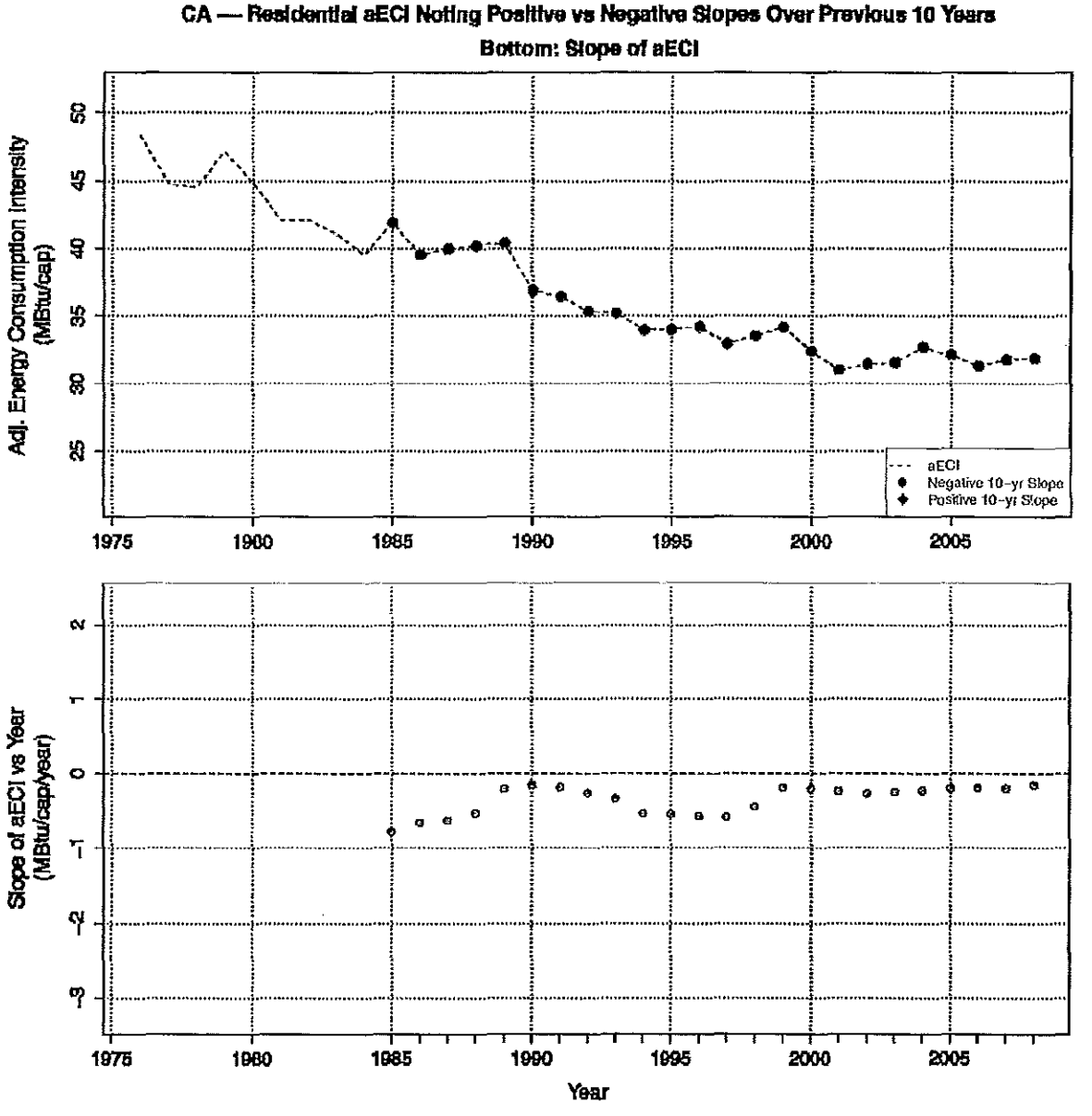
[30] It is also possible to add the condition that the slope estimate for a given test period be negative with some level of confidence. This can decrease the occurrence of false positives, that is, exclude states that actually made no improvement in aECI from our definition of progress. In our broader report, we apply such a hypothesis test at the 80% significance level.

adjusted energy consumption intensity. Finally, as described in more detail in the "Key Conclusions" section below, the data currently reported for energy consumption by state are not perfect. This may influence some of the results in the current assessment of performance-based results. As a result of these differences, it is not surprising that in some cases, states' rankings under the performance metric presented in this chapter do not match those in the rest of the *Scorecard*. Importantly, the approaches can be used to complement each other, as one is a measure of state energy efficiency policy while the other is a measure of progress in achieving reductions in energy consumption intensity.

A Closer Look at Two States

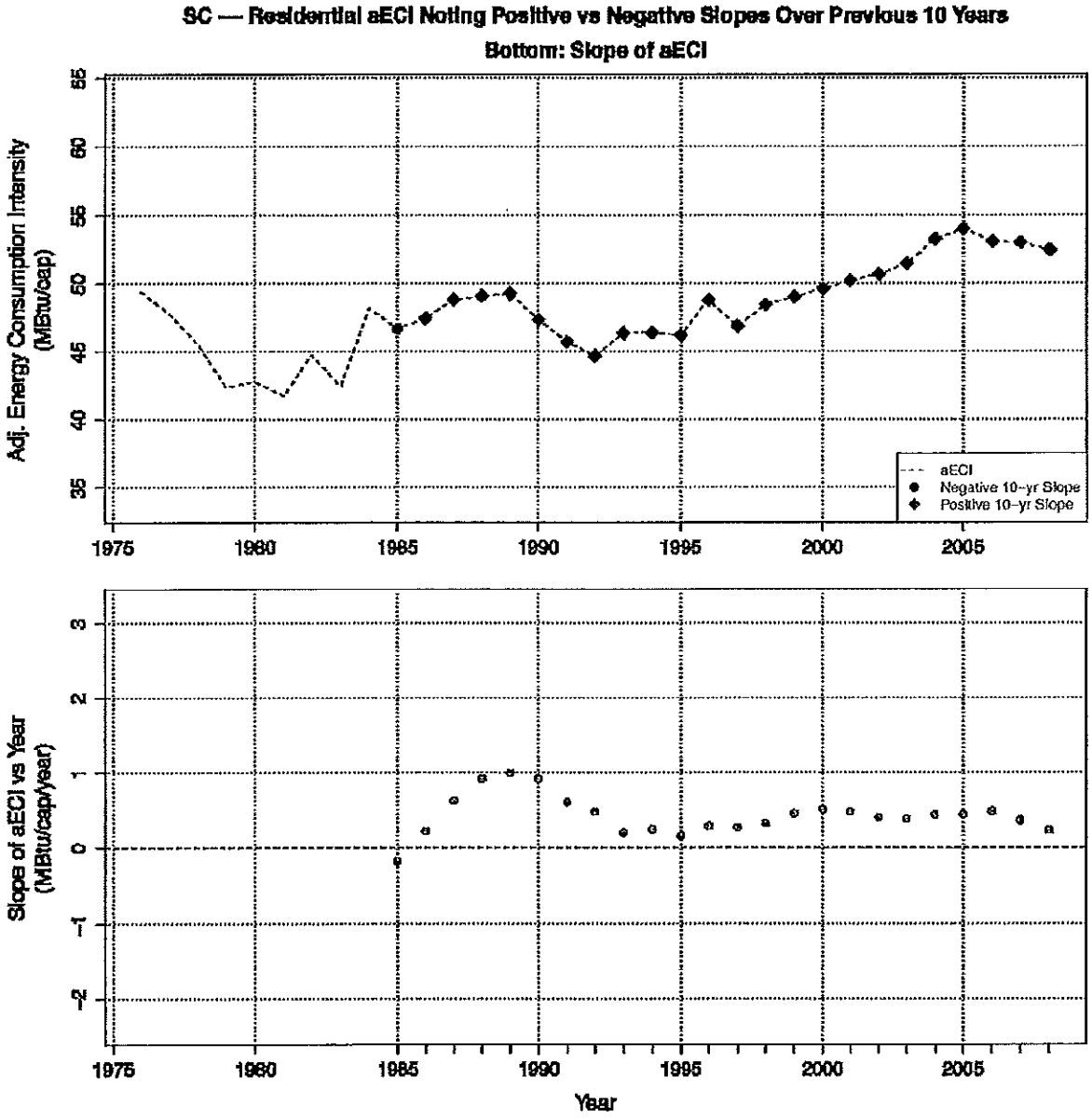
In Figures 11 and 12, we present the result of this analysis for the states of California and South Carolina. California shows a generally decreasing trend over the whole time period and in all 24 years from 1985-2008 the state had a negative ten-year slope. South Carolina exhibits an overall increasing trend and had only one negative ten-year slope, in 1985, during the time period.

Figure 11. California Residential Adjusted ECI Trend (Top) and Ten Year Adjusted ECI Slopes (Bottom)



Note: The aECI trend is marked based on whether the corresponding slope term is positive (grey diamond) or negative (green circle).

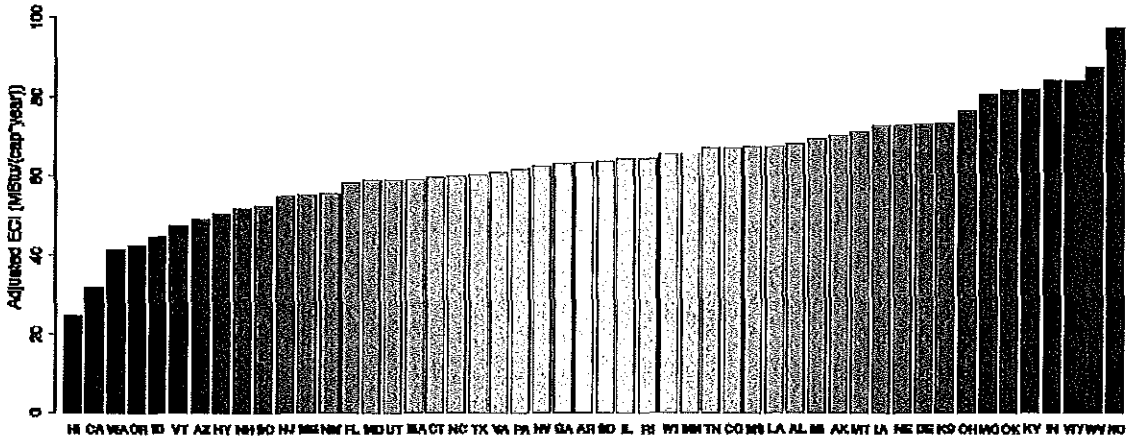
Figure 12. South Carolina Residential Adjusted ECI Trend (Top) and Ten Year Adjusted ECI Slopes (Bottom)



Note: The aECI trend is marked based on whether the corresponding slope term is positive (grey diamond) or negative (green circle).

In addition to measuring improvement in energy efficiency over time, the absolute value of residential energy consumption adjusted for weather can provide a useful reference. In Figure 13, we present aECI by state in ascending order for the year 2008. While aECI is weather adjusted, it does not account for inherent climatic and other differences between states (e.g. mild versus extreme weather will have a large influence on the magnitude of aECI). Therefore, the absolute value of aECI does not necessarily reflect the strength of state policy or other factors that influence energy efficiency. It is for this reason that we have used the rate of change (i.e., the slope) in aECI over a ten-year time period rather than current year aECI as the basis for evaluating states' progress.

Figure 13: 2008 Weather-Adjusted Energy Consumption Intensity for Continental U.S. States



Ground Truth Analysis

We have conducted a series of analyses we call "ground truth" reports to better understand the relationship between performance as measured by this metric and the history of residential sector energy consumption and residential efficiency policies in specific states. This ground truth work has proven extremely valuable on two counts.

Based on taking a detailed look at certain states, we have discovered important considerations that were originally missing from our methodology. We have subsequently addressed these considerations in the updated method used for this report. For example, analysis of Washington's consumption trends led us to realize that the SEDS data analysis unrealistically treats all electricity consumption as if it were produced by fossil fuel power plants.

Secondly, the ground truth analysis of some states has revealed what may be missing in current policies and programs or where opportunities may exist for improvement. For example, Vermont has a long history of aggressive energy efficiency policies, but they have largely been focused on reducing electricity consumption. Historical growth in fuel oil consumption, the dominant form of energy use in Vermont, has offset those electric efficiency policy achievements.

Ultimately, a combination of an aggregate level metric along with detailed ground truth analysis can yield conclusions and insights of more value than what either approach might accomplish on its own. The metric tracks overall progress and the ground truth analysis leads to strategies for improving performance.

The full ground truth reports can be found on the Schatz Energy Research Center Web site.[31]

Disaggregated Energy Consumption

The starting point for our ground truth analyses is to look at energy consumption within a state disaggregated by energy source (e.g., electricity, natural gas, petroleum products, etc.). This type of disaggregated analysis can help explain some of the results presented in this chapter. The following discussion highlights consumption trends within some of the highest performing states according to this metric: the New England states and Texas.

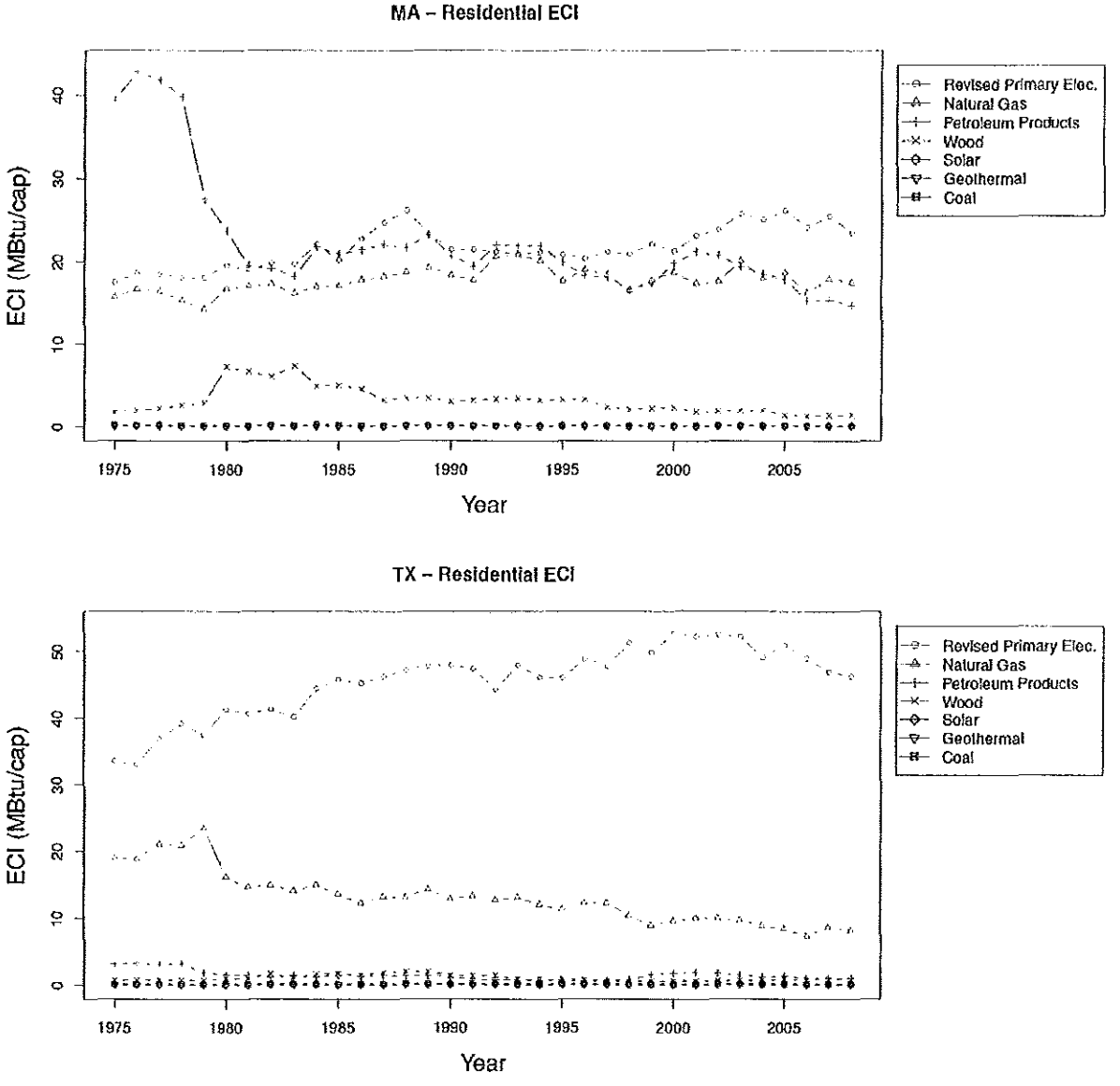
[31] http://www.schatzlab.org/projects/psep

The top state rankings for 2007 and 2008 contain most of the New England states (all but Connecticut were in the top 17 in both years). Across New England, the principal drivers of this progress are recent declines in the consumption of petroleum products (mostly fuel oil) and, in some states, natural gas (see Figure 14 for an example state). Decreases in fuel oil consumption may be a consequence of price signals, policy efforts, or a combination of both. Nevertheless, there have not been any corresponding increases in other types of energy consumption, which suggests that residents are moving toward heating fuels and equipment with higher efficiencies.

Texas also stands out as a high performing state according to this metric (they are among the top five states for all three test years: 2006–2008). The disaggregated data for Texas (Figure 14) show a longstanding, steady decline in natural gas consumption since 1980. This decrease has historically been offset by a corresponding increase in electricity consumption; however, the electricity trend has flattened in the last decade, resulting in marked decreases in overall aECI.

Analysis of disaggregated consumption does not explain the mechanisms behind the trends. Rather it serves as a valuable starting point for further investigation, providing insight and guidance as to what might be the principle drivers of a state's performance.

Figure 14: Energy Consumption Intensity Disaggregated by Fuel for Massachusetts and Texas



Key Considerations and Conclusions

The analyses that we have conducted indicate that it is possible to track trends in residential ECI by state. Although ECI trends can be tracked, it is not possible to isolate changes in ECI that are solely due to policy choices from changes due to other factors with 100% reliability. However, while we were not able to explain all of the year-to-year variability in the ECI with this approach, including additional policy independent variables (e.g., disposable income, percent employment, GDP by state, etc.) did not dramatically improve the results. Therefore, while no metric can isolate changes due to policy with 100% reliability, we believe this methodology is a reasonable approach to gauge policy impacts over the long term. Notably, a preliminary analysis of commercial sector data indicates that it may be possible to extend the use of the performance-based ECI metric to the commercial sector, although access to improved data would be required to achieve this.

Almost all of the data used in the analyses in this report are from the EIA State Energy Data System (SEDS). The data for SEDS are self-reported by utilities and electric power generating plants, and the sectoral classifications (i.e., residential, commercial, etc.) are based on the supplier classification of accounts and may vary by supplier, by state, and by year. In order to more accurately track state level trends in energy efficiency, we recommend the following improvements in data collection and reporting:

1. Standardize and Disaggregate SEDS Classification System: For ideal implementation of the proposed program, the classification system associated with SEDS should be standardized across all states and suppliers.

2. Quarterly Energy Consumption and HDD/CDD Data: If quarterly, not just annual, energy consumption data were available, the statistical power of the proposed analysis would be increased substantially.

3. Implement System to Improve Reliability of Data reported through SEDS: assessing and improving the reliability of the self reported data from utilities and electric power generating plants is important to accurately track consumption trends and ultimately design effective energy efficiency policies and programs.

4. Population Weight HDD and CDD using Current Year Populations: Currently, HDD and CDD values are weighted by the decennial census population data; this should be changed to use annual population estimates.

5. Publish Population Weighted HDD and CDD for the States of Alaska and Hawaii: Currently, the NCDC do not make estimates of annual HDD and CDD available for these states. While stand-in estimates can be made based on available data, the NCDC should include these states in its product to ensure that a consistent methodology is used.

6. Publish Consumption-Based Grid Mix Data: Estimating the mix of generation types on the electricity grid would ideally be based on electricity consumption in each state rather than on energy production. The current SEDS data only allow for production-based estimates for each state, with no accounting for imports and exports.

7. Establish Clear Leadership and Coordination across Agencies: At present, the data required for this analysis are collected by a wide range of agencies, including the EIA, NCDC, and Census Bureau. All of the contributing agencies should explicitly be made responsible for providing their portion of the data on a timely basis and should be funded so they can do so.

8. Improve Timeliness of Data Reporting: For the state energy consumption tracking system to be effective and have its desired influence, the interval between the end of the reporting period and the release of the tracking results should be as brief as practical (e.g., 6–12 months).

To successfully implement these changes, the EIA and other agencies will require modest funding increases in order to cover costs associated with additional data collection and processing.

Finally, we recommend that any top-down metric be accompanied in practice with detailed ground truth analysis. The combination of these two approaches can yield conclusions and insights of more value than what either approach might accomplish on its own.

CHAPTER 8: DISCUSSION OF SCORECARD RESULTS

The results of the *Scorecard* are presented again in Table 28 and the last column shows the state's change in ranking compared to the *2009 Scorecard*. Readers should note an important caveat: changes in state rankings are due to *both* changes in the scoring methodology as well as changes in state efficiency programs and policies. We present here some key highlights on changes in state rankings, discuss the notable states making new commitments to energy efficiency over the past year, and suggest further areas of research for future editions of the *Scorecard*.

Table 28. Summary of Overall State Scoring on Energy Efficiency

Rank	State	Utility and Public Benefits Fund Efficiency Programs and Policies Score	Transportation Score	Building Energy Code Score	Combined Heat and Power (CHP) Score	State Government Initiatives Score	Appliance Efficiency Standards Score	Total Score	Change in Rank from 2009 Results
	Maximum Possible Points:	*20*	*8*	*7*	*5*	*7*	*3*	*50*	
1	California	18.5	7	7	5	5	3	45.5	0
2	Massachusetts	15.5	6	7	5	7	2.5	42.5	0
3	Oregon	14.5	5	6.5	4	6	1	37	1
4	New York	12	5	6.5	5	4.5	1.5	34.5	1
5	Vermont	19.5	4	3.5	3	3	0	33	1
6	Washington	12.5	6	6	4	2.5	0.5	31.5	1
7	Rhode Island	16	4	5.5	2	1.5	0.5	29.5	2
8	Connecticut	10.5	5	4	5	2.5	1	28	-5
8	Minnesota	15	1	4	3	5	0	28	0
10	Maine	10.5	4	6	4	2.5	0	27	0
11	Wisconsin	13	1	4	4	4	0	26	0
12	New Jersey	7	5	5.5	4	3	0	24.5	1
12	Hawaii	12	2	4	3	3.5	0	24.5	7
12	Iowa	12	0	6	2	4.5	0	24.5	6
↑ 12	Utah	11.5	2	5	3	3	0	24.5	↑ 11
16	Maryland	6	5	5.5	3	4	0.5	24	-5
16	Pennsylvania	4.5	4	6	5	4.5	0	24	-1
↑ 18	Arizona	9	4	3	3	2.5	1.5	23	↑ 11
19	Nevada	11	0	4	2	2.5	2.5	22	-3
19	District of Columbia	5	4	6	4	2.5	0.5	22	1
19	Colorado	10	1	2	4	5	0	22	-3
↑ 22	New Mexico	6.5	2	5.5	4	3.5	0	21.5	↑ 8
22	New Hampshire	9	0	5.5	2	4.5	0.5	21.5	-9
24	North Carolina	5	0	5	5	5	0	20	2
25	Illinois	5.5	0	5.5	5	2.5	0	18.5	1
26	Idaho	8.5	0	5	2	2.5	0	18	-6
27	Delaware	1.5	3	5.5	3	4.5	0	17.5	-7
27	Ohio	4.5	0	3.5	5	4.5	0	17.5	1
27	Michigan	8	0	4.5	2	3	0	17.5	7
30	Florida	4	2	5.5	3	2.5	0	17	-7
31	Indiana	5.5	0	5.5	3	2.5	0	16.5	1

Rank	State	Utility and Public Benefits Fund Efficiency Programs and Policies Score	Transportation Score	Building Energy Code Score	Combined Heat and Power (CHP) Score	State Government Initiatives Score	Appliance Efficiency Standards Score	Total Score	Change in Rank from 2009 Results
32	Texas	3	0	3	5	3.5	0	14.5	-9
33	Montana	4	0	6	1	3	0	14	-2
34	Virginia	1.5	1	6.5	0	2.5	0	11.5	0
35	Tennessee	1.5	2	2	1	4.5	0	11	3
36	Kentucky	3.5	0	4	1	2	0	10.5	-3
† 37	Alaska	0	1	2	2	5	0	10	† 8
37	Georgia	1.5	1	4.5	0	3	0	10	7
39	South Dakota	4	0	0.5	3	2	0	9.5	-3
40	South Carolina	1.5	1	3	1	2	0	8.5	-4
41	Arkansas	1.5	0	3	1	2	0	7.5	0
42	Louisiana	0	0	4	0	3	0	7	-1
43	Missouri	1.5	0	0	2	2.5	0	6	-2
43	Oklahoma	1.5	1	1.5	0	2	0	6	-4
43	West Virginia	0	0	3	1	2	0	6	2
46	Kansas	0.5	0	2	0	2.5	0	5	-7
47	Nebraska	0.5	0	2.5	0	1	0	4	0
48	Wyoming	2.5	0	0	0	1	0	3.5	3
49	Alabama	0	0	0	1	2	0	3	-1
50	Mississippi	0	0	0	1	1	0	2	-1
51	North Dakota	0.5	0	0	1	0	0	1.5	-2

Notes: † denotes "most improved" states.

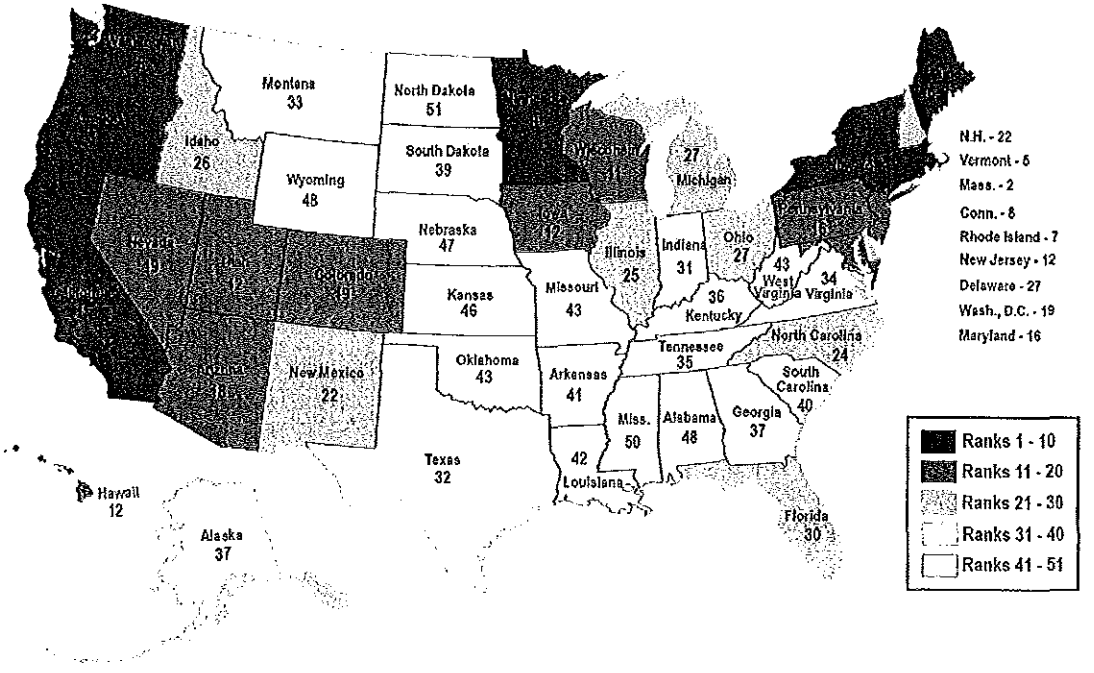
Differences among States

In this *Scorecard,* we attempt to plausibly score states on their varying commitments to energy efficiency policies and programs. Readers should note, however, that minor differences in overall state rankings, such as the difference between one to a few ranking positions, should not be viewed as significant. Differences between "bins" of ten states or so, however, provide more real comparisons among state efficiency commitments. See Figure 15, which shows the five "bins" of ten state rankings.

Changes in Scoring Methodology

Some minor changes in scoring methodology compared to last year may affect some of the overall rankings. The Utility and Public Benefits Fund Program and Policies chapter included several improvements and updates to the methodology. Instead of tracking actual program data, which has a two-year data lag, this year we track program budget data, which has only a one-year data lag. We hope this represents a more up-to-date snapshot of state program activity. We also increased the thresholds that states had to reach to earn points for program budget and electricity savings in Chapter 1, effectively making it slightly more difficult to earn points, to reflect the rising levels of relative program commitments that we consider to be best practice. This means that a state may have increased its program budget this year relative to other states, but earned the same number of points as last year because of the higher scoring thresholds.

Figure 15. Map of 2010 State Energy Efficiency Scorecard Results



Notes: Several states have the same score so are tied for the same ranking. We do not score the U.S. territories due to lack of data, though hope to expand the *Scorecard* in the future to include them in the rankings.

"Most Improved" States

Last year, we highlighted six states that improved by at least eight spots in the overall state rankings due to significant expansion of their efficiency policies and programs. This year several new states, particularly from the Southwest region, stand out as "most improved" in the rankings compared to last year. These include: Utah (23rd to tied for 12th); Arizona (29th to 18th); New Mexico (30th to 22nd); and Alaska (45th to 37th).

Utah significantly increased its budgets for energy efficiency programs to help customers save electricity and natural gas in their homes and businesses. The state legislature also recently passed goals for energy efficiency and renewable energy. In 2010, Arizona adopted aggressive new electricity savings targets to achieve 2% annual savings beginning in 2014 and by 2020 to reach 20% cumulative savings, relative to 2005 sales. New Mexico climbed eight spots (30th to 22nd) thanks to several measures to improve energy efficiency, including adoption of more stringent building energy codes, performance incentives for utilities administering effective efficiency programs, and financial incentives for combined heat and power systems. Alaska moved up 8 spots from the fifth to the fourth quintile. The state housing financing authority has recently implemented new initiatives to offer loans and rebates to residential customers and multi-family homeowners' associations for energy efficiency improvements. Several other states have made significant advances that improved the state's rank compared to last year, including Hawaii, Michigan, and Georgia.

Looking Ahead to 2011

In addition to the many states that have moved up in the rankings compared to last year's report, we see signs that states continue to raise the bar on energy efficiency program and policy commitments. Next year, we will see further improvements from these states. For example, Pennsylvania, Michigan, Ohio, Delaware, Indiana, and Arizona all passed Energy Efficiency Resource Standards since late 2008 (and Wisconsin has goals pending), which means these states will continue to ramp

up efficiency program activity over the next few years to meet those rising goals. Massachusetts, Illinois, and Missouri also have plans to increase their energy efficiency program portfolios.

Further Areas of Research

The scoring framework we described at the beginning of this report is our best 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 its obvious limitations. We suggest here a few areas of future research to continue to refine our scoring methodology.

One of the most glaring limitations is access to reliable and recent data on results from energy efficiency efforts. Many states do not gather the data on performance of energy efficiency policy efforts, forcing us to score them using a "best practices" for some of the policy areas. For example, scoring states on building energy code compliance was difficult because states do not have the funding to collect the required data to estimate a state's level of compliance. While states should be applauded for adopting stringent building energy codes, the success of these codes at reducing energy consumption is indeterminable if we are unable to verify that they are actually being incorporated. Inclusion of building energy code compliance metrics, based on a state-by-state review of compliance and enforcement activity, is an improvement over previous versions of the *Scorecard*, and we hope to continue to refine a survey of state code compliance in the future.

State-led energy efficiency programs funded through non-ratepayer revenue sources represent a growing area of efficiency activity at the state level. State efforts include Energy Savings Performance Contracting through state government service administrations; environmental agency activities that target efficiency improvements; and research, development and demonstration efforts. These types of programs are currently accounted for qualitatively in Chapter 5, State Initiatives. Next year, we hope to develop a more comprehensive definition and quantitative assessment of state efficiency programs that fall outside the realm of utility-sector and public benefits programs. Similarly, we do not currently fully capture energy efficiency for natural gas, home heating fuel, or propane (although we do capture budget data) because programs do not systematically report energy savings results. In future editions of the *Scorecard*, we plan to examine metrics for energy savings from natural gas, fuel oil, and propane efficiency.

State climate policies also play a role in shaping energy efficiency policy and program measures. Next year, we plan to conduct new research on how states are integrating climate change and energy efficiency policies, and to what effect. Finally, the U.S. territories should be included in our assessment; however, due to lack of data we have been unable to score their policies and programs. We hope to move toward integration of the territories in our *Scorecard* by expanding data collection efforts and developing contacts in the territories.

Conclusions

In 2010, states continued to guide our nation toward a cleaner energy future through more efficiency. Given this tremendous amount of activity at the state level, it is important to recognize best practices and leadership, both to encourage other states to follow and to lay the groundwork for strong federal policy in the future. This state energy efficiency policy *Scorecard* builds on this need to document and benchmark state best practices, recognize leadership, and provide a roadmap for other states to follow. Since 2008, the National Renewable Energy Laboratory (NREL) has completed a similar analysis on renewable energy development and policy best practices each year.[32] The results of that effort serve as an important complement to this review of energy efficiency policies, which together provide a robust roadmap for states to follow in paving a path toward a cleaner and more reliable energy future.

[32] See www.nrel.gov/cepa for the *State of the States 2009: Renewable Energy Development and the Role of Policy*. A 2010 update is forthcoming.

REFERENCES

[AASHTO] American Association of State Highway Transportation Officials. 2008. *Survey of State Funding for Public Transportation.* Washington, D.C.: American Association of State Highway Transportation Officials.

[AGA] American Gas Association. 2010. Fact Sheet *"Decoupling and Natural Gas Utilities."* August. American Gas Association.

Applied Energy Group. 2010. Personal communication with Larry Masland. September 28.

[ARB] Air Resources Board, California Environmental Protection Agency. 2010a. Draft Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375. Sacramento, CA. Air Resources Board, California Environmental Protection Agency.

———. 2010b. "Hybrid Truck and Bus Voucher Incentive Project." http://www.californiahvip.org/. Accessed July 2010. Sacramento, CA. Air Resources Board, California Environmental Protection Agency.

Barbose, G., C. Goldman, and J. Schlegel. 2009. *The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S.* Berkeley, Calif.: Lawrence Berkeley National Laboratory.

[BCAP] Building Codes Assistance Project. 2010. *Code Status and Maps.* http://www.bcap-energy.org/. Accessed September 2010.

Bharvikar, Ranjit, C. Goldman, D. Gilligan, T. Singer, D. Birr, P. Donahue, and S. Serota 2008. "Performance Contracting and Energy Efficiency in the State Government Market." Berkeley, CA: Lawrence Berkeley National Laboratory.

[CEC} California Energy Commission. 2009. *Achieving Cost-Effective Energy Efficiency for California: 2008 Progress Report.* http://www.energy.ca.gov/2009publications/CEC-200-2009-008/CEC-200-2009-008-SF.PDF California Energy Commission, Electricity Supply Analysis Division.

[CEE] Consortium for Energy Efficiency. 2010. *The State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts 2009.* Boston, Mass.: The Consortium for Energy Efficiency.

[Census] United States Census Bureau. 2009. American Housing Survey (multiple years). http://www.census.gov/hhes/ www/housing/ahs/nationaldata.html. Washington, D.C.: United States Census Bureau.

Clean Cars Campaign. 2010. State Action. http://www.cleancarscampaign.com/. Accessed June 2010.

[CPUC] California Public Utilities Commission. 2010. *2006-2008 Energy Efficiency Evaluation Report, Executive Summary.* California Public Utilities Commission.

[CT ECMB] Connecticut Energy Conservation Management Board. 2010. *Report of the Energy Conservation Management Board Year 2009 Programs and Operations.* New Britain, Conn.: Energy Conservation Management Board.

[DC DOE] District of Columbia Department of the Environment. 2010. Personal communication with Taresa Lawrence. July 21st.

[DNREC] Delaware Department of Natural Resources and Environmental Control. 2010. Personal communication with Philip Cherry. July 23.

[DOE] U.S. Department of Energy. 2008. *2008 Buildings Energy Data Book.* http://buildingsdatabook.eere.energy.gov/. Washington, D.C.: U.S. Department of Energy, Energy Efficiency and Renewable Energy.

[DOE] U.S. Department of Energy. 2010a. "Alternative Fuel and Advanced Vehicle Data Center: Hybrid Electric Vehicle Incentives and Laws." http://www.afdc.energy.gov/afdc/vehicles/hybrid_electric_laws.html. Accessed July 2010. Washington D.C.: U.S. Department of Energy, Energy Efficiency and Renewable Energy.

_____. 2010b. Status of State Energy Codes. http://www.energycodes.gov/implement/state_codes/index.stm. Accessed September 2010. Washington, D.C.: U.S. Department of Energy, Energy Efficiency and Renewable Energy.

[DSIRE] Database of State Incentives for Renewable Energy. 2010. www.dsireusa.org. Accessed August - September 2010.

[EIA] Energy Information Administration. 2010a. *Form EIA-861 Final Data File for 2008.* http://www.eia.doe.gov/cneaf/electricity/page/eia861.html. Washington, D.C. U.S. Department of Energy, Energy Information Administration.

_____. 2010b. *Annual Energy Outlook.* Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

Eldridge, Maggie, Michael Sciortino, Laura Furrey, Seth Nowak, Shruti Vaidyanathan, Max Neubauer, Nate Kaufman, Anna Chittum, and Sarah Black. 2009. *The 2009 State Energy Efficiency Scorecard.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Eldridge, Maggie, M. Neubauer, D. York, S. Vaidyanathan, A. Chittum, and S. Nadel. 2008. *The 2008 State Energy Efficiency Scorecard.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Eldridge, Maggie, Bill Prindle, Dan York, and Steve Nadel. 2007. *The State Energy Efficiency Scorecard for 2006.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Eldridge, Maggie, S. Nadel, J. Talbot, V. McKinney, A. Korane and D. Trombley. 2009. *Potential for Energy Efficiency, Demand Response, and Onsite Solar Energy in Pennsylvania.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Elliott, R.N., M. Eldridge, A.M. Shipley, J.S. Laitner, S. Nadel, P. Fairey, R. Vieira, Jeff Sonne, A. Silverstein, B. Hedman, and Ken Darrow. 2007a. *Potential for Energy Efficiency and Renewable Energy to Meet Florida's Growing Energy Demands.* ACEEE Report E072. Washington, D.C.: American Council for an Energy-Efficient Economy.

Elliott, R.N., M. Eldridge, A.M. Shipley, J.S. Laitner, S. Nadel, A. Silverstein, B. Hedman, and M. Sloan. 2007b. *Potential for Energy Efficiency, Demand Response and Onsite Renewable Energy to Meet Texas' Growing Electricity Demands.* ACEEE Report E073. Washington, D.C.: American Council for an Energy-Efficient Economy.

[EPA] Environmental Protection Agency. 2009. http://www.epa.gov/statelocalclimate/resources/example.html. Washington, D.C.: U.S. Environmental Protection Agency.

_____. 2010. "United States Environmental Protection Agency Combined Heat and Power Partnership Funding Database." http://www.epa.gov/chp/funding/funding.html. Washington, D.C.: U.S. Environmental Protection Agency.

Friedrich, Katherine, M. Kushler, S. Nowak, P. Witte, and D. York. Forthcoming – 2010. *Steady Progress and Rapid Growth: A National Review of State-Level Activity by Utility and Public Benefits Energy Efficiency Programs.* Washington, D.C.: American Council for an Energy-Efficient Economy.

[FTA] U.S. Department of Transportation, Federal Transit Administration. 2010. "The American Recovery and Reinvestment Act." http://www.fta.dot.gov/index_9440.html Accessed July 2010. Washington D.C.: U.S. Department of Transportation, Federal Transit Administration.

Hartford Business. 2010. "Connecticut #1 in Promoting Efficiency." September 13th. http://www.hartfordbusiness.com/news14728.html.

[ICF] ICF International, Inc. 2009. *Energy & Cost Savings Analysis of 2009 IECC Efficiency Improvements.* Prepared for the Energy Efficient Codes Coalition (EECC). Fairfax, VA: ICF International.

[IEE] Institute for Electric Efficiency. 2010. *State Electric Efficiency Regulatory Frameworks.* Washington, D.C.: Institute for Electric Efficiency.

[IL DCEO] Illinois Department of Commerce and Economic Opportunity. Personal communication with David Baker. July 29th.

[KCC] Kansas Corporation Commission. 2010. Personal communication with Michael Deupree. July 28th.

Kushler, M., D. York and P. Witte. 2006. Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance Incentives. Washington, D.C.: American Council for an Energy-Efficient Economy.

Laitner, John A, "Skip," R. Gold, S. Nadel, T. Langer, R.N. Elliott, and D. Trombley. 2010. *The American Power Act and Enhanced Energy Efficiency Provisions: Impacts on the U.S. Economy.* Washington, DC." American Council for an Energy-Efficient Economy.

MD Daily Record. 2010. "RGGI Funds Get Diverted to Help Some Pay Electric Bills." April 8th. http://mddailyrecord.com/2010/04/08/rggi-funds-get-diverted-to-help-some-pay-electric-bills/

[MA DOER] Massachusetts Department of Energy Resources. 2010. Personal communication with Larry Masland. September 20th.

[MD PSC] Maryland Public Service Commission. Personal communication with Calvin Timmerman. August 27th.

Merkley, Jeff. 2010. *America Over a Barrel: Solving Our Oil Vulnerability.* Washington D.C.: Senator Jeff Merkley.

[MN PUC] Minnesota Public Utilities Commission. 2010. Personal communication with Laura Silver. August 11th.

[MT PSC] Montana Public Service Commission. 2010. Personal communication with Will Rosquist. July 23rd.

Nadel, S., T. Kubo, and H. Geller. 2000. *State Scorecard on Utility Energy Efficiency Programs in 2000.* Washington, D.C.: American Council for an Energy-Efficient Economy.

[NCFSA] National Conference of State Fleet Administrators. 2007. 2007 *NCSFA Target Membership Estimated Fleet Totals and Dollars (Reported by State Fleets).* http://www.ncsfa.net/PUBLICATIONS/Conference/2007%20NCSFA%20Est.%20Target%20Fleet$.pdf. Gaithersburg, Md.: National Conference of State Fleet Administrators.

Neubauer, M., A. deLaski, M. Dimascio, and S. Nadel. 2009. *Ka-Boom! Appliance Standards Make a Big Bang.* Washington, D.C.: American Council for an Energy-Efficient Economy.

[NEEP] Northeast Energy Efficiency Partnership. 2010. http://neep.org/news/newsletters/policy-highlights/seen-heard/nv-aug-2010#states.

NH State Legislature. 2010a. Senate Bill 300. http://www.gencourt.state.nh.us/legislation/2010/SB0300.html

NH State Legislature. 2010b. Special Session House Bill 1. http://www.gencourt.state.nh.us/legislation/2010/SSHB0001.html

NJ.com. 2010. "N.J.'s clean-energy advocates fear job losses." Feb. 21st. http://www.nj.com/business/index.ssf/2010/02/njs_energy_advocates_fear_gove.html

NorthWestern Energy. 2010. Personal communication with William Thomas. July 23rd.

[NRDC] Natural Resources Defense Council. 2009. *Ranking States' Oil Vulnerability and Solutions for Change.* Washington D.C.: Natural Resources Defense Council.

[NYS] New York State Division of the Budget. 2009. "Fact Sheet: $2.7 Billion Enacted Deficit Reduction Legislation. " December 2. Albany, NY: New York State Division of the Budget. http://www.budget.state.ny.us/pubs/press/2009/press_release09_DRP120209.html

[NYSERDA] New York Energy Research and Development Authority. 2010. Personal communication with Victoria Engel-Fowles. June 6 e-mail.

[PA PUC] Pennsylvania Public Utilities Commission. 2010. Personal Communication with Charles Covage. August 4.

Philadelphia Inquirer. 2010. "Energy Funds Raided to Balance New Jersey Budget." http://www.philly.com/inquirer/local/20100705_Energy_funds_raided_to_balance_New_Jersey_budget.html

[PNNL] Pacific Northwest National Laboratory. 2009. *Comparison of Standard 90.1-07 and the 2009 IECC with Respect to Commercial Buildings.* Richland, WA: Pacific Northwest National Laboratory.

[RI OER] Rhode Island Office of Energy Resources. 2010. Personal Communication with Dan Carrigg. September 7th.

Satchwell, Andrew, C. Goldman, P. Larsen, D. Gilligan, and T. Singer. 2010. *A Survey of the U.S. ESCO Industry: Market Growth and Development from 2008 to 2011.* Berkeley, CA: Lawrence Berkeley National Laboratory.

Sciortino, Michael. 2010. *States Stepping Forward: Best Practices for State-Led Energy Efficiency Programs.* Washington, D.C.: American Council for an Energy-Efficient Economy.

[SD PUC] South Dakota Public Utilities Commission. Personal communication with Brian Rounds. July 29th.

[SWEEP] Southwest Energy Efficiency Project. 2007. Geller, H., S. Baldwin, P. Case, K. Emerson, T. Langer & S. Wright. *Utah Energy Efficiency Strategy: Policy Options.* Boulder, CO: Southwest Energy Efficiency Project.

____. 2009. Personal communication with Jim Meyers. October 8.

[TVA] Tennessee Valley Authority. 2010. Personal communication with Michelle Martin. July 29th.

[UT PUC] Utah Public Utilities Commission. 2010. Personal communication with Becky Wilson. August 24th.

[WGA] Western Governors Association. 2006. *Clean and Diversified Energy Initiative: Energy Efficiency Task Force Report.* January.

York, D. and M. Kushler. 2002. *State Scorecard on Utility and Public Benefits Energy Efficiency Programs: An Update*. Washington, D.C.: American Council for an Energy-Efficient Economy.

_____. 2005. *ACEEE's 3rd National Scorecard on Utility and Public Benefits Energy Efficiency Programs: A National Review and Update of State-Level Activity.* Washington, D.C.: American Council for an Energy-Efficient Economy.

APPENDIX A. UTILITY AND PUBLIC BENEFITS FUND ENERGY EFFICIENCY BUDGETS PER CAPITA

2009 State Electricity Efficiency Program Budgets per Capita

State	2009 Budgets (Mil. $)	Spending per Capita	Ranking
Vermont	$30.7	$49.38	1
Rhode Island	$29.5	$28.01	2
Massachusetts	$183.8	$27.88	3
Hawaii	$35.5	$27.41	4
California	$998.3	$27.01	5
Oregon	$84.7	$22.14	6
Washington	$146.5	$21.98	7
Minnesota	$111.2	$21.11	8
Connecticut	$73.4	$20.88	9
District of Columbia	$12.5	$20.80	10
Idaho	$31.5	$20.38	11
New York	$378.3	$19.36	12
Iowa	$55.6	$18.48	13
Wisconsin	$101.1	$17.88	14
Utah	$45.4	$16.30	15
Nevada	$41.9	$15.85	16
Maine	$20.8	$15.78	17
New Jersey	$132.3	$15.19	18
Montana	$13.2	$13.54	19
New Hampshire	$15.2	$11.49	20
Colorado	$46.7	$9.29	21
Pennsylvania	$96.9	$7.68	22
Arizona	$49.2	$7.46	23
New Mexico	$14.4	$7.17	24
Florida	$132.6	$7.15	25
Illinois	$89.9	$6.96	26
North Carolina	$64.3	$6.85	27
Maryland	$38.0	$6.67	28
Michigan	$50.1	$5.03	29
Wyoming	$2.6	$4.78	30
Kentucky	$17.2	$3.99	31
Texas	$98.7	$3.98	32
Nebraska	$7.1	$3.95	33
Tennessee	$24.2	$3.84	34
Missouri	$22.7	$3.79	35
South Dakota	$2.7	$3.36	36
South Carolina	$14.6	$3.20	37
Mississippi	$9.2	$3.12	38
Arkansas	$7.7	$2.66	39
Georgia	$21.3	$2.16	40
Indiana	$13.6	$2.12	41

State	2009 Budgets (Mil. $)	Spending per Capita	Ranking
Alabama	$9.1	$1.93	42
Ohio	$18.6	$1.61	43
Kansas	$3.7	$1.31	44
Oklahoma	$3.8	$1.03	45
Louisiana	$2.3	$0.51	46
North Dakota	$0.1	$0.15	47
Virginia	$0.4	$0.05	48
Alaska	$0.0	$0.00	49
Delaware	$0.0	$0.00	49
West Virginia	$0.0	$0.00	49
U.S. Total	**$3,403**	**$11.08**	

*Utility spending is on "ratepayer-funded energy efficiency" programs, or energy efficiency programs funded through charges included in customer utility rates or otherwise paid via some type of charge on customer bills. This includes both utility-administered programs and "public benefits" programs administered by other entities. We do not include data on load management programs or energy efficiency research and development.

APPENDIX B: EXPANDED TABLE OF STATE RD&D PROGRAMS

State	Major RD&D Programs	Score
California	**The California Energy Commission's Public Interest Energy Research (PIER)** program supports research and development in several key areas including energy efficiency for buildings, industry, agriculture, and water systems; generation for renewable resources, combined heat and power, and advanced generation; transportation and alternative fuels, vehicle efficiency, and biofuels; technology systems and smart grid, transmission, and distribution; and environmental research on minimizing impacts from renewable energy development, climate change adaptation and mitigation, and improving indoor air quality. PIER is funded from a surcharge on electricity and natural gas use in the state and totals about $80 million per year.	2
Iowa	The **Iowa Energy Center** advances energy efficiency through research, education, and demonstration. Amongst its many goals, the Iowa Energy Center strives to advance efficiency and renewable energy within the state through research and development while providing a model for the state to decrease its dependence on imported fuels.	2
Massachusetts	**Massachusetts Energy Efficiency Partnership (MAEEP)** supports demonstration of energy efficiency technology and tools to the industrial, commercial, and institutional sectors. The MAEEP program leverages resources from USDOE, the University of Massachusetts and Massachusetts Electric Utilities, NSTAR, MECO and WMECO, in partnership. Massachusetts is also offering **High Performance Green Building Grants** to demonstrate innovative ways to improve energy performance in various types of buildings. The grants will use $16.25 million of ARRA funds to leverage an additional $42.5 million from grant recipients. The state's program administrators also have a number of deep energy retrofits and behavioral pilot programs.	2
New York	**The New York State Energy Research and Development Authority (NYSERDA)** RD&D efforts include a wide range of energy efficiency and renewables programs, including, but not limited to, a Renewable Portfolio Standard (RPS), a Regional Greenhouse Gas Initiative (RGGI), clean energy business development, the Smart Grid Consortium and the Battery Energy Storage (BEST) Consortium. NYSERDA's 2009/10 RD&D budget was approximately $165 million.	2
North Carolina	The **North Carolina Green Business Fund** provides grants of up to $100,000 to North Carolina small and mid-size businesses, nonprofit organizations, state agencies, and local governments to encourage the development and commercialization of promising renewable energy and energy-efficient building technologies. The **NC Solar Center** also focuses on energy efficiency to assist commercial and industrial clients in saving energy. This team has grown over the years and now operates multiple programs focusing on Combined Heat & Power (CHP) technology in the Southeast.	2
Oregon	The **Oregon State University Energy Efficiency Center** houses the OSU Industrial Assessment Center, offers rural energy audits, OSU facility assessments, and other customized assessments. The Center focuses on energy efficiency training, and performs related research, analysis, and data collection. The **University of Oregon Energy Studies in Building Laboratory** conducts research on buildings and related transportation to develop strategies for maximum energy efficiency in new materials, components, assemblies, and whole buildings. It has received funding from numerous private and public sources. The **Oregon Built Environment and Sustainable Technologies Center (BEST)** shares research facilities for study of energy-efficient and green buildings. **Portland State University's Renewable Energy Research Lab** conducts sustainable urban development research, which covers smart grid development and net-zero energy use. **The Baker Lighting Lab at University of Oregon** studies daylighting and control of these systems. The **Energy Trust of Oregon** also runs programs to field test emerging technologies.	2
West Virginia	West Virginia has established a number of initiatives to advance energy efficiency, particularly in its industrial and manufacturing sectors. The state has been active in analyzing energy usage in manufacturing facilities across the state, funding benchmarking initiatives for companies of all sizes. The **Energy Efficiency Center of West Virginia** and **West Virginia University Building Energy Center** partner	2

	with West Virginia Industries of the Future and the state Manufacturing Extension Partnership to provide centralized locations for the development of new energy-saving technologies and services.	
Wisconsin	The **Energy Center of Wisconsin** conducts technology and field research; education programs; program evaluation and market research; program development, and implementation. The Energy Center, funded through state, ratepayer, private, and other sources, features an award-winning program on building energy use in commercial new construction. Other research focuses on buildings and market characteristics, as well as bio-energy. **Wisconsin Focus on Energy** operates an Emerging Technology (ET) program that promotes emerging, industrial, energy efficiency technologies. The program deploys and commercializes those emerging industrial technologies that have the potential for large, cost-effective energy savings and multiple installations in Wisconsin.	2
Alaska	The **Cold Climate Housing Research Center** in Fairbanks, Alaska conducts applied research, development, and deployment on sustainable, energy-efficient and healthy buildings in Alaska and the circumpolar north. The Alaska Housing Finance Corporation (AHFC) has a **Research Information Center** (RIC) that gathers research, articles, fact sheets, books, manuals, studies, and reports in energy efficiency, building science, and sustainable technology, and deploys the information through its library services via the Web, onsite visits, statewide presentations, and a toll-free number for Alaskans.	1
Florida	**Florida Solar Energy Center's** building science program includes research projects concentrating on: Building America Industrialized Housing; Zero Energy Buildings; Fenestration; Energy Efficient Schools; Green Standards; and Ceiling Fans.	1
Minnesota	**The Conservation Applied Research & Development (CARD) Fund** receives $3.1M annually in ratepayer funding to identify new technologies or strategies to maximize energy savings, improve the effectiveness of energy conservation programs, or document carbon dioxide reductions from energy conservation programs.	1
New Jersey	The New Jersey Commission on Science and Technology (CST) administers the **Edison Innovation Clean Energy Fund** through a Memorandum of Understanding with the New Jersey Board of Public Utilities (BPU). The Clean Energy Fund provides grants of $100,000 to $500,000 to New Jersey companies for demonstration projects and developmental and ancillary activities necessary to commercialize identified renewable energy technologies and innovative technologies that significantly increase energy efficiency. All grants are subject to a 50% matching funds requirement. Businesses may also apply for and receive up to 20% of the approved grant amount in equity-like financing from the New Jersey Economic Development Authority (EDA) for non-research and development related costs.	1
New Mexico	The **Energy Innovation Fund** was created in 2007 to accelerate the development of innovation and enable faster commercial adaptation of clean energy technologies in New Mexico. State appropriations of $2.7M and equal matching private sector investment provided funding for projects awarded in FY08 and FY09. The Energy, Minerals and Natural Resources Department manages the awarded projects.	1
Ohio	Funded through a 2007 job stimulus package, **Ohio Air Quality Development Authority (AQDA) Advanced Energy Program Grants** will provide $84 million to non-coal related projects. CHP is deemed eligible. **Energy Industries of Ohio** (EIO) also seeks to develop, demonstrate, and incubate technologies that will improve the competitiveness of Ohio industry through increased energy efficiency, reduced operating costs, and improved environmental performance. EIO is a nonprofit corporation that obtains funding from numerous sources to support R&D programs.	1
Texas	The **Texas A&M Energy Systems Laboratory (ESL)** focuses on energy-related research, energy efficiency, and emissions reduction. Some specialized areas include: metering and modeling energy use in buildings; optimization of HVAC systems; and modeling and analysis. ESL plays an important role in the implementation of state energy standards.	1
Delaware	Delaware offers two RD&D grant programs run through the Green Energy Fund. **Research and Development Grants** offers up to 35% of the cost of qualifying projects, which include energy efficiency technologies. The grants have an annual budget of up to $288,000 annually. **Technology and Demonstration Grants** fund up to 25% of project cost and may be funded up to $720,000 annually.	0.5

Georgia	Funded in part by Georgia Environmental Finance Authority (GEFA), **Southface Energy Institute** conducts research and training on energy-efficient housing and communities. GEFA collaborates with Southface on its weatherization training and technical assistance.	0.5
Hawaii	The ***Transportation Energy Transformation Program*** focuses on deployment with the ***Hawaii EV Ready Program*** and the ***State Fleet Program***. The Hawaii EV Ready Program provides grants and rebates for the installation of electric vehicle chargers and the purchase of new, commercially-available full-speed electric motor vehicles. The program expects results of 1,000–5,000 electric vehicle chargers installed and 200–600 electric vehicle purchases supported by grant and rebate funds.	0.5
Illinois	The **University of Illinois at Chicago Energy Resources Center** focuses on energy conservation and production technologies. Its programs include: energy management assessments; economic modeling; analysis of policy and regulatory initiatives; and public outreach and education. ERC staff work across all market sectors on projects impacting the industrial, commercial, and residential markets.	0.5
Indiana	**The Indiana Office of Energy Development (OED)** annually offers an Energy Project Feasibility Study Program. The grant program provides cost share grants to Indiana's public, nonprofit, and business sectors for the production of feasibility studies investigating renewable energy. Recently, projects have ranged from LED and SSL pilot projects to energy-efficient wastewater treatment studies.	0.5
South Dakota	The **Energy Analysis Lab (EAL) at South Dakota State University** pursues various demonstration and outreach programs to advance energy efficiency. The EAL also tests and evaluates energy savings of new technologies and conducts audits of large commercial facilities in combination with other energy-related projects running through the university.	0.5
Tennessee	Tennessee's Clean Energy Future Act of 2009 enables the clean energy technology sector, including efficiency technologies, to be eligible for Tennessee's **emerging industry tax credit**. Businesses engaged in the clean energy tech sector—including research and development, manufacturing or installation of certain equipment—may be designated eligible for the existing emerging industry tax credit. The emerging industry tax credit encourages investment, development and deployment of these technologies.	0.5

APPENDIX C: STATE AND FEDERAL TRANSIT FUNDING

State	FY 2007 State Funding	FY 2009 American Recovery and Reinvestment Act Funding	Population	Per Capita Transit Expenditure
Connecticut	$876,357,467	$11,533,527	3,488,633	$256.16
Massachusetts	$1,351,917,492	$18,523,517	6,499,275	$212.29
New York	$3,009,046,000	$23,215,240	19,422,777	$156.72
Alaska	$91,359,200	$9,083,890	682,297	$153.87
Maryland	$749,371,455	$22,601,729	5,634,242	$139.02
New Jersey	$1,008,129,998	$71,439,259	8,636,043	$129.14
Delaware	$72,962,500	$1,886,750	864,896	$87.63
California	$3,110,690,806	$35,940,300	36,226,122	$87.36
Pennsylvania	$860,963,000	$31,623,912	12,522,531	$72.54
District of Columbia	$250,868,928	$0	3,500,000	$71.68
Utah	$0	$98,143,443	2,663,796	$55.27
Minnesota	$237,023,000	$13,730,588	5,191,206	$49.63
Rhode Island	$49,214,195	$864,972	1,055,009	$47.88
Oregon	$74,092,943	$55,951,606	3,732,957	$42.33
Illinois	$498,900,000	$21,184,115	12,779,417	$41.53
New Mexico	$56,478,000	$12,255,602	1,968,731	$38.03
Wisconsin	$119,134,447	$20,130,095	5,601,571	$26.66
Virginia	$184,417,844	$10,630,815	7,719,749	$25.95
Wyoming	$2,294,200	$6,979,334	523,414	$24.38
Michigan	$200,661,111	$26,311,201	10,050,847	$23.89
Vermont	$6,166,576	$3,926,923	620,460	$19.43
North Dakota	$2,900,000	$5,956,263	638,202	$18.54
Montana	$818,385	$11,279,390	957,225	$18.53
South Dakota	$750,000	$7,372,825	797,035	$14.82
North Carolina	$75,866,447	$33,055,504	9,064,074	$13.84
Maine	$4,502,528	$8,109,443	1,317,308	$12.65
Indiana	$42,694,683	$20,316,134	6,346,113	$11.53
Iowa	$10,840,785	$15,611,579	2,978,719	$11.50
Tennessee	$38,310,000	$21,168,758	6,172,862	$11.35
Florida	$174,806,597	$20,333,034	18,277,888	$11.23
Nebraska	$2,900,000	$9,811,054	1,769,912	$9.95
Washington	$42,438,767	$14,524,916	6,464,979	$9.93
Arkansas	$4,251,656	$15,139,150	2,842,194	$9.49
West Virginia	$2,523,342	$9,722,574	1,811,198	$9.45
Idaho	$312,000	$9,222,783	1,499,245	$9.44
Mississippi	$1,600,000	$17,252,566	2,921,723	$9.41
Oklahoma	$5,750,000	$16,923,315	3,612,186	$8.62
Kansas	$6,000,000	$11,056,694	2,775,586	$8.14
Kentucky	$3,709,262	$19,201,019	4,256,278	$7.64
South Carolina	$6,400,000	$16,617,727	4,424,232	$7.08
Missouri	$7,018,541	$20,698,281	5,909,824	$6.44
Alabama	$0	$19,849,776	4,637,904	$6.42

New Hampshire	$1,530,000	$3,960,983	1,317,343	$5.67
Ohio	$16,450,000	$29,837,234	11,520,815	$5.31
Louisiana	$0	$15,273,707	4,376,122	$5.24
Arizona	$10,142,000	$14,182,654	6,362,241	$4.94
Georgia	$6,024,552	$25,649,675	9,533,761	$4.67
Texas	$28,741,067	$50,587,402	23,837,701	$4.39
Nevada	$125,403	$7,350,247	2,567,752	$4.34
Colorado	$0	$12,492,195	4,842,259	$3.87
Hawaii	$0	$2,933,435	1,276,832	$3.45