State-Level Energy Efficiency Analysis: Goals, Methods, and Lessons Learned

Maggie Eldridge, R. Neal Elliott, and Max Neubauer,
American Council for an Energy-Efficient Economy

ABSTRACT

The past few years have seen a resurgence of interest in state-level energy efficiency studies. These studies have been undertaken for a range of reasons and have had a variety of scopes and approaches—some more effective than others. In the interest of sharing lessons learned and developing effective strategies for state-level analyses, this paper will first review recent studies done by others to examine themes in approaches and scope, and then look at recent studies that the authors have been involved with and explore their goals, approaches and effectiveness. Based on these experiences, the authors will present their recommendations on: guidance on identifying the goal/goals for the study; what are the appropriate scopes and methods to meet different goals; and what other project elements are critical to an effective study release. In addition, the authors discuss some of the data and analytical challenges that are faced by state-level energy efficiency assessments and how the analysis results are most effectively presented to a state-level policy audience.

Introduction

An energy efficiency potential study is a tool to help states advance smart energy policies and programs by providing critical data resources that inform decision makers. These studies are typically a first step taken by states interested in building the case for efficiency policies. A study could support a number of state needs for designing efficiency policies and programs, such as setting energy savings goals, incorporating energy efficiency into the integrated resource planning (IRP) process, or determining funding levels for efficiency programs and policies. The Environmental Protection Agency's (EPA) *Guide for Conducting Energy Efficiency Potential Studies* (see EPA 2007) is an excellent resource for parties interested in advancing energy efficiency in their own state, region, or program area.

In recent years, there has been a resurgence of interest in state-level energy efficiency studies. In 2007, ACEEE completed energy efficiency potential analyses for the states of Texas, Florida, and Michigan (Elliott et al. 2007a&b; Laitner & Kushler 2007). Similar studies were recently completed for Utah (Geller et al. 2007), California (Itron et al. 2007), North Carolina (GDS 2006) and others. Following the publication of the Florida and Texas studies, several additional states contacted ACEEE requesting a similar study for their own state. In response to this surge in interest, ACEEE launched its State Clean Energy Resource Project (SCERP) in the fall of 2007, with the goal of completing about four state studies each year for the next 3 years. In 2008, ACEEE completed a study for Maryland (Eldridge et al. 2008) and plans to complete studies for Ohio, Virginia, and Pennsylvania by the end of 2008 or early 2009. Based on these experiences, and past experience dating to the late 1980s, ACEEE has gained some important insights into how to effectively plan, undertake and use these state potential studies. We will attempt to share these lessons learned in hopes of increasing the effectiveness of future efforts.

The numerous energy efficiency potential studies that have been conducted over the past decades have played an important role in motivating and shaping energy policies at both the state and national level. In this paper, we will first the review the elements of an efficiency potential analysis and examine the approach of several recent efficiency studies. Then, we explore how experiences with these studies have lead ACEEE to identify and provide insights on the following elements of a successful and effective analysis:

- Clearly identify goals that the study is intended to achieve
- Match the level of analysis to goals
- Engage stakeholders early in the analysis process
- Match analysis to available data
- Plan for and implement an effective media strategy
- Plan and budget for analysis follow-up

Elements of a Potential Analysis

While energy efficiency potential analyses have been prepared for decades, there has been some inconsistency in how the studies have been conducted and how terms are defined. Our meta-analysis of efficiency potential studies (Nadel, Elliott and Shipley 2004), and recent updates in 2006 and 2008 (report forthcoming) revealed these differences in term definitions. These reviews did find, however, that a common approach was generally used. Our recent studies, however, have found that this "traditional approach" is not always the most effective for some purposes.

Traditional Approach

In the traditional approach of energy efficiency potential studies, there are three broad categories of efficiency potential: technical, economic, and achievable. These are generally characterized by the following definitions:

- The **technical potential** represents an ideal scenario which sums all energy efficiency measures that are feasible given technology limitations. The technical potential bears no consideration of technology costs.
- **Economic potential** represents the fraction of the technical potential that is cost-effective, which can be evaluated in several ways. Some options include the Total Resource Cost (TRC) test or, from the consumer's perspective, such as a participant's cost of saved energy (CSE).
- Finally, the **achievable potential** represents a fraction of the economic potential that is attainable given actual program infrastructure and both societal and market limitations.

Recent Studies

ACEEE recently reviewed seven state and regional potential studies in addition to those we reviewed for our 2004 meta-analysis (Nadel, Elliott and Shipley 2004): California (Itron 2006), New England (Dunksy Energy Consulting 2005), New Mexico (GDS 2005), North Carolina (GDS 2006), Québec (Optimal Energy 2004), Utah (SWEEP 2007), and Vermont (GDS

2007). The New Mexico study focused solely on analyzing potential savings from natural gas energy-efficiency programs, while the California, New England, and Utah studies incorporated both electricity and natural gas into their analyses. Most of these studies were conducted at the behest of state governments (New Mexico, North Carolina, Utah, and Vermont); the rest were commissioned by non-governmental organizations (California, New England, Quebec).

The scope, detail, and duration of these studies vary significantly. Four of the studies analyze the technical, economic, and achievable potential across all sectors of the economy, whereas three of the studies focus solely on achievable potential. Five of the studies aggregate achievable potential across all sectors, which is the estimate that policymakers consider to be the most important when analyzing state efficiency potential.

The definition of "achievable potential" varies among studies, which necessitates a rigorous perusal of the methodologies. For example, the North Carolina and Vermont GDS studies refer to the "Achievable Cost-Effective Potential," which they define as the "realistic penetration of energy efficient measures that are cost-effective […] and would be adopted given aggressive funding [...]" The GDS New Mexico study refers to achievable potential as "Maximum Achievable Cost-Effective Potential" and defines it as "the potential for maximum penetration of energy efficient measures that are cost-effective […] and would be adopted given unlimited funding […]"Optimal Energy's study of New England similarly refers to achievable potential as "the potential for maximum market penetration of energy efficient measures that are cost-effective […] and that would be adopted through a concerted, sustained campaign […]"Achievable potential savings for electricity across all sectors in these studies ranges from 0.6% (Itron 2006) to 4% (Optimal Energy 2004) per year beyond normal reference case improvements (see Figure 1). The Utah study (SWEEP 2007) takes a slightly different approach, modeling several policy scenarios and estimating the energy and economic impacts of the policies, and estimates about 1.7% savings per year. This is similar to the policy scenario approach used in ACEEE's recent state studies, which is discussed in the next section.

The majority of the studies utilize the Total Resource Cost (TRC) test to determine cost-effectiveness when estimating economic and achievable potential savings. Two studies, North Carolina and Quebec, rely on a levelized cost of conserved energy (CCE) as the metric for measuring cost-effectiveness. ACEEE's recent state studies use this same approach, with cost-effectiveness defined as having a CCE less than the end user's retail cost of energy. The Vermont study uses a societal cost test, which quantifies the benefits, such as reduced emissions, and costs to society as a whole as opposed to just utilities and ratepayers. All of the study results show net positive benefits for the measured efficiency potential.

Table 1 shows the results of several electricity efficiency potential studies from the past eight years, most of which follow the traditional approach outlined above. The recent ACEEE studies and the SWEEP 2007 study followed a slightly different "policy scenario" approach for estimating achievable potential, as is discussed in the next section. This figure incorporates results from the 2004 meta-analysis by ACEEE (see Nadel, Elliott and Shipley 2004), a few studies completed in 2005 and late 2004, and a recent update in 2008. The meta-reviews also examined natural gas studies, though we present electricity study results here only. The average study identified an electricity savings technical potential of 2.3%, 1.8% economic, and 1.5% achievable, averaged annually over the study time period. Studies that did not include one or more of a type of potential were not incorporated into the average annual percent savings for that specific type of potential.

Table 1. Meta-Analysis of Electricity Energy Efficiency Potential Study Results

Region of Study	Total Efficiency Potential over Study Time Period (%) Technical	Economic	Achievable	Study Time Period (years)	Average Annual Efficiency Potential (%) Technical	Economic	Achievable
U.S. (2000)	NA	NA	24%	20	NA	NA	1.2%
Mass. (RLW 2001)	NA	24%	NA	5	NA	4.8%	NA
Calif. (Xenergy/EF 2002)	18%	13%	10%	10	1.8%	1.3%	1.0%
Southwest (SWEEP 2002)	NA	NA	33%	17	NA	NA	1.9%
NY (NSERDA/OE 2003)	36%	27%	NA	20	1.8%	1.4%	NA
Oreg. (2003)	31%	NA	NA	10	3.1%	NA	NA
Puget (2003)	35%	19%	11%	20	1.8%	1.0%	0.6%
Vermont (2003)	NA	NA	31%	10	NA	NA	3.1%
Quebec (Optimal 2004)	NA	NA	32%	8	NA	NA	4.0%
NJ (Kema 2004)	23%	17%	11%	16	1.4%	1.1%	0.7%
Conn. (GDS 2004)	24%	13%	NA	10	2.4%	1.3%	NA
New England (Optimal 2005)	NA	NA	23%	10	NA	NA	2.3%
Northwest (NW Council 2005)	25%	17%	13%	20	1.3%	0.9%	0.6%
Georgia (ICF 2005)	29%	20%	9%	10	2.9%	2.0%	0.9%
Wisc. (ECW 2005)	NA	NA	4%	5	NA	NA	0.7%
Calif. (Itron 2006)	21%	17%	8%	13	1.6%	1.3%	0.6%
North Carolina (GDS 2006)	33%	20%	14%	10	3.3%	2.0%	1.4%
Florida (ACEEE 2007)	NA	25%	20%	15	NA	1.7%	1.3%
Texas (ACEEE 2007)	NA	30%	18%	15	NA	2.0%	1.2%
Utah (SWEEP 2007)	NA	NA	26%	15	NA	NA	1.7%
Vermont (GDS 2007)	35%	22%	19%	10	3.5%	2.2%	1.9%
Average	NA	NA	NA	NA	2.3%	1.8%	1.5%

As noted in Nadel, Elliott and Shipley (2004), the technical potential is a somewhat problematic construct because it is intended to capture all the efficiency opportunities available without consideration of the cost of implementing the efficiency improvements. In reality, analysts may restrict their assessments to measures they think will likely be cost-effective, and therefore blends the traditional definition of economic and technical potential. As a result, the actual estimate is only a partial estimate of the technical potential, and is not particularly meaningful in a policy context. ACEEE's recent studies for Texas, Florida and Maryland have not included an assessment of technical potential but rather focus specifically on the economic, or cost-effective, potential. In addition, rather than an assessment of "achievable" potential, which is defined in a number of different ways among study authors, we now estimate the impacts of what we term a "policy scenario." In the next section we suggest this alternative approach as an effective means of informing policymakers at the state and regional levels.

Alternative Approach

Recently, ACEEE has taken an alternative approach to the traditional energy efficiency potential studies, one which has been successful for our recent energy efficiency studies for Florida, Texas, and Maryland. Keeping in mind that the audience for these state analyses, including policy makers and state advocates, is not familiar with the traditional language of efficiency potential studies, this framework moves away from the terms described above toward what we hope is a more transparent discussion to a lay audience.

First, we substitute the term "efficiency resource assessment" for "economic potential." This construct puts demand-side energy efficiency in the same framework as supply side resources. The same metrics of cost-effectiveness apply, though it helps to frame energy efficiency as a resource similar to the manner in which utilities assess the potential for new generation or transmission resources. EPA's guide for potential studies describes this type of analysis as requiring mid-level detail and time to complete (EPA 2007). We discuss in the next section the range of analysis levels of detail.

Second, we perform a policy scenario assessment by modeling a specific suite of efficiency policies that can be implemented at the state-level. These typically include building energy codes, appliance efficiency standards, combined heat and power (CHP) initiatives, and energy efficiency resource standards (EERS), among others. The policy assessment draws upon the overall efficiency resource assessment for data on costs and savings potential for policies. Again, by framing the analysis from the state policymaker's standpoint, we offer actions that are understandable and can be readily implemented. In addition to the energy impacts of the policy scenario assessment, our state studies also examine the macro-economic impacts, i.e. jobs, consumer energy bill savings, wages, and GSP, using a input-output model called DEEPER (see Laitner et al. 2007). These results are highly effective for informing state policymakers' discussions of benefits to the state from energy efficiency.

This alternative approach provides effective framing for policymakers, a key audience for many efficiency studies. In addition, this approach offers flexibility to use different levels of analysis, depending on the needs of a state's specific request. We discuss later how to identify the appropriate level of analysis.

Identifying the Goals of an EE Potential Study

The first steps in undertaking an efficiency potential study are to identify the following: *why* has the study been requested (or what the goals are), *who* is your audience, and *what* is the scope of the analysis.

It is crucial to first have a clear understanding of why the study is being undertaken. In other words, what is the ultimate goal? Is the study to support legislation and/or regulatory hearings? Is it to establish energy savings targets or levels of funding for efficiency investments? Is it to develop specific efficiency programs? Once the need is defined, the next thing to be considered is: has there already been an efficiency potential study done for the state or region? If so, does the existing study meet the need driving the request? Only if these last two answers are no should a state or region pursue its own energy efficiency potential assessment. Then, understanding why the study is being undertaken will be the key driving force behind the level of analysis needed, which is discussed in the next section.

Next, who is the audience for the study? Who are the players that can use the critical data provided in a potential study to help make the goal happen? Typical audiences for efficiency potential studies are policymakers, state agencies, advocacy organizations, and program implementers. Understanding who your audience is will help drive the focus and framing of the analysis. Engaging key stakeholders, which is discussed shortly, is an important part of this process.

Finally, what is the scope? This includes the sectors and fuel types analyzed, analysis time period, and the necessary information on costs and benefits. Scope is largely dependent on the region and the specific needs of the state requesting the study. Recently, our studies have focused primarily on electricity and peak demand in the residential, commercial, and industrial sectors, though we have also received requests for natural gas and oil savings, onsite renewable energy, and transportation. Many policy makers and consumers do not differentiate between different energy markets and types of energy the way most energy experts do, so a restrictive focus can create confusion for a broader audience.

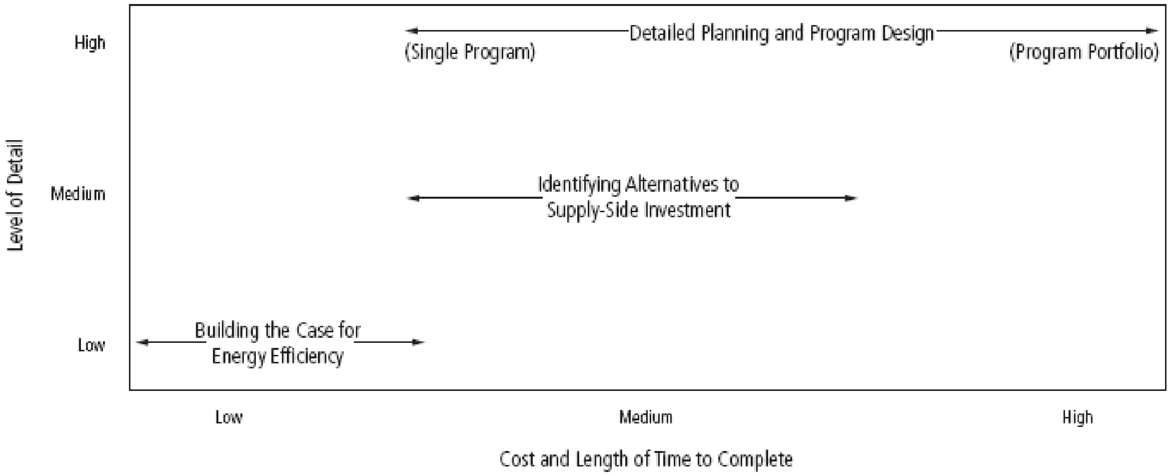
Levels of Analyses

There is no one size fits all for state-level efficiency assessments—they can vary in their level of detail and complexity of the analysis. ACEEE has found that assessments fall into three broad categories: high-level, policy scoping; policy planning and analysis; and detail program planning and targeting. The EPA efficiency potential study primer (EPA 2007) very similarly captures these levels of analyses, from low detail to high, as: building the case for efficiency; identifying alternatives to supply-side investments; and detailed planning and program design; these are captured as a continuum graphically (see Figure 1). Understanding the goals for a potential study is crucial to inform the level of analysis, and can help deter spending more time and money than is needed or investing in a study that does not provide the level of detail needed.

High-Level Policy Scoping

These analyses draw upon publicly available data and past program experiences to provide a first-order indication of the magnitude of the energy efficiency resource available in a state at the sector level (e.g., residential, commercial and industrial). These studies can be completed fairly quickly and cost in the range of $25,000 to $50,000. These studies are appropriate to beginning a discussion of the role of energy efficiency resources in a state's energy policy portfolio.

Figure 2. Considerations for Determining the Appropriate Level of Analysis



Source: EPA 2007

Policy and Planning Analysis

These assessments have a greater level of detail, providing a more detailed desegregation of energy efficiency resources and the policies and programs that could be implemented to realize the efficiency potential. These studies—ACEEE's study of Maryland (Eldridge et al. 2008) is a good example—take five to six months to complete and can cost between $100,000 and $150,000 depending on scope. These assessments are appropriate for informing state-level policy development.

Detailed Program Planning and Targeting

These highly detailed analyses are intended to inform the design and implementation of individual energy efficiency programs. Key sector and measure opportunities are assessed, detailed suggestions are made on specific program approaches, and key market allies are identified. These assessments are intended for program administrators and may not be comprehensive, focusing only on key markets that have been already identified for program development. These analyses can be very time consuming, depending upon the amount of original field data collection that is undertaken (e.g., equipment saturation surveys), and because the scope varies so much their cost can range from $100,000 to well over $500,000.

Stakeholder Engagement

One of the frequently overlooked elements of state-level potential studies is stakeholder engagement prior to the start of the data collection and analysis. While this may not seem an analytical task, it is critical to developing an effective assessment. Clearly, understanding what policies are politically tenable among the key stakeholders is important. In addition, one should consider what data sources are credible among the various stakeholders. We have encountered this latter issue with reference forecasts of energy consumption and energy prices., For example, the electricity and capacity forecast released by the Florida Reliability Coordinating Council (FRCC), which is a regional organization of the North American Electric Reliability Corporation

(NERC), was deemed more favorable among in-state players, particularly the utilities, than the Florida Public Service Commission's (FPSC) published forecast. Choosing an accepted forecast can confer credibility to the analysis with these audiences.

One less intuitive aspect of the process is using in-state experts. While this would seem to confer credibility to the assessment, we have found that this frequently creates unanticipated political complications. Most in-state subject matter experts are also involved with state-level programs and policies, and their involvement with the team can create unanticipated credibility problems. For example, in one study our renewable expert was representing the industry in a state proceeding causing some groups to discount the analysis because it was perceived as being prepared by an "advocate." Having national-level experts can confer a level of independence to the study that can increase its effectiveness.

Data Limitations and Recommendations

One of the biggest challenges ACEEE has faced in undertaking efficiency potential studies has been the availability of consistent data and forecasts for states. This problem is common in most states we have analyzed, and results from a combination of factors. The movement in the 1990s toward utility restructuring not only resulted in the suspension of most energy efficiency utility programs, but also led to termination of many energy data collection and market surveying activities. This problem is not unique to states. Budget cuts over the past decade have resulted in the termination of important data sources by federal agencies such as DOE's Energy Information Administration and the U.S. Census Bureau. While collection of original survey data is always an option, this increases the time and budget significantly, and may not be warranted for a policy-focused study.

Although there is some regional data available from public utility commissions and non-profit energy efficiency organizations, often, especially for the commercial sector, we need to use regional data from EIA to derive estimates for data not available at the state level. Even regional data from EIA, however, is badly out of date. For example, although EIA's Commercial Building Consumption Survey (CBECS) was updated in 2003 (EIA 2005), it has not examined electricity consumption at the end-use level since its 1995 version (EIA 1997). There is also very little detailed state-level energy data for the industrial sector. This lack of data is a particular problem because of the variation in the nature of the efficiency resource among different, individual industries within a state. As a result, ACEEE has been forced to rely upon national energy intensity and state and regional economic information (see Eldridge et al. 2008 for a discussion of this approach).

A key recommendation to states is that, if they are serious about realizing the benefits of energy efficiency resources, the states and utilities must be focused and strategic about identifying data needs and following through on collection of these data resources. They should work together to develop and implement a coordinated plan for collecting this information in order to effectively design and evaluate the performance of efficiency programs.

To accomplish this task, a state agency such as the public utility commission or state energy office should be designated as the energy data coordinator for the state. While some utilities are resuming the collection of some of this data, it is important that the collection is comprehensive and consistent across the state. This entity should consider developing data resources including the following:

- A consensus statewide electricity and peak demand reference forecast on which to base the current and future efficiency targets.
- Appliance saturation surveys (similar coordinated surveys conducted by each utility, or perhaps a single survey with each utility on the stakeholder list and the study designed to provide utility-specific breakdowns).
- New construction baseline surveys (e.g., a statewide survey with utility-specific information). These should include building size and key features suggestive of energy efficiency.
- End-use load-shape studies to help identify the contribution of each major sectoral end-use to peak electrical demand. Power costs are particularly high during peak demand periods, and understanding and reducing the major loads at times of peak demand can be very cost-effective.
- Measurement and verification studies using common methodologies and reporting formats to provide data on program costs and savings.
- Avoided costs to utilities.

By having a single entity with the responsibility and resources to collect and analyze energy data, states will be able to verify that its policies are achieving their goals, and future analysts will have the necessary data to identify energy efficiency opportunities and design programs to realize these energy efficiency resources. While having good data and forecasts will not save energy by itself, it represents an important enabling infrastructure.

Effective Media Release Strategy

As important as the analysis of energy efficiency potential is, it will have limited value if the target audiences are not aware of it. Policymakers get much of their information from general media channels, so media coverage is an important element of the project. ACEEE has learned from experience that most analytical organizations do not have the internal expertise to manage the successful release of a report. For example, ACEEE used an in-state media consultant to support the released of its Florida, which proved very effective because the consultant understood how to frame the message so that it responded to local issues and was able to effectively bring the story to the attention of local media leaders. We have used media consultants who have state-specific expertise to support the release of two of our recent studies (Florida and Maryland), and achieved much greater earned media coverage than in states where we handled the release or relied upon a local partner organization. Media professionals are called "professionals" for a reason—they focus all of their efforts on planning the study's release, including framing of messaging, coordination of the press event and follow-on reporting, and placement of op-eds.

Follow-Up with State

Once a study has been released and the target audiences become aware of it, the authors must then be prepared to respond to the questions and requests for additional information. An effective stakeholder engagement process can reduce this somewhat by identifying key issues and responding to them in the report. However, the study will spark questions that cannot be anticipated. Many efforts underestimate the time and resource requirements, which can compromise the effectiveness of the effort or create stress for analysis staff. Planning for the required staff time and structuring the analysis in ways that can allow the exploration of different scenarios can make this phase of the project much more manageable.

Conclusions

ACEEE's recent studies have yielded both significant successes and challenges. In Florida, our study provided a timely framework that was embraced by Governor Charlie Crist who was seeking to address electricity supply and global warming concerns, and the study showed that energy efficiency represented a least-cost resource that could address these challenges while creating new "green-collar" jobs. Among the challenges, we note especially the potential politics associated with collaborating with in-state players, the data limitations, and the transparency of our study results to policymakers.

Likewise, our study for the state of Maryland provided analytical support for policymakers and aided passage of significant energy efficiency legislation in the state. Again, stakeholder engagement was critical to the process, and could have benefited from even more time than we allowed.

Based on these experiences and others, we have identified several elements, as outlined in this paper, which are crucial to a successful report and dissemination of results. While the focus of preparing a study is frequently on the analysis and preparation of the report, these other project aspects are at least as important: stakeholder engagement, release strategy, and follow-up with policymakers. These non-analytical elements can determine how effective and useful a report proves to be to policy makers.

References

Dunksy Energy Consulting, Optimal Energy, Inc., and Vermont Energy Investment Corporation. 2004. *Opportunities for Accelerated Electric Energy Efficiency in Quebec: 2005-2012*. Montreal, Quebec.: Dunksy Energy Consulting.

[EIA] Energy Information Administration. 1997. *1995 Commercial Buildings Energy Consumption Survey*, http://www.eia.doe.gov/emeu/cbecs/contents.html. Washington, D.C.: U.S. Department of Energy.

________. 2005. *2003. Commercial Buildings Energy Consumption Survey*, http://www.eia.doe.gov/emeu/cbecs/contents.html. Washington, D.C.: U.S. Department of Energy.

[EPA] U.S. Environmental Protection Agency. 2007. *Guide for Conducting Energy Efficiency Potential Studies.* Prepared by Philip Mosenthal and Jeffrey Loiter, Optimal Energy, Inc. Washington, D.C.: U.S. Environmental Protection Agency.

Eldridge, M., R.N. Elliott, B. Prindle, K. Ackerly, J.S. Laitner, V. McKinney, S. Nadel, M. Neubauer, A. Silverstein, B. Hedman and Ken Darrow. 2008. *Energy Efficiency: The First Fuel for a Clean Energy Future—Resources for Meeting Maryland's Electricity Needs.* 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.

GDS Associates, Inc. 2005. *The Maximum Achievable Cost Effective Potential for Natural Gas Energy Efficiency in the Service Territory of PNM*. Madison, WI.: GDS Associates, Inc.

———. 2006. *A Study of the Feasibility of Energy Efficiency as an Eligible Resource as Part of a Renewable Portfolio Standard for the State of North Carolina*. Madison, WI.: GDS Associates, Inc.

———. 2007. *Vermont Electric Energy Efficiency Potential Study*. Madison, WI.: GDS Associates, Inc.

Itron, Inc., KEMA-Xenergy, RLW Analytics, Inc., and Architectural Energy Corporation. 2006. *California Energy Efficiency Potential Study*. Prepared for Pacific Gas & Electric. San Diego, CA.: Itron, Inc.

Laitner, S. & M. Kushler. 2007. *More Jobs and Greater Total Wage Income: The Economic Benefits of an Efficiency-Led Clean Energy Strategy to Meet Growing Electricity Needs in Michigan.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Laitner, John A. "Skip," M. Eldridge, and N. Elliott. 2007. *The Economic Benefits of an Energy Efficiency and Onsite Renewable Energy Strategy to Meet Growing Electricity Needs in Texas.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Nadel, S., A. Shipley, and R.N. Elliott. 2004. "The Technical, Economic, and Achievable Potential for Energy-Efficiency in the U.S.—A Meta-Analysis of Recent Studies." From *Proceedings of the 2004 ACEEE Summer Study on Energy Efficiency in Buildings.* Washington, D.C.: American Council for an Energy-Efficient Economy.

Optimal Energy, Inc. 2005. *Economically Achievable Energy Efficiency Potential in New England*. Prepared for Northeast Energy Efficiency Partnerships. Bristol, VT.: Optimal Energy, Inc.

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