The State Energy Program: Building Energy Efficiency and Renewable Energy Capacity in the States

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Submitted by

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EXECUTIVE SUMMARY

The primary purpose of this study is to document the capacity-building effects that the federal State Energy Program (SEP) has had on the states' capacity to design, manage and implement energy efficiency (EE) and renewable energy (RE) programs. This study, based on 68 interviews with 40 current and former state energy officials in 24 states, examines the role that SEP has had in not only building state expertise, but in moving that expertise forward across a wide range of programmatic efforts. This report documents how SEP has influenced state capacity, state-implemented initiatives and the resulting accomplishments.

The current and former state energy efficiency and renewable energy officials interviewed for this study reported that SEP has provided the knowledge, skills and expertise needed to design, manage and implement a wide range of energy efficiency and renewable energy programs, and to deliver an expanding set of energy services to their citizens In addition, the respondents reported that the skills acquired through SEP allowed them to obtain additional funding and provide added energy efficiency and renewable energy services beyond those provided directly by SEP. It was widely reported by managers that their SEP-acquired ability to design, manage and implement energy services and guide related policy decisions has led to the development and implementation of a wide range of other programs and services.

Across most of the interviewed states, SEP was described the essential foundation for the states' entire portfolio of energy efficiency and renewable energy efforts.

While other forces and funding mechanisms have played a role in building state capacity and capability, the states typically described themselves as relying on SEP for oversight, management, guidance, and support across their energy efficiency and renewable energy portfolios. The flexibility associated with how SEP funds can be prioritized and spent is a central and key element allowing the states to build energy efficiency and renewable energy program capacity. States with limited energy efficiency and renewable energy funding other than SEP reported that it is their state's SEP funding that has allowed them to build and maintain expertise and capability over the years. States with moderate levels of non-SEP energy efficiency and renewable energy funding typically reported that their SEP funds have enabled them to obtain the additional funding necessary to establish, manage, and direct their other initiatives. States with significant levels of non-SEP funding, including those that offer larger portfolios of services, reported that their SEP funds helped establish the legislation for those efforts, helped manage and oversee those non-SEP activities, helped provide technical assistance and advice to the regulatory agencies that oversee those efforts, and/or helped expedite those undertakings in other ways. In other words, the state SEP-funded efforts have helped to enable the state's non-SEP initiatives.

In many respects, SEP has served as an energy efficiency and renewable energy incubator for the states' energy efficiency and renewable energy portfolios.

SEP-ACQUIRED SKILLS AND EXPERTISE

The program managers interviewed for this study were asked to describe the types of skills that their office has acquired as a result of offering SEP and SEP-influenced services. The key responses to that inquiry are as follows:

Policy, Regulatory and Legislative Skills

- Understanding of the policy setting process and the documentation and support needed to set, influence, and change state energy policy.
- Understanding of the legislative process and how legislation is developed, supported, and passed.
- Policy analysis skills to predict the impact of various policy changes on technologies, markets, operations and costs.
- Drafting of legislation and writing policy and position documents and submitting evidence to support legislative considerations.
- Understanding of decision frameworks and how to inject new information into decision frameworks so that the information will be accepted and acknowledged.

Technical Skills

- Engineering and technology systems design and operational knowledge to be able to understand the physical and engineering principles pertaining to how, why and under what conditions technologies provide savings or renewable energy.
- Commissioning and retro-commissioning skills to make sure buildings are operating well and to identify where opportunities can be found.
- Cost effectiveness analysis techniques to understand what technologies and standards have the greatest economic benefit.
- Auditing and building assessment skills to be able to identify what changes are needed to save energy and to understand key factors affecting building savings potential.
- Building science and systems knowledge to understand not only how to audit buildings, but acquire an expert understanding of how building systems work and what can be done to the building or the management system to save energy.
- Understanding of building control equipment, systems, software and operations.
- Renewable energy technology and equipment fundamentals and an understanding of how they work and how to configure and deploy them.
- Loan development, processing, and monitoring skills to ensure adequate performance, including developing alternative financing approaches, formation and management of revolving fund accounts, tax issue resolution, project financing assistance and other expertise required to develop, provide and service loans and loan systems.
- Financial payback and net present value scenario building skills for different decisions and equipment or policy issues.
- Taxing and taxing system skills to understand and manage incentives and credits.
- Performance contracting skills and approaches including technology assessment, savings analysis, and payment systems.
- Programming and software development tools and support processes to build the right tools for state programs.

- Social marketing and behavior change inducement skills focusing on how to influence consumer behavior and decisions.
- Database construction, data synthesis, and statistical analysis skills needed to form opinions and decisions and take actions in response to data findings.
- Modeling skills to set up and conduct engineering, econometric, statistical and change analysis models to inform decisions.
- Physical and chemical property relationships and interactions to understand how energy flows and heat-change systems work.
- Thermodynamic flow and analysis skills to understand energy impacts and conditions.

Team Building Collaboration

- Understanding of the consensus building process and how to work with different interest groups to build agreement, gain support, identify resistance, and build documentation to work with collaborators, allies and stakeholders. Knowledge and skills of how to establish agreements with multiple stakeholders who can have competing or conflicting, as well as compatible interests or perspectives.
- Trust-building skills so that stakeholders can have confidence in the information provided.
- Partnership building skills to develop partnerships across organizations and interests that can work together to accomplish an objective.

Professional Skills

- Understanding of the code change process and the steps involved.
- Knowledge of how to write and update codes and standards and how to build a code and standard change case with the required economic and technical support analysis that can hold up under close examination and testing.
- Expertise in building code change demonstrations and conducting cost effectiveness tests to inform stakeholder and consumer positions and interests.
- Expertise in how to work with state and national groups to change codes or standards.
- Knowledge of how to design and conduct a demonstration to show proof of concept and performance on which programs, policies, codes or standards can be based.
- Materials development skills to develop and design materials that are effective at accomplishing a number of educational or behavior change goals.
- Call center skills and information dissemination skills including web site design and operation and effective ways to place information in the market.
- Educational skills to be able to teach and communicate concepts and ideas that result in behavior change.
- Information development skills related to educational tools and materials for the public as well as for workshops and classroom training.
- Training skills that are effective at educating and training students, attendees and stakeholders.
- Listening and guidance skills so that opinions and perspectives can be addressed in a way that is supportive and can accomplish key objectives.
- Management skills including administrative, reporting, financial control and other associated operational skills.

STATE CAPACITY IN KEY PROGRAMMATIC AREAS

According to the interviewed experts, SEP funding established the primary platform on which state energy efficiency and renewable energy programs, projects and initiatives have developed. Interviewed energy program managers reported that, within the sampled programmatic areas for which they were interviewed, they have strong professional knowledge, skills and expertise that were built primarily by SEP.

Across eight of the eleven SEP programmatic areas covered in the interviews, the median self-reported state capacity score given by the interviewed experts was 8 on a 10 point scale[1]. The scale allowed the interviewed experts to rate their state's capacity to design, manage and implement programs within each of the broad programmatic areas described later in this report. As shown in Table ES.1, only three of the eleven programmatic areas received capacity scores less than 8: technical assistance programs (7); new construction design programs (6); and transportation programs (5). The self-reported scores reflect strong perceived capacity across most of the SEP programmatic areas but also reflect the varying levels of capacity across the states from topic to topic.

Because of the flexibility in how SEP funds can be spent, the states were able to focus their capacity-building efforts on those programmatic areas of highest importance to their state. Thus, some states have higher or lower capabilities within each SEP programmatic area consistent with their state's priorities. Managers across both large and small states noted that recent cuts in SEP funding have impacted their capacity to design, manage, and implement some services. However, they also indicated that their capacity remains strong in the key program areas most important to their state. Some of the larger states and states with other funding sources have had to support a portion of their activities with other funding sources or risk additional capacity loss beyond that forced by SEP cuts. These experts reported that, with the addition of the SEP funding provided by the American Recovery and Reinvestment Act (ARRA), they are beginning to reacquire the capacity that had been lost and are able to move forward with additional achievements similar to those identified above.

In addition to reporting strong capacity to design, manage and implement energy efficiency and renewable energy programs in most topical areas, the interviewed experts attributed the vast majority of that capacity to SEP. Across all of the programmatic areas addressed, those interviewed credited SEP with providing, on average, 80% of their energy efficiency and renewable energy program capacity.

[1] 1=no capacity within the programmatic area; 10=very strong capacity within the programmatic area.

Table ES.1. Self-Reported State Capacity to Design, Manage, and Implement Programs in 11 Key Programmatic Areas

Programmatic Area	Median State Capacity Score	Percent of Capacity Caused by SEP
EE Information to Public	8	90%
Building Codes & Appliance Standards	8	90%
Financial Support	8	80%
Existing Buildings	8	80%
RE Policy, Regulatory, Legislative Support	8	80%
RE development and deployment	8	78%
RE Information to the Public	8	75%
EE Policy, Regulatory, Legislative Support	8	60%
Technical Assistance	7	83%
New Construction	6	75%
Transportation	5	90%
Median Across Programmatic Areas	8	80%

(1-10 Scale with 1 being very low capacity and 10 being very high capacity)

EXAMPLES OF SPECIFIC EFFORTS SUPPORTED BY SEP

In the bulleted highlights below, we describe a number of specific SEP-supported efforts reported by the responding states. This list is not comprehensive but rather is a partial sampling of the states' SEP-influenced efforts, providing a limited but representative overview of the types of activities described by the interviewed experts. Following each bulleted description is a list of the states in which the initiative was reported. The information presented below is a summary of the information presented in this report and is taken directly from the interview results without weighting or filtering to reflect size of the responding state, size of the SEP budget or the portfolio of services offered. These results are discussed in more detail within each state's interview results, presented in Appendix A.

- Building Codes: Energy efficient building codes for state, public and private buildings have been drafted, approved, improved and expedited with SEP support. Those states with new codes also train builders on code compliance and enforcement (e.g., Arkansas, California, Connecticut, Illinois, Kentucky, Louisiana, Michigan, Minnesota, New York, Oregon, Texas, Vermont);
- Appliance Standards: SEP efforts focused on developing, improving, expediting, and gaining approval for appliance standards (e.g., California, Connecticut, Kentucky, Minnesota, New York, Oregon, Wisconsin);
- Public Benefits Program: SEP supported management and oversight efforts for non-SEP funded public benefits portfolios (e.g., Illinois, Minnesota, Montana, Vermont);
- Renewable Portfolio Standards: Renewable portfolio standards that set minimum goals for renewable energy supplies and establish policies enabling renewable energy to be

integrated into distribution systems and power supply networks were designed and supported by SEP (e.g., Illinois, Kentucky, Minnesota, Montana, Utah, Vermont);

- Decision Frameworks: States have used SEP funds to set up committees, professional groups and decision systems to guide energy and climate change policy and decisions within their states (e.g., Arkansas, Kentucky, Minnesota, Mississippi, Montana, Utah, Vermont Wisconsin);
- Loan and Grant Programs: States have used SEP funds to develop and implement energy efficiency loan programs within public and non-profit sectors that continue saving energy as loans are repaid and re-loaned, and have established initiatives to design, implement and manage energy efficiency grant programs that have focused on energy savings as the primary objective (e.g., Arizona, California, Florida, Montana, South Carolina, Texas, Utah);
- Tax Incentives: Tax incentive initiatives designed to save energy, increase renewable fuels production, and off-set the purchase price for energy efficient equipment have been developed and implemented using SEP funds (e.g., Florida, Montana, Oregon);
- Retrofit Programs: States have used their SEP funds to support building retrofit programs such as ICP, Rebuild America, Schools and Hospitals, and others that have helped improve the energy efficiency of public buildings (e.g., Arizona, Connecticut, Florida, New York);
- Skills Training: Technical Training workshops, seminars, courses, and conference have employed SEP funds to increase the skills and expertise within the energy services delivery industry (e.g., Connecticut, Illinois, South Carolina, Arizona);
- Solar and Wind Energy Development: SEP funds have been used to provide advice on solar and wind technologies, support demonstration projects, provide training, promote awareness of the potential for solar and wind energy, and speed the development of the industry (e.g., Arizona, Idaho, Louisiana, Michigan, South Carolina, Utah);
- Alternative Fuels: Several states have used their SEP funds to establish alternative transportation fuel production, help increase fuel delivery, develop improved fuel distribution infrastructure, and prepare emergency fuel plans that are supported by alternative fuel supplies (e.g., Arkansas, Delaware, Idaho, Maine, New York, Utah, Virginia, Wisconsin).
- Purchasing Standards: State purchasing standards and specification were adopted, expedited or improved with SEP support (e.g., Kentucky, Wisconsin);
- Energy Efficiency Information Dissemination: States have provided a wide range of SEP-supported energy efficiency information to their populace, allowing consumers to pursue activities that save energy and reduce energy costs (e.g., Arkansas, Michigan, Kentucky, Minnesota, Mississippi, South Carolina, Utah, Vermont);
- Renewable Energy Information Dissemination: States have established SEP-supported programs, systems and approaches for getting renewable energy information to the public aimed at increasing generation, production, distribution and resource use (e.g., Delaware, Michigan, Minnesota, Mississippi, Utah, Wyoming);
- Technical Assistance Services: Technical assistance services of many different kinds have been developed and offered using SEP funds (e.g., Alaska, Arkansas, California,

Colorado Connecticut, Illinois, Mississippi, South Carolina, Utah, Vermont, Virginia, Wyoming[2]);

- New Construction Design Programs: Design and support programs and services aimed at increasing the efficiency of new buildings have been developed and launched using SEP funds (e.g., Arizona, Arkansas, California, Connecticut, Florida, Minnesota, New York, Texas, Wisconsin);

The above examples highlight some of the states' SEP-supported activities. In addition, SEP funds have been used to help develop, and in some cases lead, public benefits energy efficiency programs. These are programs typically offered by a state's utility companies or by non-profit or third party program administrators. In many states, SEP has not only supported the development of skills, knowledge and expertise within its respective energy office but has also supported training within the energy efficiency and renewable energy industries.

READINESS FOR THE FUTURE

Interviewed experts almost without exception expressed the opinion that the skills, knowledge and expertise acquired over the years via SEP have built a solid foundation on which current efforts are built and future efforts rest. A central theme that emerged from nearly every interview conducted was the role of SEP in helping the states establish their state energy offices, design and implement effective programs, understand the energy efficiency and renewable energy priorities of the state, and gain knowledge and expertise regarding what works best at accomplishing the state's energy-related goals and objectives.

Interviewees noted that SEP managers have become their state's experts on future energy efficiency and renewable energy initiatives and that these managers are working on both SEP funded initiatives and on initiatives funded by other sources, enabling them to apply their SEP-acquired skills to non-SEP funded efforts. A common thread in many interviews was that the states are now ready for ARRA and other initiatives because of SEP. In fact, nearly every interviewed expert noted that their ability to put together plans to implement ARRA initiatives in such a short time is based on the foundation of expertise built and program infrastructure created by SEP.

Several managers noted that without SEP and the capacity and skills it helped build, there would be either a lack of necessary knowledge or a limited knowledge base from which to plan the ARRA efforts. Most of the interviewed experts indicated that their state would not have allocated scarce state funds to a state energy office for the purpose of designing, implementing, and managing energy efficiency or renewable energy programs. According to the interviewed experts, the future energy programs now being planned and launched within the majority of the studied states rest on their SEP-acquired expertise.

[2] Includes state not interviewed who collaborated with the interviewed states to develop the HERS tools.

1. INTRODUCTION

The State Energy Program (SEP) is a federal grant program administered by the Office of Weatherization and Intergovernmental Programs (OWIP) within the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE). The Program offers grants to all 50 states, five territories and the District of Columbia (hereafter "states") to support a wide range of energy efficiency and renewable energy activities that best meet their individual energy needs.

The SEP was established in 1996 by merging the State Energy Conservation Program (SECP) and the Institutional Conservation Program (ICP), both of which had been in existence since 1976. SEP provides grants to the states according to a formula that includes population and energy use. In addition to these formula grants, SEP "Special Project" funds are made available on a competitive basis to carry out specific types of energy efficiency and renewable energy activities. The resources provided by DOE typically are augmented by additional funds and in-kind assistance from a number of sources, including funding from state and local governments, federal agencies, non-profit funds, public benefits funds and the private sector.

This document presents the results of a study of the influence of SEP on the establishment and growth of the state energy offices. The primary purpose of this study is to obtain a qualitative understanding of the level of influence that SEP funds have had on the states' energy efficiency and renewable energy capacities and provide examples of how this capacity has influenced state energy efficiency and renewable energy achievements. This study documents the effects that SEP has had on the states' capacity to design, manage and implement energy efficiency and renewable energy policies and programs. This study looks back over time to assess how SEP has influenced that capacity. "SEP funding" as used in this study includes funds provided by SEP formula grants and competitive grants, Petroleum Violation Escrow (PVE) funds, and the precursors to the current SEP.

To conduct this study, TecMarket Works used professional in-depth interviews with current and former state energy office managers and with other stakeholders to explore the influence of SEP on the state energy offices' capability to offer services within 11 broad programmatic areas:

1. Energy efficiency policy, regulation, and legislative support
2. Renewable energy policy, regulation, and legislative support
3. Energy efficiency information to the public
4. Renewable energy information to the public
5. Financial support services
6. Technical assistance services
7. Building retrofits
8. New construction
9. Building codes and appliance standards
10. Renewable energy development and deployment
11. Transportation

While this study looks at the historical development of programmatic capacity within a set of 24 states across the various programmatic areas listed above, the study also examines how SEP has influenced current state capacity and the effect of that capacity on the states' ability to move forward with new programs, projects, and initiatives that help more efficiently use our country's energy supplies and increase the generation and use of renewable energy. This study is a qualitative assessment of state capacity based on a series of 68 topic interviews with 40 individuals within the 24 states.

The interviews were conducted with current and former energy officials within the following states who were, or still are, involved with their state's current or past SEP initiatives.

1. Arkansas
2. Arizona
3. California
4. Connecticut
5. Delaware
6. Florida
7. Idaho
8. Illinois
9. Kentucky
10. Louisiana
11. Maine
12. Michigan
13. Minnesota
14. Mississippi
15. Montana
16. New York
17. Oregon
18. South Carolina
19. Texas
20. Utah
21. Virginia
22. Vermont
23. Wisconsin
24. Wyoming

The states listed above are all of those that responded to a request for interviews with current and former state energy officials and others that are knowledgeable about the history and development of energy policies and programs within the state. That is, the sample of states examined in this study actually constitutes a *census* of all states that provided us with the contact information needed to conduct interviews with their self-identified energy experts. Multiple requests for interviews were sent to all 50 states (see Methodology section of this report for additional information). The responding states include those with the largest and smallest populations in the nation as well as a broad range in between, and they cover all major U.S. geographic regions.

The research hypothesis explored in this project is that the many years of SEP funding have had a capacity-building impact on the states in terms of the ability of state energy offices to design, manage and implement energy efficiency and renewable energy programs. Figure 2 presents a model of capacity-building and social change developed from this study, illustrating the hypothesized relationship between SEP funding, state capacity to implement energy efficiency and renewable energy initiatives, and the ultimate resource and economic impacts that are achieved.

The key message resulting from this research, and depicted in the SEP Capacity Building Model constructed from this research, is that in order for organizations to implement activities that

impact the way energy efficiency and renewable energy accomplishments are achieved, there needs to first be the development of the expertise and capacity to plan, develop, implement and manage those type of efforts. Traditional behavior change models typically include personal beliefs, attitudes and knowledge that lead to intentions and actions. However, before an energy efficiency portfolio can influence program participants in this way, it first has to develop the broader system capacity in which behavior change and other component impacts can exist. If the capacity to influence behavior change is not developed on a well structured programmatic platform, the results can be significantly less than expected.

What SEP has done (as depicted in the model below and documented in this report) is establish a substantial energy efficiency and renewable energy capacity within the states. This foundation has enabled the states to perform a wide and varied set of energy efficiency and renewable energy activities within and outside of the SEP umbrella of services. While this study was not designed to establish a quantitative relationship between SEP inputs and ultimate impacts, the findings presented in subsequent chapters will show the key role played by the Program at critical junctures throughout the capacity-building process. In summary, SEP has provided the foundation on which a large and significant portion of state capacity was generated and upon which current capacity now rests or from which current capacity was built. The SEP has resulted in substantial sustained energy efficiency and renewable energy accomplishments both within the SEP-funded initiatives and also beyond SEP, impacting a wide range of initiatives and the resulting accomplishments within those states.

It may be that the long-term impact from the original legislation that established SEP and the resulting years of capacity building is a nation of states each with considerable capacity to design, implement and manage initiatives that have grown, and which continue to grow, energy efficiency and renewable energy accomplishments across the country. This hypothesis is supported by the fact that almost all interviewed experts noted, in one way or another, that their ability to take on the energy efficiency and renewable energy challenges associated with their ARRA funding was due to the capacity already acquired with SEP support. This SEP-constructed platform is the capacity foundation from which the states have designed and launched their new initiatives. Likewise, states that have launched public benefits programs report that the energy efficiency capacity established through their SEP funded and supported activities helped them design, plan, approve, oversee or support these non-SEP programs and their resulting accomplishments.

The resulting systems model illustrates the flow of influence among the system components, including influences both to and from the human impact elements of knowledge, attitudes, intentions and behaviors.

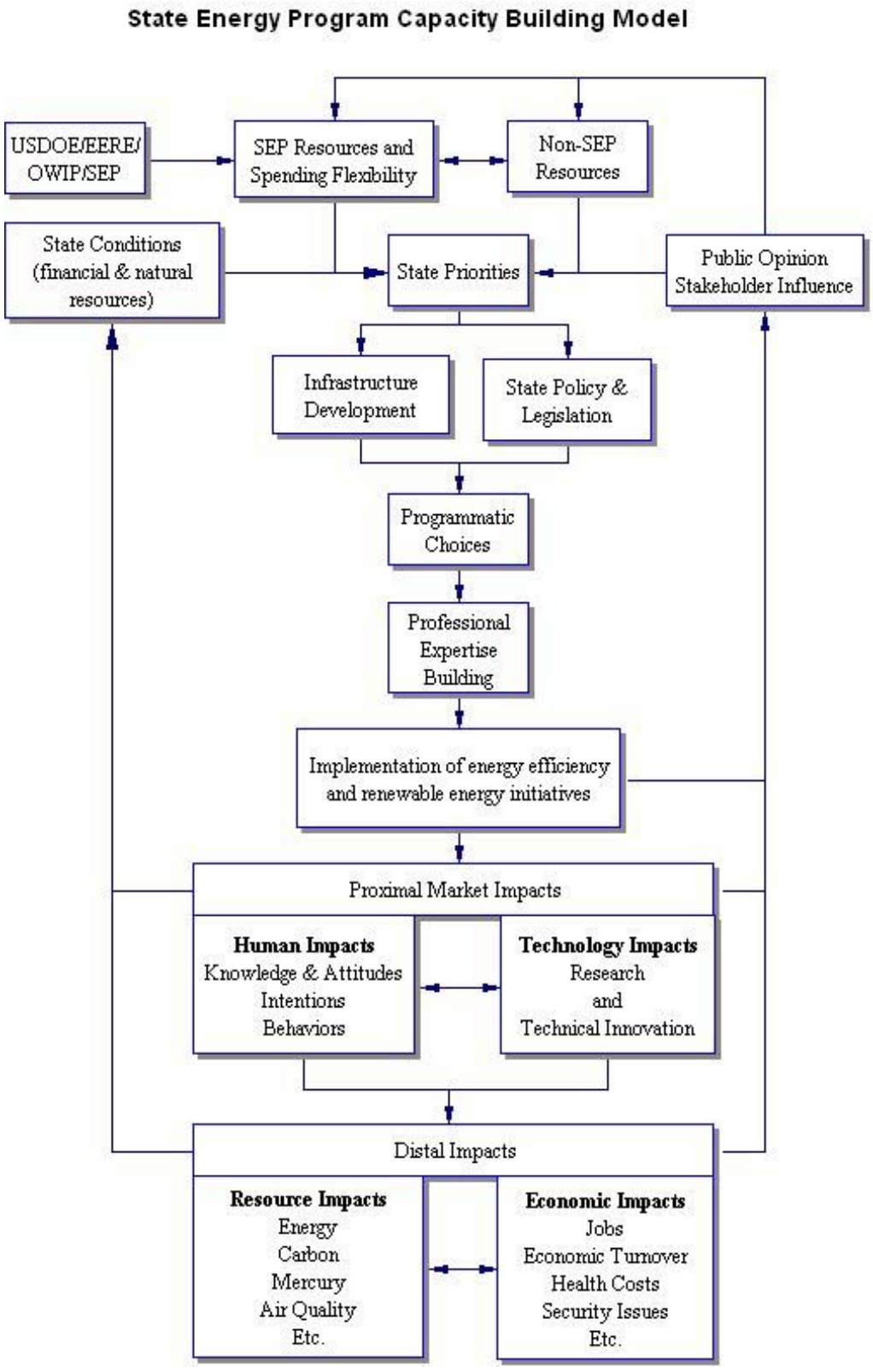

Figure 1. State Energy Program Capacity Building Model

2. METHODOLOGY

In essence, this is a qualitative study that draws heavily from the experiences and perceptions of current and former state-level SEP staff, managers and other stakeholders regarding the influence of SEP support on their states' energy efficiency and renewable energy capacity. It is not a statistical examination of capacity metrics based on testing or field measurements, but is instead a documentation of the types of programs, skills, knowledge and expertise that have been acquired by the state energy offices with SEP support. The primary data collection approach for this study is the use of in-depth interviews with the energy efficiency and renewable energy experts identified by the states as being most knowledgeable about how capacity was acquired within one or more of the broad programmatic areas examined.

The following steps were used to design and implement this study.

Task 1: Develop the study plan
A study plan was developed in June, 2009 by TecMarket Works (the subcontractor conducting the study) with input from Oak Ridge National Laboratory (ORNL), the OWIP office within DOE, and a Peer Review Panel of energy efficiency and renewable energy program evaluation experts. TecMarket Works is an independent program evaluation firm that has no program design, management or implementation responsibilities for DOE, SEP or any of the states or state programs. The plan was reviewed and approved by ORNL and OWIP, and the study was launched in July of 2009.

Task 2: Build Expert Contacts Database
This task covers the development of a contacts database of state energy efficiency and renewable energy experts who could potentially serve as interviewees for this study. The database included professionals from multiple states familiar with the background and history of SEP and the evolution of program services, approaches, materials and tools that have been developed and applied over the years.

To develop the database, TecMarket Works contacted the states' SEP directors and managers to obtain recommendations of the appropriate individuals within their respective states to interview. TecMarket Works asked each state energy office director to identify the leading experts within their state with the greatest knowledge about the capacity built within the state and how that capacity was used for each of the broad SEP programmatic areas identified for study. Experts across multiple programmatic areas, as well as individuals with varying perspectives relative to the services provided by SEP, were sought. Referrals to both SEP and non-SEP employees were sought to ensure that credible information from multiple perspectives was received.

TecMarket Works worked with OWIP's SEP managers and with ORNL to identify key topic areas in order to focus the study on high priority areas of energy efficiency and renewable energy expertise. The end result of Task 2 consisted of a listing of state-specific contacts arranged by programmatic topic areas, which served as the database of SEP experts utilized in Task 3.

Task 3: Design and Conduct Exploratory Interviews
This study utilized a "process-generated" approach, to identify areas of SEP impact from exploratory interviews. The "process-generated" approach requires that the interviews be conducted objectively, following a prescribed interview guide and conducted in a way that allows the interviewees (rather than the research team) to identify the major topic areas on which the research should focus.

The TecMarket interviewers asked representatives from each state to identify the various topics appropriate for their state and to specify the individual experts within their state to be targeted for detailed interviews in each of the identified topic areas. Each specified expert's level of historical knowledge regarding SEP developments in each identified topic area was rated by the states (i.e., none, basic, moderate, or extensive). State representatives were selected by TecMarket Works for interviews on topics for which they were rated as having extensive SEP historical knowledge for their respective state, as described below in Task 4.

This process allowed TecMarket Works to identify the topic areas to be targeted for each state, to build the detailed interview sample, and to launch the topic area interviews with the specifically targeted state experts. This data collection process was conducted in conjunction with Task 2 because the same individuals who could identify the experts to include as targets for subsequent in-depth interviews were also well-equipped to identify key topical areas for their state.

In reality, Tasks 2 and 3 became a series of e-communications and telephone conversations to collect the contact data, the program area categories data, and levels of expertise information at the same time. To make the effort as convenient as possible for the state respondents, who were simultaneously engaged in planning new ARRA initiatives, TecMarket Works developed three options for the states to provide the needed information. The first option involved clicking on a link (embedded in the contact e-mail) and providing the necessary information online. The second option allowed states to fill out an attached spreadsheet to provide the requested information. The final option involved having states call TecMarket Works and provide the necessary information over the telephone.

Task 4: Analyze Data for Targeting Interviews
The information collected from Tasks 2 and 3 was examined and a target population was identified for each of the programmatic areas identified for study. The research budget required limiting the sample to about 65-70 interviews across all of the targeted programmatic areas. Thus, the original plan was to identify the population of state programmatic areas and experts and then select a sample from that larger group to target for the in-depth interviews. However, because less contact information was collected than originally anticipated and a large number of states and programmatic areas were needed for the study, we ended up interviewing *all* of the state-identified contacts with expert knowledge within the programmatic areas of interest. That is, the expert population became the sample. The limiting factor for the successful completion of the in-depth interviews turned out not to be the research budget (as expected), but rather the number of SEP experts that could pull away from their SEP and ARRA planning efforts during the height of the ARRA planning process to complete the interviews.

Task 5: Design and Conduct In-Depth Interviews

In this task, topic-specific interview guides were developed to support the interview process. Because every interview was unique, focusing on an individual state, programmatic area, and capacity condition, the guides had to be flexible enough to focus the effort but unspecified enough to allow the respondents to describe their own unique conditions. The primary purpose of this task was to compile a set of examples describing how SEP had or had not improved the capacity of the states to design, manage and implement energy efficiency and renewable energy programs.

Individual in-depth interviews were conducted with each selected expert who agreed to be interviewed. The interview guide was reviewed and approved by ORNL prior to implementation, and all interviews were conducted by telephone. The objective was to obtain interviews from a sample of states that represented a distribution of large states, small states, southern states, northern states, eastern states, midwestern states and western states. Accordingly, the effort targeted all states with willing respondents who were available to be interviewed within the project's allotted time period. The study was able to obtain completed interviews from all targeted regions of the country, encompassing states having both large and small populations over a dispersed geographic area. Figure 2 below presents a diagram of the states included in the study.

Figure 2. Diagram of Responding States (darker color shading)

In total, 68 topic-specific in-depth interviews were conducted with 40 different state-identified experts within 24 states. To help ensure objectivity and accuracy in the information collected and to comply with the American Evaluation Association's ethical standards, all individuals were provided assurance that the information they provided would not be directly linked with them as individuals. Thus, the names of the individuals interviewed are not identified in this document.

Task 6: Analyze the In-Depth Interview Data and Prepare Report
Data from the in-depth interviews were analyzed to address the process-driven topic areas hypothesized to be significantly impacted by SEP-acquired capacity. The resulting report identifies the key areas of capacity building on which the interviews focused, identifies examples of programs and program initiatives that helped build that capacity, identifies the skills and knowledge acquired as a result of the SEP efforts, and reports on what the interviewees said about how SEP efforts influenced the acquired capacity and expertise in their states.

It is important to note that the primary data collection approach for this study was the use of in-depth interviews with the energy efficiency and renewable energy experts identified by each of the states taking part in this study. In many cases, these experts are current and past managers of the state energy offices and other individuals who were identified with those efforts. This condition can be viewed as both strength and a weakness of the study. The strength of this approach is that interviews were conducted with the leading SEP capacity experts within the states who are most knowledgeable about those conditions. The weakness of this approach is that the study is based on information provided by individuals who are not independent arms-length stakeholders and may, as a result, be biased in their perceptions of the significance of the SEP contribution.

The SEP Evaluation Peer Review Panel concurred that the study design is sound, reasoned and acceptable to address the researchable objectives of this study.

3. HISTORIC DEVELOPMENT OF STATE CAPACITY

This chapter provides an overview of the impacts that SEP funding has had on the capacity and capability of the state energy offices to design, manage, and implement energy efficiency and renewable energy programs, projects and initiatives. This chapter presents a summary of the detailed discussions of individual state initiatives and the influence that SEP has had within each of the sampled states (see full descriptions in Appendix A.) It is constructed from a sample of the states (N=24) and represents a subset of the programs and initiatives from the sampled states rather than a comprehensive listing of every SEP-supported activity. Thus, the information presented here is a small part of the states' capacity and capabilities; however, it does reflect what is typical of the nation's state energy offices.

POLICY, REGULATION, AND LEGISLATIVE SUPPORT

SEP has supported the development of many state-level energy efficiency and renewable energy policies, regulations and legislation. State energy managers interviewed for this study pointed out the role of SEP in supporting building code changes for both public and private sector buildings across the residential and non-residential markets. States also reported SEP efforts aimed at changing appliance standards, equipment acquisitions, and purchasing policies regarding the treatment of energy efficiency and renewable energy resources. SEP efforts to create and pass policies and legislation have helped develop public benefits energy efficiency programs and portfolios in the states. SEP-supported policy and legislation initiatives also have contributed to the adoption of renewable portfolio standards. In addition, states reported that their SEP efforts targeted the increased use of alternative fuels. They noted that their efforts to build strong policy foundations have stimulated public policy initiatives within their states. In many cases, respondents reported that the work supported by SEP provided the push needed to accomplish SEP's objectives and also to build energy efficiency and renewable energy infrastructures, portfolios and programs often embedded in new funding mechanisms.

States reported that they have developed substantial capacity to create state policies and regulations and provide the information on which legislative initiatives are based. Table 2 and Table 3 reveal a comparably high SEP impact on both energy efficiency and renewable energy policy and legislation. On average, the interviewed states gave their capability in this area a score of 8 on a 10-point scale, indicating substantial skills within the state energy offices. These states indicated that SEP and the associated funding sources were responsible for building, on average, about 60% of the state's capacity to provide policy, regulation and legislative support within their state.

Table 2. Energy Efficiency Policy, Regulatory or Legislative Support

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	7	30%
Arizona	9	80%
California	9	5%
Connecticut	3	25%
Delaware	8	80%
Florida	9	5%
Idaho	7	40%
Illinois	10	95%
Kentucky	8	80%
Louisiana	8	60%
Michigan	8	100%
Minnesota	8	60%
Mississippi	7	95%
Montana	8	70%
New York	7	50%
Oregon	8	30%
South Carolina	8	100%
Texas	9	50%
Utah	7	50%
Virginia	8	50%
Vermont	8	60%
Wisconsin	7	80%
Wyoming	6	90%
Minimum	**3**	**5%**
Maximum	**10**	**100%**
Mean	**7.7**	**60%**
Median	**8**	**60%**

Table 3. Renewable Energy Policy, Regulatory or Legislative Support

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	7	30%
Arizona	9	80%
California	9	5%
Connecticut	3	15%
Delaware	8	80%
Florida	9	5%
Idaho	6	30%
Illinois	10	95%
Kentucky	7	80%
Louisiana	8	60%
Michigan	8	100%
Minnesota	7	60%
Mississippi	6	80%
Montana	7	100%
New York	6	10%
Oregon	8	30%
South Carolina	9	95%
Texas	7	60%
Utah	9	80%
Virginia	8	100%
Vermont	8	60%
Wisconsin	7	85%
Wyoming	10	80%
Minimum	**3**	**5%**
Maximum	**10**	**100%**
Mean	**7.7**	**62%**
Median	**8**	**80%**

Examples of SEP-supported state policy, regulatory, and legislative initiatives include:

A. Policy Making Support: A significant number of states reported that state energy office staff are integrally involved in formulating and/or providing key information for their states' energy policies and regulations. They report that the funding provided through SEP was essential to the development of their capacity to fill these roles in their states. Some examples include:

1) Arkansas formed a Joint Committee on Energy that helps develop state energy policy, guide initiatives, and reduce barriers to new energy policies. This committee is composed of SEP managers and supported with SEP funds.
2) Arkansas, Wisconsin, Vermont and others use SEP-funded demonstrations as a tool to help guide state energy policies and decisions and as a consensus-building tool.

3) Illinois's SEP-funded energy office has become the state's primary information source for key energy-related policy decisions (e.g., codes, public benefits programs, home labeling, etc.).
4) Kentucky's SEP funds helped build a 7-point decision support strategy that incorporates a longer-term cost assessment perspective regarding energy policies and initiatives related to energy efficiency and renewable energy.
5) Minnesota's SEP managers have built a coordinated system for addressing state energy decisions that includes citizen involvement and has been integrated into the legislative support and decision framework. This system also includes a mechanism for providing advice on climate change actions.
6) Montana's SEP managers provide support in assessing and advising on energy policy and planning to guide state initiatives and decisions.
7) Utah's SEP managers provide the expertise for policy development efforts in the state, serve on the Governor's Climate Change Panel to assess policy options, and provide quantitative research support to state policy-makers.
8) Vermont's SEP managers are lead advisors and conduct feasibility studies used to develop state policy and expedite policy change.
9) Wisconsin SEP managers compile and maintain a comprehensive database of energy statistics that guide all state energy policies. The state also demonstrates energy saving technologies to build familiarity and support for change.

B. Energy efficient building codes: Half of the states interviewed indicated that part of their policy, regulatory and legislative support efforts focused on establishing state-wide building codes for public or private buildings, or both. They reported that SEP funds have been used to support or drive decisions that led to the adoption of new building codes or performance standards that improved the energy efficiency of public and private sector buildings. For a more detailed discussion of the codes and standards changes achieved, see the Building Codes and Appliance Standards section of this report. Examples of SEP-supported policy, regulatory, and legislative efforts in support of new or updated codes and standards include:

1) Arkansas SEP managers provided the assessment and documentation that allowed their energy efficiency codes to be changed in 1992 and again enhanced in 2000.
2) Connecticut implemented a state standard requiring public buildings to be 20% more efficient than the building code. This effort was recommended by the SEP managers and supported with their analyses.
3) Illinois provided analysis and support for a new commercial and residential building code that SEP managers indicated would not have been adopted without the SEP-funded policy support.
4) Kentucky SEP managers developed and helped pass legislation that established state building codes and performance standards in the state.
5) Louisiana SEP-funded efforts provided analysis and policy support for passage of a building code that covers new construction as well as retrofits.
6) Michigan SEP managers established a process for assessing the cost and effects of code changes over a longer-term payback timeframe, which facilitated the adoption of energy efficient code changes.

7) Minnesota SEP staff provided information and analysis in support of the adoption of sustainable building guidelines.
8) New York used SEP managers and analysis results to support adoption of a state building code that also established a requirement for regular updating.
9) Oregon was one of the first states to conduct a detailed technology and building approach analysis (performed by the SEP-funded state energy office) that allowed for the adoption of an energy efficiency building code.
10) Texas used SEP-provided analyses to support the adoption of both a residential and a non-residential building code.
11) Vermont used SEP funds to support a policy to adopt residential and non-residential energy efficient building codes and to provide training to increase compliance and performance.

C. Appliance Standards and Purchasing Specifications: A number of states noted that SEP funds were used to support appliance standards, specifications or purchasing policy. Some examples include:

1) California uses SEP funds to support its aggressive appliance standards for the state. The SEP funds are used to keep program staff informed on the appliances in the market, maintain their assessment database, and enforce the standards.
2) Connecticut SEP efforts help to support standards development and fund coordination with other states to facilitate their adoption of appliance standards. SEP funds also helped Connecticut successfully push for the development of federal standards.
3) Kentucky passed a bill based on SEP manager's recommendations and analysis which established appliance standards for state facilities.
4) Minnesota's sustainable building guidelines developed with SEP support include energy efficient specifications for appliances.
5) New York was one of the first states to develop appliance standards and has developed and implemented new standards for a number of appliances. They have established partnerships to identify and develop new standards and have helped support federal standards development efforts. These efforts were supported by SEP funding.
6) Oregon used SEP funding to design and implement a tax incentive program that has allowed them to incentivize energy efficient equipment. They have also joined with other states to push for federal appliance standards on a number of product lines.
7) Wisconsin's SEP manager crafted state purchasing policies making energy efficient equipment and technologies the required choice for all state buildings purchasing. These policies also allow local governments to purchase off the state's contracts for these technologies. The state SEP program pushed for policies disallowing the use of inefficient fixtures in state buildings and inefficient ballasts throughout the state.

D. Public Benefits Portfolios: According to the experts interviewed for this study, SEP-funded efforts have been instrumental in moving states to develop and implement rate-

payer funded public benefits portfolios that offer a wide range of energy efficiency programs across the country. Some of these efforts include the following:

1) In Illinois, SEP-funded managers were the key experts behind legislation to develop and implement the state's public benefits programs. SEP managers provided the impact and cost effectiveness analysis and the recommendations needed to pass the legislation and continue to provide oversight. These programs are implemented by the state's investor-owned utilities.
2) Minnesota's SEP-funded managers provided the primary analysis, support and structure development needed to pass legislation implementing a public benefits portfolio in the state. These managers helped guide program policy and design efforts and have overseen the implementation of portfolios offered by the state's utility companies. SEP managers also helped establish policy to include the state's municipal and cooperative utilities in the public benefits portfolio and helped build incentive mechanisms to compensate utilities for their energy efficiency accomplishments.
3) Montana's SEP managers sit on committees that influenced the state to implement utility programs. These key managers, decision makers and decision support managers provided testimony to the commission and have helped establish the universal charge system on which the energy efficiency programs are based.
4) In Vermont, SEP managers developed the concept for the state's public benefits portfolio (Efficiency Vermont) and helped establish the legislation for this effort. They also provide key management direction and development oversight for the non-profit organization and the programs offered within this portfolio. These SEP managers also published and presented extensively across the country to help other states adopt similar accomplishments.

E. Alternative Energy: SEP funding played a role in the development of alternative energy policies and legislation in many states. SEP staff provided expertise, research and analysis to guide policymakers on a variety of renewable energy issues and initiatives.

1) Illinois' SEP managers were integrally involved in the effort to have renewable energy requirements incorporated into state energy policy. Subsequently, the state established a policy objective to obtain a 25% reduction in conventional energy use by 2025 through renewable energy and energy efficiency.
2) Kentucky's SEP managers worked with state policy-makers to pass a renewable energy portfolio standard in their state. This portfolio standard has set a goal of achieving a 25% reduction in conventional energy needs through renewable energy and energy efficiency.
3) Minnesota's SEP office established the potential for wind energy in the state by inventorying wind energy supplies and mapping wind flows and patterns. This effort supported the establishment of a policy to install wind generating resources in the state. The SEP office also researched the performance and reliability of alternative transportation fuels in support of the state's E-85 policy and infrastructure initiatives.

4) In Montana, SEP funds were used to conduct wind assessments and monitoring efforts on which the state's subsequent renewable energy portfolio policy was based. SEP managers served as key advisors to legislative members who voted to implement those initiatives.
5) Utah's SEP managers helped develop the state's renewable portfolio standard which increased the amount of alternative energy generation facilities in the state. Managers provided technical and policy support information and worked with others on the Governor's Climate Change Panel.
6) Vermont's SEP managers provided support for the development of the state's renewable energy policies, which are increasing the use of renewable energy in the state. SEP funds have also been used for demonstrations of the use of alternative transportation fuels.

F. Other policy based efforts: SEP-funded efforts have also supported other policies, regulations and legislation. Some examples include:

1) In Arkansas, SEP funds were used to develop an initiative to go beyond the required right-turn-on-red program and allow left-turn-on-red for appropriate one-way streets.
2) Kentucky used its SEP managers to build an energy efficient and renewable energy policy roadmap for the future. This now guides the programs and initiatives offered in the state. SEP managers also helped develop legislation that allows performance contracting initiatives in state buildings and facilitated policies allowing incentives for Energy Star homes and renewable energy technologies.
3) Minnesota used SEP funds to benchmark 5,000 state and public buildings and set policies to enable these buildings to meet the state's Sustainable Building Guidelines, which were also developed by SEP managers.
4) Mississippi's SEP managers helped establish policies that require every state agency to have an Energy Management Coordinator responsible for the energy efficiency of their associated state buildings.
5) Wisconsin SEP managers created the statistical reports and analysis databases that inform a wide range of state policies, legislation, and program operations.
6) Many states reported using their SEP funds to acquire the skills, knowledge and education that led to policy support initiatives.

ENERGY INFORMATION TO THE PUBLIC

All states, to some degree, rely on SEP staff to be the primary source or one of the primary sources for reliable, accurate and state-of-the-art information on an extensive range of energy topics. SEP managers respond to inquiries from a variety of stakeholders. They also design and produce energy efficiency and renewable energy information materials, and deliver presentations on those topics. These experts may be required to provide information on specific technologies, proper installation practices, costs of equipment and energy savings. As energy office staffing

levels have declined, state personnel take their SEP-acquired expertise and network connections with them to other governmental agencies or the private sector.

Interviewed states indicated that SEP-funded educational programs have been very active in developing and providing informational materials to schools, from kindergarten through 12th grade. They have also used materials available through national programs such as the National Energy Education Development Program (NEED). States have provided energy educational materials, sent speakers, and demonstrated energy usage in the classroom. States have also utilized other opportunities for the distribution of energy educational materials. Some of these venues include: state and county fairs, sporting events, conferences, and special events focused on specialized topics such as renewable energy. Another major tool for providing information has been the internet.

States reported that they have developed substantial capacity to provide energy information to the public. **Table 4** and Table 5 (below) reveal that the managers interviewed for this study reported that SEP had a substantial impact on the states' informational capacity for both energy efficiency and renewable energy. The average rating of current capacity and staff expertise in this area provided by the interviewed states was 8 on a 10-point scale, indicating the perception of substantial skills in the state energy offices. These states indicated that SEP was responsible for building, on average, 80-90% of the state's capacity regarding educational and informational services. Even those states reporting a lower reliance on SEP stated that SEP initiated their programs, created the capacity and infrastructure upon which they built, and enabled them to leverage other resources for expansion. According to the interviewed experts, the vast majority of these programs would not exist or would be substantially less developed without the availability of SEP funds.

Examples of SEP supported capacity developed in this programmatic area are described in the Appendix and summarized below:

A. Energy Efficiency Information: The states reported high demand for information about the availability of energy efficient appliances and other energy-efficient equipment. There has also been demand for information regarding technical assistance, cost of installation, and energy savings or cost effectiveness (particularly in term of payback periods or savings verses costs).

   State energy offices are the key providers of energy efficiency information in their respective states. The continued need for reliable energy efficiency information provides opportunities for state energy offices to implement demonstration projects illustrating the effectiveness of energy efficiency technologies. State SEP managers reported that there is currently more demand for energy efficiency information services than the states can provide at the current levels of funding.

   State energy offices have utilized SEP funds to develop energy efficiency staff expertise and to develop and deliver informational materials. Over the years, an information sharing network of state energy experts has evolved and it continues to raise awareness of

energy efficiency opportunities. Some examples of state programs providing energy efficiency information include:

Table 4. Energy Efficiency Information to the Public

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	7	70%
Arizona	7	100%
California	9	15%
Connecticut	5	95%
Delaware	5	100%
Florida	9	10%
Idaho	8	60%
Illinois	10	90%
Kentucky	8	80%
Louisiana	7	90%
Michigan	9	100%
Minnesota	8	90%
Mississippi	10	95%
Montana	10	100%
New York	10	90%
Oregon	8	60%
South Carolina	8	100%
Texas	7	50%
Utah	9	90%
Virginia	8	100%
Vermont	7	80%
Wisconsin	3	90%
Wyoming	8	100%
Minimum	**3**	**10%**
Maximum	**10**	**100%**
Mean	**7.8**	**81%**
Median	**8**	**90%**

1) In Arkansas, SEP-funded staff worked with the Arkansas Cooperative Extension Service to establish an Energy Emergency Management Program. Educational materials have been developed and are available for use during energy emergencies. These materials provide support and information on how citizens can respond to an energy emergency. Arkansas has also conducted successful media campaigns utilizing TV spots and has distributed a newsletter called Energizing Arkansas through the Co-op Extension Service.
2) Michigan's SEP funding created an energy information clearinghouse for the distribution of energy information at eight centers around the state. These centers provide information and educational materials to the public and their information experts participate in conferences and state fairs. The energy office often distributes information to more than 5,000 people at such events.

3) Kentucky's SEP-supported personnel have worked with the K-12 public schools to establish the Kentucky K-12 Schools Program and provide educational materials. Kentucky also has a 3,000 square foot exhibit space and offers workshops on high performance homes.
4) Minnesota used SEP funding to developed its NEED program with SEP funds. Minnesota Energy Office managers reported that their NEED program was recognized with national awards as was their K-12 program.
5) In Mississippi, SEP funds assisted in the development of a GIS (Geographic Information System) that provides information on the energy resources available in Mississippi.
6) South Carolina's SEP-supported staff established a website and an 800 number for the purpose of providing energy information to every type of customer. The website receives over a million hits per year from 80,000 unique customers and disseminates energy information to that client base.
7) Utah utilized SEP-supported personnel to develop a team approach for the presentation of educational material at sporting events and other occasions where there is a large audience (Utah Green Team). The Green Team is an outgrowth of a program directed at state government employees called Think Energy, which is designed to assist state employees in reducing energy use in state office buildings and in their homes.
8) Vermont's SEP-funded staff established a successful information program for the public schools called the Vermont Energy Education Program (VEEP).

B. Renewable Energy Information: Many of the state energy offices found a great deal of demand for materials on the use, availability and costs of renewable energy. Specifically, there was a need for information and educational materials on solar generation of electricity, solar hot water systems, solar heating, wind energy, and the use of biofuels. The state energy offices used SEP funds to gather information on the availability and use of renewable energy.

Utilizing SEP funds, states have been able to provide a broad range of information on the availability, use, and potential for the development of renewable energy. The continued interest in renewable energy has provided opportunities to emphasize the economic development aspects of renewable energy production, equipment manufacturing, and installation. State energy experts reported that the energy information infrastructure developed for renewable energy has supported the development of a renewable industry. This was also one of the program areas that generated continued support for the funding of state energy office activities. The success of early-generation informational and demonstration projects targeting the production of ethanol from various products (e.g., waste products, corn, and others) led more states to enter the field of ethanol production. Some examples of the capacity developed in this area include:

Table 5. Renewable Energy Information to the Public

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	8	80%
Arizona	9	75%
California	9	5%
Connecticut	4	40%
Delaware	9	60%
Florida	8	10%
Idaho	8	80%
Illinois	8	75%
Kentucky	7	80%
Louisiana	8	100%
Michigan	9	100%
Minnesota	7	75%
Mississippi	5	80%
Montana	9	100%
New York	6	10%
Oregon	7	40%
South Carolina	9	100%
Texas	9	70%
Utah	9	95%
Virginia	8	100%
Vermont	7	60%
Wisconsin	8	70%
Wyoming	10	60%
Minimum	**4**	**5%**
Maximum	**10**	**100%**
Mean	**7.9**	**68%**
Median	**8**	**75%**

1) Delaware's SEP funding provided information for the promotion of solar cars (Delaware Junior Solar Sprint). Their model solar car program is implemented at the junior high school level and has been successfully increasing awareness of solar energy for the past 15 years.
2) Michigan's SEP-funded managers have provided tours of renewable energy centers to generate awareness of renewable energy and support for its increasing use.
3) Minnesota reported that SEP provided funds for special projects that supported the distribution and use of E-85 fuel.
4) Mississippi utilized SEP funding to conduct a study of biomass potential and develop a feasibility plan. Several projects were developed subsequent to those efforts, which grew into the Mississippi Biomass Council. The mission of this organization is to promote biomass utilization in Mississippi. Through this effort Mississippi learned that some initiatives need to be coordinated with other organizations, and the promotion of solar water heaters is now coordinated through trade shows and other venues.

5) Utah used SEP funds to develop materials promoting the use of alternative fuels for motor vehicles. Their initial efforts included the use of natural gas as an alternative to gasoline.
6) Wyoming used SEP funds to sponsor events for the promotion of wind energy (Wyoming Roping the Wind). This is an annual event for Wyoming citizens providing educational materials on wind power. Wyoming has leveraged their wind energy educational efforts to promote the use of wind energy for small-scale facilities in the residential and small commercial sectors and to provide assistance to the large commercial and industrial sectors.

FINANCIAL SUPPORT SERVICES

Most of the interviewed states reported that SEP and similar funding have had a substantial impact on developing energy efficiency and renewable energy financial support services. As Table 6 shows, the average rating of current capacity and staff expertise in this area was 8 on a 10-point maximum scale. Virtually every state interviewed about their financial support service programs said that SEP was directly responsible for getting these programs implemented. In many cases, the SEP experience and learning was used to expand the size of such programs when more non-SEP funding became available. According to the interviewed experts, without SEP, the vast majority of these programs would not exist today. Managers expressed the opinion that the few that might have emerged in the absence of SEP would probably have started much later and would be considerably less developed at present. While Table 6 indicates that most states attribute 80-100% of their current capacity to SEP, even those who now have more supplemental support for these programs (and thus a lower percentage of current SEP reliance) stated that SEP initiated their programs and created the capacity and infrastructure that made supplemental expansion possible and/or substantially more successful.

The most commonly cited financial support service across interviewed states was a loan program (sometimes in conjunction with a bond program). The range of financial support services also included grant programs, tax incentives, and rebates. Examples of SEP-supported financial services capacity are provided below.

A. Loan programs: These programs most commonly target energy efficiency improvements in public institutions, including local governments and schools. Attempts to expand into the private sector have been limited by additional program structure and resource requirements. Some states have succeeded by specifically targeting large comprehensive projects (e.g., California), while others have had some success with smaller loans (e.g., Montana).

   SEP-supported staff have provided a wide range of critical services, including but not limited to: engineering analysis, financial analysis, energy audits, and architectural design services. States that significantly invested in developing staff expertise and creating positive cash flow loan structures appear to have more successful loan programs. Some example loan programs include:

Table 6. Financial Support Services

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	8	90%
Arizona	9	100%
California	10	20%
Connecticut	5	60%
Delaware	5	0%
Florida	10	90%
Idaho	5	40%
Illinois	10	90%
Kentucky	7	80%
Louisiana	8	100%
Michigan	7	100%
Minnesota	8	35%
Mississippi	9	80%
Montana	9	100%
New York	10	100%
Oregon	9	35%
South Carolina	8	100%
Texas	9	20%
Utah	6	40%
Virginia	7	100%
Vermont	8	80%
Wisconsin	8	90%
Wyoming	8	40%
Minimum	**5**	**0%**
Maximum	**10**	**100%**
Mean	**8.0**	**69%**
Median	**8**	**80%**

1) Arizona and Minnesota both had successful SEP-developed energy efficiency loan programs that were eventually discontinued due to SEP budget cuts.
2) California has an SEP-supported loan program targeting energy efficiency improvements in schools and hospitals, which is structured to provide a positive cash flow to the participants. Bonding authorities now allow $3-$4 of loans for each $1 of SEP-related funds received, which has accelerated the rate of energy savings and carbon reductions. California's program subsequently expanded to also include loans for renewable energy and distributed generation projects.
3) Supported by SEP funds, Montana utilized a bond program to renovate its state buildings, with energy savings used to repay the bonds and fund expansion of the program to renovate more buildings. SEP also supports Montana's renewable energy loan program for consumers and businesses.
4) With SEP funded support, South Carolina instituted a loan program for state agencies, local governments, non-profit organizations, and schools. A program for

private industry targeting energy efficiency development was not as successful and was later discontinued, with its resources put into the public sector program.

5) The Texas Loan Star program, which targets public institutions such as local governments and schools, began as a demonstration project funded by SEP and PVE funds. Subsequently, it has grown into a self-supporting program that has loaned out a total of $286 million in energy efficient improvements over the past 20 years, with 100% of those loans successfully repaid. The average pay back period from energy savings is 5.7 years, and the loans are structured to gain a net positive return for each month of the loan.

B. Grant programs: Some states have used SEP to help fund energy efficiency grants, as well as to build and maintain related staff expertise and skills capacity. Some examples include:

1) Arizona utilizes SEP and associated PVE funds to provide 10-20 grants per year averaging $15,000 apiece, and to build staff capacity (e.g., financial expertise, managing and tracking disbursements, etc.).
2) Florida's grant program includes a particular focus on SEP/ICP support for schools and not-for-profit hospitals. They have provided grants in 67 counties at a rate of $20-$30 million annually from SEP and other funds.
3) South Carolina's grant program primarily targets state agencies, local governments, and school districts. The main focus has been on increasing energy efficiency and renewable energy capacity rather than one-time improvements. Grants have supported a wide range of initiatives across such areas as transportation systems, agriculture, building codes, lighting efficiency, and recycling.
4) Utah's grant program has successfully utilized SEP support to fund energy efficiency grants, particularly for the local government and non-profit sectors, and helped provide technical and design assistance.

C. Tax incentives: Some states have developed the capacity to use tax incentives to stimulate energy efficiency initiatives. Of those interviewed about their use of this approach, there was considerable variability regarding the number and types of incentives offered. The staff interviewed for this study reported that SEP played an important role in building the staff skills and expertise needed to effectively analyze what projects should qualify for tax credits.

1) Florida offers tax incentives, particularly for biofuels, with SEP staff assisting with program development and implementation.
2) Montana's "green and clean" energy tax program has stimulated a wide range of clean energy and energy efficiency initiatives. This program relies on SEP staff to specify what qualifies for tax credits based on both technical and economic analysis.
3) Oregon has used SEP support to enact both residential and business tax credits for the installation of energy efficient measures (e.g., duct sealing, Energy Star appliances, hybrid vehicles, wind energy systems, geothermal heating systems).

A total of 50,000 credits per year cover a wide range of energy technologies that increase efficiency and/or reduce carbon emissions. SEP staff research the technologies to ensure that energy saving performance is sufficient to qualify for the tax credit.

D. Rebate incentives: Two of the nine states interviewed about financial assistance services mentioned their use of rebate programs to stimulate the manufacturing and marketplace adoption of energy efficient products. Florida offers rebate incentives across various sectors. One example is their rebate program for solar water heaters, including both conductive and PV solar. South Carolina also developed a successful rebate program for residential installation of solar water heating. In all instances, SEP provided the staff expertise necessary to develop and administer those programs.

TECHNICAL ASSISTANCE SERVICES

SEP has supported a wide variety of technical assistance services that are either directly provided by SEP managers and staff or are provided through contractors or other organizations. These services include: conducting building audits and performance assessments; recommending specific changes to equipment or building operations; helping design energy efficient and environmentally friendly buildings; and teaching technical skills to key market stakeholders who can expand the impact of SEP assistance within the markets in which they work.

Table 7 shows that state SEP experts rated their technical assistance capabilities on average as 7 on a 10-point scale. While that reflects substantial capacity overall, there is considerable variability across individual state ratings. Clearly some states have more technical assistance capabilities than others. When states were asked to attribute that capacity, most of the states indicated that 80% or more of their capacity to provide technical assistance in their state resulted from SEP-funded efforts. Even those who have a lower percentage reliance on SEP indicated that SEP initiated their programs and created the capacity and infrastructure upon which they were built, enabling them to leverage other resources for expansion.

Examples of SEP-supported accomplishments in this programmatic area include:

A. Auditing and Building Technology Assistance: Several states reported that they provide a range of building auditing and operational assessments through their SEP-funded services.

Table 7. Technical Assistance Services

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	5	70%
Arizona	7	100%
California	10	30%
Connecticut	3	80%
Delaware	2	100%
Florida	D/K	D/K
Idaho	6	60%
Illinois	10	95%
Kentucky	8	80%
Louisiana	4	100%
Michigan	9	100%
Minnesota	6	85%
Mississippi	8	95%
Montana	7	100%
New York	10	100%
Oregon	7	30%
South Carolina	7	100%
Texas	8	85%
Utah	4	30%
Virginia	7	75%
Vermont	5	80%
Wisconsin	3	80%
Wyoming	8	75%
Minimum	**2**	**30%**
Maximum	**10**	**100%**
Mean	**6.5**	**80%**
Median	**7**	**83%**

1) Connecticut uses SEP-funded energy audits and provides technical advice services though their Rebuild America Program. This service helps build or renovate facilities into high performance schools in the state. These services help schools upgrade to higher efficiency equipment and operational approaches.
2) Illinois provides SEP-funded engineering and technology assistance to the state's schools and hospitals to help reduce energy use. They also provide SEP-supported engineering assistance to public, nonprofit and private organizations through the Illinois Industrial Development Center. Additional engineering support is provided to organizations wanting to build wind and solar facilities in the state. Illinois also uses SEP funding to provide architects and building designers technical assistance and training though the Illinois Design Assistance Program provided via the University of Illinois. This service also provides advice on how to design green buildings (e.g., approaches that meet LEED certification). Illinois SEP managers provide technical support and advice to the state's utility

commission and to the investor-owned utilities, advising on programs, markets, and technologies to help the programs achieve their energy objectives and maintain cost effectiveness.

3) Mississippi was one of the first states in the country (along with 6 others including Alaska, Arkansas, California, Vermont, Virginia and Colorado) to apply SEP funds to support the development of the HERS rating system so that state energy offices and others had the tools needed for assessing the energy efficiency of residential structures. This early developmental support provided by SEP funds helped build the foundation for the current HERS network. Mississippi also uses SEP funds to support their Rebuild Mississippi program, which provides technical assistance to small commercial and manufactured housing sectors, among others. Mississippi also used SEP funds to set up their Combined Heat and Power Program (CHP), which provides technical, engineering and mechanical assistance for building CHP plants in the state. In addition, they use SEP funds to help maintain a CHP database to guide future projects.
4) South Carolina uses SEP funds to provide commercial and industrial energy audits using in-house SEP-funded staff and contracted auditors. The state energy office provides SEP-funded assistance for the development of energy plans for organizations and businesses. These plans prescribe what equipment to replace or install via an economic payback analysis. The state energy office provides over 1,000 technical recommendations annually.
5) Utah uses SEP funds to provide state building operators with technical assistance on how to improve the energy efficiency of state buildings and provides technical information on renewable energy projects to public agencies and governmental facilities. The office also provides design and technical support assistance for local governments and schools to assess energy efficiency improvement potential and links those assessments to a loan program to provide financing, if needed.
6) Wyoming applies SEP funds to support their Roping the Wind Program. This program provides training, engineering information and support services to individuals and organizations that are considering wind systems.

B. Technical Training: Several states offer classroom training on how to operate a building to achieve maximum levels of energy savings while meeting the needs of the occupants. Some examples include:

1) Connecticut and Illinois offer Builder Operator Certification training courses to building owners and operators in the state; these classes are supported by SEP funds.
2) Illinois uses SEP funds to provide code enforcement training to local governmental jurisdictions to help them understand how to monitor, inspect and enforce state building codes. They also train builders and specifiers on how to design and build to meet the codes. In addition, Illinois provides training and skills development for students through the state's SEP-funded K-12 NEED program.
3) South Carolina used SEP funds to form the South Carolina Energy Efficiency Training Collaborative. They also provide technical skill training to individuals

to help increase the number of people skilled and available for the green jobs market.

BUILDING RETROFITS AND NEW CONSTRUCTION DESIGN

The programmatic area of energy efficiency in existing buildings and in new construction has depended heavily on SEP funding. The interviewed states indicated that SEP and other federal funds had a significant role in the development of the capability of the states to increase the energy efficiency of buildings. While SEP does not fund the actual construction of new buildings, many states have used SEP funds to support energy efficiency in new construction – through design, energy efficient building codes, etc.

Table 8 shows that states typically rated their capacity and expertise for energy efficiency building retrofit programs as 8 on a 10-point maximum scale, indicating substantial overall capability in this area. Virtually every state that was interviewed in this area said that SEP was responsible for getting these programs started. In their opinion, without the availability of SEP funding in the early years, such programs would have gotten started much later and would be less effective.

Table 8. Energy Efficiency Programs for Existing Buildings

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	4	50%
Arizona	8	100%
California	8	15%
Connecticut	6	80%
Delaware	1	0%
Florida	D/K	D/K
Idaho	9	50%
Illinois	10	80%
Kentucky	8	80%
Louisiana	7	100%
Michigan	9	100%
Minnesota	8	80%
Mississippi	8	95%
Montana	8	100%
New York	10	100%
Oregon	7	30%
South Carolina	8	100%
Texas	9	50%
Utah	8	80%
Virginia	8	75%
Vermont	6	30%
Wisconsin	8	80%
Wyoming	9	100%
Minimum	**1**	**0%**
Maximum	**10**	**100%**
Mean	**7.6**	**72%**
Median	**8**	**80%**

Table 8 further indicates that states typically attribute nearly 80% of their current capacity to SEP. Moreover, even those that have a lower reliance on SEP have stated that SEP initiated their programs and created the capacity and infrastructure upon which they built, enabling them to leverage other resources for expansion.

Table 9 shows that capacity ratings for energy efficiency in new construction are generally below those for building retrofits (and nearly every other topic addressed in this study), which might be expected since SEP does not fund new construction. States rated their capacity and expertise on average as 6 on a 10-point scale, with noticeable variability across individual states. The median percentage of that capability attributed to SEP was 75%.

Table 9. Energy Efficiency in New Construction

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	2	90%
Arizona	3	100%
California	7	15%
Connecticut	6	90%
Delaware	1	0%
Florida	D/K	D/K
Idaho	8	60%
Illinois	10	80%
Kentucky	8	80%
Louisiana	7	100%
Michigan	4	100%
Minnesota	6	75%
Mississippi	4	80%
Montana	7	100%
New York	10	50%
Oregon	5	15%
South Carolina	5	70%
Texas	5	50%
Utah	7	75%
Virginia	7	100%
Vermont	6	30%
Wisconsin	2	70%
Wyoming	6	40%
Minimum	**1**	**0%**
Maximum	**10**	**100%**
Mean	**5.7**	**67%**
Median	**6**	**75%**

Examples of the SEP-supported capacity developed in this programmatic area include:

A. Retrofits of Existing Buildings: The states participated in many SEP and EERE supported buildings programs, including the Institutional Conservation Program and Rebuild America Program. These programs covered a wide range of retrofit and retrofit

support services and ranged from audits to the provision of technical assistance to the funding of retrofits through grants and loans. These programs provided state energy offices the opportunity to develop a comprehensive set of technical skills and expertise and established linkages and contacts within the building service and contracting community. Those linkages in turn helped build support for energy efficiency within the building equipment and service communities.

Some examples of SEP-supported state efforts targeting energy efficiency in retrofits of existing buildings include[3]:

1) Arizona utilized SEP funds to illustrate the benefits of energy efficiency for existing buildings through demonstration projects in state government buildings. Arizona also utilized SEP funds to offer training programs for facility managers and energy auditors. SEP and associated PVE funds were used to push for legislation requiring that state government facilities reduce their energy usage by 15%. SEP managers were able to prequalify energy service performance contractors to provide energy efficiency services for existing state and local government buildings. Arizona also trained individuals who installed solar energy systems on buildings on Hopi tribal lands and acquired about 75% of the estimated solar use potential in 18,000 unelectrified tribal homes. These individuals went on to train Native Americans to install systems.
2) In Connecticut, SEP funding provided the opportunity to gain skills and expertise in building energy efficiency and provide education and hire contractors to complete energy efficiency buildings projects.
3) Florida utilized SEP funding to assist in the development of building codes and standards for existing buildings and new construction. PVE funds were utilized to incorporate energy efficiency into the audits of homes that were damaged in Florida storms. SEP also supported and help fund the installation of solar arrays on school buildings.
4) New York's energy office managers reported that energy efficiency in existing buildings was first pioneered and funded by SEP. SEP funds supported New York's initiatives directed at energy efficiency in existing building during the 1970's and 1980's. In 1995, New York had nine SEP-funded positions focusing on energy efficiency in existing buildings. Those early efforts were developed and managed by SEP, and SEP was used as the foundation to build a $285 million portfolio expansion of programs staffed by 55 individuals. SEP managers reported that this effort and its growth is directly due to SEP funds and the flexibility available through SEP funding.

B. New Construction: SEP funds were instrumental in the development of energy efficient building codes to guide new construction efforts (discussed in more detail in the Building Codes and Appliance Standards section). SEP funds were used to support the training of code officials and the development of technical and design assistance. States provided

[3] Note: A few state experts considered their codes and standards efforts to be a part of their new construction efforts. If a state reported code and standards related capacity and work as a new construction component it is summarized above and is included in the codes and standards section of this report.

several examples of energy efficiency initiatives affecting new construction, which are summarized below.

1) Arizona reported that SEP funds played a primary role in the development and training of personnel who became energy efficiency experts. These experts have provided technical assistance for new construction projects across the state, and are now involved in the specifications of new buildings to assure they will qualify as LEED certified buildings. Arizona has used SEP funds to deliver workshops on energy efficiency in buildings. An Arizona SEP technical support solar initiative for new construction was the Civano Project, an 800-home subdivision that incorporated solar energy and sustainable design.
2) Arkansas used SEP funds to support the establishment of an energy efficiency building code for residential and non-residential new construction. SEP has allowed the codes to stay current and move to higher levels of energy efficiency.
3) Connecticut's SEP funding provided 100% of the support for the development and deployment of standards for high performance buildings that are 20% more energy efficient than required under ASHRAE 90.1 2004. Connecticut uses SEP funds to provide the technical support needed to update its building code for new construction and major retrofits of existing buildings.
4) Florida's SEP funds supported the revision and updating of its hazard mitigation code applying to new construction.
5) Minnesota's SEP-funded staff developed energy efficiency building code changes. The current code increased energy performance to higher levels of efficiency for new construction as well as for retrofits.
6) Wisconsin's SEP-funded personnel promoted the incorporation of Energy Star into the master specification for new construction of state government buildings. SEP-funded staff also assisted in the development of daylighting and sustainability requirements for all new Wisconsin state government buildings and the requirement that all new state government buildings be LEED certified.

BUILDING CODES AND APPLIANCE STANDARDS

A substantial number of state-level efforts to adopt or update building codes and appliance standards have been supported by SEP funds, both at the policy level (see Policy, Regulation and Legislative Support section of this report) and at the design, adoption, implementation and operational level. The codes and standards associated with those state efforts have led to significant increases in the energy efficiency of retrofits and new construction projects, as well as to the selection and use of energy efficient appliances and equipment.

The interviewed states reported strong capabilities within the codes and appliance standards area. More specifically, Table 10 shows that the average rating of state energy office capacity was 8 on a 10-point scale. Additionally, the majority of interviewed states attributed 90% or more of this capacity and expertise to SEP-funded and supported efforts.

Examples of SEP supported accomplishments in this programmatic area include:

A. Energy Efficient Building Codes: Several of the accomplishments reported by the interviewed states include:

1) Arkansas used SEP funds to conduct the assessments that identified the need for a state code and subsequent code changes. It also used SEP funds to develop stakeholder consensus on the need for the code and code updates and to demonstrate construction techniques and building practices to acquire the code change support needed from the building industry. This SEP-supported effort enabled a residential and non-residential building code to be established in 1979, and to be updated in 1992 and again in 2000. Each of these efforts resulted in improvements in the energy efficiency requirements within the code.

2) California did not use their SEP funds to adopt their residential or non-residential state building codes, but has applied SEP funds to keep the codes updated. SEP funds are used to pay for the research needed to keep the state's benefit cost

Table 10. Building Codes and Appliance Standards

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	9	90%
Arizona	7	100%
California	10	30%
Connecticut	8	90%
Delaware	5	100%
Florida	D/K	D/K
Idaho	8	40%
Illinois	10	60%
Kentucky	6	80%
Louisiana	8	100%
Michigan	8	100%
Minnesota	9	90%
Mississippi	8	95%
Montana	9	100%
New York	8	70%
Oregon	8	45%
South Carolina	5	80%
Texas	9	70%
Utah	9	90%
Virginia	6	100%
Vermont	8	90%
Wisconsin	8	85%
Wyoming	5	25%
Minimum	**5**	**25%**
Maximum	**10**	**100%**
Mean	**7.8**	**79%**
Median	**8**	**90%**

models up to date, to understand the appliances in the market, and to conduct analyses to identify what changes are needed in the codes.

3) Connecticut has used SEP funds to establish high performance building specifications for new construction and renovations in state buildings and local schools. The legislature tasked the state energy office to provide regulations for state buildings and schools, which were developed by the SEP managers. These regulations require state buildings to perform 20% more efficiently than state standards.
4) Illinois used SEP funds to allow state energy office managers to work with the Governor's office to obtain the Governor's support for the adoption of mandatory residential and non-residential building codes. The SEP managers provided the energy savings and financial analysis as well as the technical support needed to have the Governor's office and key legislative members support and pass the code change legislation.
5) Louisiana used their SEP-supported Home Energy Rating Options (HERO) audit results to identify a need for state building codes. The state energy office used the results from the SEP-supported energy audits to document that homes built under energy efficient building codes cost less to own and occupy and save substantial amounts of energy compared to homes built in areas that did not have a building code. This allowed the energy office to document the added costs to consumers living in areas without building codes. This information, combined with other stakeholder information showing higher storm damage in non-code covered areas, influenced the legislature to adopt an energy efficient statewide building code. The new commercial code adopted in 1999 and the residential code adopted in 2005 cover both new construction and retrofits.
6) Michigan's SEP-funded state energy office provides benefit cost analysis as well as legislative support to help overcome resistance to state codes and to help stakeholders understand the need for an energy efficient code. An SEP-funded benefit cost analysis documented that statewide building codes reduce building ownership costs. SEP managers were instrumental in setting the required analysis period for code changes to use a seven year benefit cost analysis rather than applying only a first-cost consideration. This analysis facilitated the adoption of a statewide building code that is periodically updated to include energy efficiency provisions. SEP managers also reported that, with the help of SEP funds, they have been able to argue for a more energy efficient state public buildings code and set that code as a requirement for public buildings in the state.
7) Minnesota's state energy office was given the authority to establish state building codes in 1980. SEP managers were responsible for assessing potentials, performing cost effectiveness analyses, developing the code, and testifying in favor of code adoption. The codes have been improved over the years to be substantially more energy efficient than older versions, and were the first in the country to incorporate specific types of insulation and air handling requirements that were then adopted by other states. The codes were also expanded to a variety of different building types. In 2000, the state energy office updated the code to increase the thermodynamic performance of buildings. Minnesota also adopted a

policy that all state governmental buildings must meet the current code requirements by 2010. While the codes are now mandatory for state buildings, they are still voluntary for the private sector.

8) New York's state energy office is housed in the New York State Energy Research and Development Authority (NYSERDA). The office used SEP funds to update the state's building codes prior to the adoption of the national building code. In those early years, the state energy office built an expert staff of code analysts and conducted or contracted code change benefit cost analysis as building practices and equipment evolved to become more energy efficient. As cost effective practices or equipment were identified they were presented to the New York Department of State for inclusion in the state's building codes. SEP funded these efforts. In the 1990s, the state adopted the national building code and its 3-year up-dating process. However, the state reserved the right to change the national building code to meet New York requirements, and SEP-supported managers take a direct role in the national building code updating process. These SEP-funded managers are now part of the national code change process impacting all states that use the national code.
9) Oregon reported using SEP funds to develop some of the most energy efficient building codes in the country and uses SEP funds to keep those codes current. The interviewed managers reported that the code recommendations provided by their SEP-supported efforts were incorporated into the state's building codes.
10) Texas has used SEP funds to develop and update both voluntary building codes and more recent mandatory codes for residential and commercial facilities. SEP-funded efforts include the assessment of equipment and practices for potential energy savings and cost effectiveness to help determine possible inclusion in the code. In 1989, with state energy office support, Texas adopted ASHRAE 90.1 as a mandatory code for state buildings. A private sector statewide mandatory code was adopted in 2001. Changes to the mandatory code were supported by the impact and cost effectiveness analysis and recommendations from the state energy office. In 2007, the responsibility for code updates was transferred to the state energy office. Currently the state energy office uses SEP funds to support the code update effort every two years.
11) Vermont assigned an SEP-supported manager with the primary responsibility to change the state's model energy codes so that they were reflective of Vermont's needs and conditions. Those codes were subsequently passed and became the state's residential and non-residential building codes.

B. Equipment Standards: Several states used SEP funds to build, adopt or support state equipment and appliance standards. Some examples provided by the interviewed states include:

1) California uses SEP funds to help keep the state's appliance standards current and to include new technologies as needed. These efforts have allowed the state to build and maintain the strongest appliance standards in the country and keep them current. SEP funds are used to maintain the state's appliance performance database that is used to assess technologies and develop standards. SEP funds are

also used to conduct examinations to make sure that retail outlets are stocking appliances that meet or exceed the standard. In addition, SEP funds are used to support the cost of conducting independent tests on the energy consumption of appliances to make sure that they comply with the standards.

2) Connecticut uses their SEP funds to establish appliance efficiency standards and performance guidelines. These were adopted in 1987 and 1988 and are updated as needed. Other states initiated comparable efforts during similar timeframes (e.g., California, New York, Massachusetts, and Rhode Island). Subsequent to these state efforts, manufacturers came out in support of a federal standard for appliance efficiency that would avoid having many different state-specific standards.
3) Kentucky passed a bill, largely developed by SEP managers that established appliance standards for state facilities and required the purchase of energy efficient appliances and equipment.
4) Minnesota's SEP managers were asked by policymakers to build a set of Sustainable Building Guidelines for state buildings. Those guidelines, provided in 2003, specify the purchase and use of energy efficient equipment and include energy efficiency specifications for appliances.
5) New York established appliance standards for the state a few years after the formation of the state energy office. These are updated as needed. This effort first focused on three groups of measures: lighting; central air conditioning; and domestic water heating. SEP-funded efforts include the assessment of the technologies and their potential impacts in the state, the documentation of energy savings, the analysis of their cost effectiveness, and the development of recommended standards. The state energy office provides their findings to the Department of State, which confirms the accuracy of the assessments and upgrades the relevant documents. Over the years, NYSERDA's SEP-funded managers have assessed 14 types of appliances for statewide standards. The office also conducts mystery shopping to inform retailers when they are selling non-complying equipment.
6) Wisconsin used SEP funds to create a policy requiring energy efficient equipment and appliances for all state buildings. This policy essentially became the purchasing standard for the state, prohibiting the use of non-approved equipment. The approved items are acquired under the state's purchasing system and local governments are allowed to buy off those pricing schedules.

C. Training: Several of the sampled states reported using SEP funds to provide code training within their state. Some examples of the training provided include:

1) Arkansas uses SEP funds to train code officials and other stakeholders to keep them informed on code requirements and subsequent code changes. They also provide training to building officials, specifiers and builders on how to build to code and how to inspect for compliance. The SEP-supported program was able to push for and acquire a state requirement that all new construction be certified as meeting code by having the builder place a seal on every new home indicating that the home complies with all code requirements.

2) California uses their SEP funds to provide education and training to code officials and the construction industry on how to build to meet the state's codes. SEP funds are used to develop compliance manuals that specifiers, builders and code compliance officials can use to understand the code changes, the conditions that comply with the code, and how to inspect for code compliance. The California codes are complex and allow different approaches for meeting the performance standards within the code. The SEP-funded training and materials help builders, architects, contractors and other specifiers understand these provisions. SEP also conducts training that provides hands-on learning opportunities to builders. In addition, SEP funds are used to educate the state's code-development managers so that they are up-to-date on equipment and technology availability and performance and on current building techniques to consider for future codes.
3) Connecticut has used SEP funds to develop and maintain a website tool that helps consumers select energy efficient equipment and appliances that save them money though energy savings. This tool recommends appliances that pass the California and Connecticut appliance standards.
4) Illinois applied part of their SEP resources for code training to code enforcement officials and builders to allow them to understand and build to the code requirements. The training also helps officials understand how to monitor and test for code compliance.
5) Kentucky SEP managers review state codes and code requirements to identify opportunities to build beyond code requirements and then provide training to builders on how to build to that efficiency level.
6) Louisiana has used SEP funds to provide guides and training to home builders on how to build to the new codes. This training also helps local governments adopt the new code requirements and enforce code changes. The information also informs consumers how much energy use and costs are reduced by building to the code and why it is important to have buildings that save energy and reduce occupancy costs.
7) Michigan used SEP funds to support code training for local governments, code officials, builders, specifiers and others. This training is provided in concert with the Construction Code Office within the state's Bureau of Energy Systems (the office responsible for code adoption and compliance), and helps stakeholders understand the code, specify to meet code requirements, build to the code's specifications, and achieve compliance. Michigan's state energy office has set up a website that informs people about the current codes and how to meet the code requirements.
8) New York has used SEP funds to establish a professional peer network that shares information on technologies and construction approaches and provides the results of benefit cost analysis to the peer network. New York also established a training initiative using published materials, workshops and training events to educate code officials, architects, builders, specifiers and others on code changes as they have occurred. Last year, NYSERDA trained 3,000 local code officials and stakeholders. New York also provides similar types of appliance standards training to market stakeholders so that they are informed about the standards and types of equipment quality.

9) Texas used SEP funds to train local officials, architects, builders and others on the provisions of the voluntary building codes as they were updated. This training allowed local jurisdictions considering adoption of the codes to know more about them, and informed architects and builders about how to meet the code. When the codes became mandatory, SEP funds were used to partner with Texas A&M University to increase the frequency of training to meet the increased demand.
10) Vermont also used SEP funds to establish a code training initiative to train stakeholders on the provision of the code and allow builders to be able to meet code requirements.

RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

SEP funds were essential in the startup of the state energy offices and in their demonstration and deployment of renewable energy technologies within the states. These SEP-funded energy offices provided the initial push to begin developing renewable energy as an alternative to traditional sources of energy. According to the interviewed experts, without the availability of SEP funds, most states would not have been able to develop critical staffing expertise or infrastructure, while the rest would have been delayed for several years or decades. The development of renewable energy options required the acquisition of expertise in the technical aspects of the availability, production, costs, application, and usefulness of alternative energy sources. Renewable energy was promoted and developed through information dissemination, technical assistance, and construction of demonstration projects. Solar, wind and hydropower technology have significantly benefitted from SEP investments, as well as biomass, geothermal, alternative fuels, and others.

Table 11 shows the perceptions of the state experts interviewed for this study regarding how SEP funding has affected the development and deployment of renewable energy resources. State energy experts' median rating of current capacity and staff expertise was 8 on a 10-point scale. Virtually every state expert interviewed said that SEP was directly responsible for getting their renewable energy programs implemented and that, without SEP, those programs would not exist today or would be considerably less developed. The median attribution of current capacity to SEP is 78%, and even those who reported less reliance on SEP stated that SEP initiated their programs and created the capacity and infrastructure upon which they were built, enabling them to more successfully leverage other resources for expansion.

Some examples of SEP-supported capacity for renewable energy development and deployment include:

A. Solar: Across the interviewed states, it was reported that SEP had a vital role in supporting solar initiatives ranging from expertise and infrastructure development to education and training initiatives through demonstration project design and implementation. Some examples include:

    1) Arizona used SEP funding to develop extensive expertise and infrastructure for use of solar energy. A major SEP-supported project created an economic

development business model for solar energy on Hopi tribal lands. As noted earlier, that has resulted in an estimated 75% solar use potential for 18,000 unelectrified tribal homes. Another successful SEP technical support solar initiative in Arizona was the Civano Project, an 800-home subdivision that incorporated solar energy. SEP staff planning efforts also generated the state's renewable energy strategy and produced a statewide solar energy policy. Moreover, these SEP-funded efforts established Arizona's renewable energy portfolio standard. Among the critical renewable energy staff expertise created by SEP support is the use of solar gain calculations, the design of solar energy systems, proper configuration of solar energy systems, costing of installations, and proper maintenance practices to ensure a well-run and successfully operating system. SEP-developed expertise in photovoltaic technologies has helped Arizona become a national leader in photovoltaic education and training.

Table 11. Renewable Energy Development and Deployment

State	Rating of Current Capacity & Staff Expertise	Percent of capacity/expertise attributed to SEP
Arkansas	5	90%
Arizona	8	100%
California	10	5%
Connecticut	4	40%
Delaware	8	30%
Florida	8	10%
Idaho	7	50%
Illinois	10	90%
Kentucky	5	80%
Louisiana	2	100%
Michigan	8	100%
Minnesota	7	75%
Mississippi	6	95%
Montana	7	100%
New York	6	10%
Oregon	8	40%
South Carolina	8	90%
Texas	8	50%
Utah	9	95%
Virginia	7	100%
Vermont	8	60%
Wisconsin	7	70%
Wyoming	D/K	D/K
Minimum	**2**	**5%**
Maximum	**10**	**100%**
Mean	**7.1**	**67%**
Median	**8**	**78%**

2) Idaho's energy office has SEP-funded expertise that helped develop the use of solar panels and other renewable energy technologies in that state.

3) Michigan involvement in the solar sector grew in the 1990's. In 2002, the state became more involved with public outreach efforts and, more recently, SEP staff helped develop related energy policies. Michigan's Go Solar workshops have been well-attended, but market impact has been small to date.
4) South Carolina, Louisiana, and Utah have each utilized SEP-funded energy staff to help design and implement various solar tax credits. SEP staff helped write the tax credit rules to ensure that good systems are acquired and used and also helped get those incentives passed and implemented. This has significantly facilitated new solar capacity. For instance, South Carolina reports substantial growth of solar installations, which have doubled in 1.5 years.

B. Wind: SEP funding has directly supported a variety of wind energy initiatives. In all instances, it was reported that SEP support was central to developing staff expertise and that it substantially or wholly supported programmatic developments.

1) Louisiana's SEP funds have developed staff expertise in wind energy and the acquisition of off-shore wind resources. SEP-supported managers and the state energy office serve as this state's source for reliable and accurate renewable energy expertise. Their primary role is information dissemination, often in response to inquiries.
2) Michigan escalated its involvement with wind energy in the 1990's. Incentives for wind turbine projects and demonstration project startups were supported by small SEP grants. That success, coupled with increased outreach efforts in the 2000's, has reportedly increased public support.
3) South Carolina developed offshore wind energy capacity. SEP staff led this effort and leveraged additional funds to accelerate progress. They have partnered with the university and utility sectors on grants to measure wind in coastal waters, with the goal of obtaining 80MW of offshore wind capacity. SEP staff have also provided wind farm research expertise to the legislature.
4) Utah's SEP-supported wind energy anemometer loan program enables businesses to borrow equipment to measure wind resources at their site and assists business decisions about whether to pursue this resource. This program has successfully stimulated investments in the installation of wind turbines in the residential and small commercial sectors. Utah has further stimulated such investments with SEP-driven wind tax incentives.

C. Alternative fuels: State energy managers interviewed for this study reported that SEP funding has had a substantial impact on the development and demonstration of alternative fuels. SEP provided seed funding that began the programs for all of the states interviewed, and that funding was used to build critical infrastructure and staff expertise. According to the interviewed experts, without SEP support, most of these programs would not exist today, and progress on the rest would substantially lag current levels. SEP-supported alternative fuel programs include development and deployment of biodiesel, ethanol, natural gas, and other technologies. Specific state examples are provided in the Transportation section of this report (immediately following this section).

D. Other renewable energy programs: There have been a variety of other renewable energy programs that were supported by SEP funding and the staff expertise that it engendered. These include hydroelectric, biomass, geothermal, and other programs. Some specific examples include:

1) Idaho's energy office provides SEP-supported technical assistance for 135 projects covering a wide range of energy initiatives. Some example sectors include gasification, hydropower, and biomass (in particular, development and use of anaerobic digesters). Hydropower projects have helped increase Idaho's use of hydroelectric to account for 60% of that state's electric generation. SEP has provided critical technical support and 10% of the programmatic funding associated with the technical assistance for the project.
2) Louisiana's SEP staff worked with private firms to identify where geothermal conditions are especially good for hot wells. The SEP staff also provided information and helped promote development of biomass systems in the state and worked with forest products and forestry associations to get tax relief for proposed biomass facilities.
3) Michigan's renewable electric generation includes the availability of net metering. The rapid success of this SEP-funded $3 per watt incentive program quickly outpaced initial funding levels. The state energy office also provided support to Michigan's Public Service Commission in passing a state renewable energy standard.
4) Montana is one of several states that developed SEP-supported renewable energy loan and tax credit programs. These are described further in the Financial Support Services section of this report.
5) In South Carolina, SEP-supported staff helped lead the formation of a state biomass council to stimulate development in this area.

TRANSPORTATION

SEP funding has been widely used to support the development of energy efficiency and renewable energy transportation initiatives, particularly those related to alternative fuels and vehicles. All of the interviewed states indicated that SEP provided the seed funding that began these programs and built critical infrastructure and staff expertise. Some programs continue to be fully SEP funded, while others have leveraged additional funds from other sources.

Alternate fuels, while clearly related to transportation, is also a major component of renewable energy development and deployment. Because state energy managers rated capacity for renewable development and deployment before they rated transportation, it is unclear whether the transportation ratings shown in Table 12 also included alternate fuels or were more focused on other transportation initiatives. Another complicating factor is that fewer states reported a capacity rating for transportation. Nonetheless, Table 12 indicates that SEP has had a smaller perceived effect on states' capacity and expertise in the Transportation area than for any other topic, with an average rating of 5 on a 10 point scale. However, the attribution of that capacity to SEP, where reported, was typically between 90 and 100%. While all states interviewed have

transportation initiatives, a blank in the follow table indicates where a rating of expertise was not obtained during the interview.

Table 12. Transportation

State	Rating of Current Capacity & Staff Expertise*	Percent of capacity/expertise attributed to SEP
Arkansas*		
Arizona	2	90%
California*		
Connecticut	2	100%
Delaware*		
Florida*		
Idaho	7	80%
Illinois*		
Kentucky	7	85%
Louisiana	5	100%
Michigan*		
Minnesota	1	D/K
Mississippi	8	90%
Montana*		
New York*		
Oregon	3	100%
South Carolina	5	100%
Texas*		
Utah*		
Virginia*		
Vermont	7	100%
Wisconsin	8	35%
Wyoming*		
Minimum	**1**	**35%**
Maximum	**8**	**100%**
Mean	**5**	**88%**
Median	**5**	**95%**

* A blank indicates that the score rating question was not asked of that state during the interview process.

Some examples of SEP-supported energy efficiency and renewable energy programs and initiatives for the transportation sector include:

A. Alternative fuels: Every state interviewed about transportation programs mentioned significant initiatives related to alternative fuels. SEP funding was reported to be directly responsible for creating the staff expertise and infrastructure foundation upon which the states' transportation programs were built. SEP funding provided seed money for establishing these programs as well as some continuing support to keep them active even in lean years. SEP was essentially the sole source of support for several programs, while in other instances additional funding was leveraged from other sources. State experts typically indicated that, without SEP, most of these programs would not exist today, and progress on the rest would substantially lag current levels.

1) Arkansas's energy office was created with SEP funding in 1974, and one of its first programs targeted motor fuel management. The energy office developed a statewide fuel allocation plan to prepare for energy emergencies, which continues to operate today. It was reported that SEP and related PVE funding are directly responsible for most or all of Arkansas's transportation programs.
2) Delaware's transportation initiatives have primarily been in alternative fuels, with SEP and Clean Cities supporting the development and growth of these initiatives. Two initiatives that have struggled are public access to compressed natural gas stations and public access to ethanol E85 stations, due in part to shifting market conditions. The level of Delaware's alternative fuels program has fluctuated over the years as SEP support has varied, and it is currently in a down phase. One limitation to private industry support is that Delaware does not have niche markets (e.g., taxi fleets, airports) for alternative fuels.
3) Idaho has used SEP support to facilitate customer acceptance and adoption of biodiesel fuels. This has included efforts to assure that vehicle manufacturers will not void warrantees when biodiesel is used.
4) New York developed its alternative fuels initiatives with SEP support. Specifically, SEP provided the seed money, infrastructure, and staff expertise necessary to create and develop its programs. Biofuel development and deployment was one major focus. Alternative fuel filling stations were established across the state, which were a substantial part of the state's Clean Cities initiative and enabled the state to acquire Clean Cities funding. The fuel stations provided important infrastructure support for increasing the use of alternative fueled vehicles.
5) Utah concentrated its transportation initiatives primarily on alternative fuels, especially natural gas. SEP funding was used to establish the infrastructure and expertise for these programs and provided leverage to gain additional resources. According to the state expert interviewed, the Utah Clean Cities Coalition and related initiatives would not exist without SEP.
6) Virginia cited SEP as the direct foundation for all its transportation programs. This state has a robust alternative fuels program for alternative vehicles (electric hybrids, biodiesel, and ethanol) from fueling infrastructure to retrofit approaches. The state also supports clean diesel grant programs via the Clean Cities program. Industry development efforts are facilitated by workshops on manufacturing and refining and fleet use of alternative fuels. According to the interviewed experts, none of this would have been possible without SEP which provided the essential expertise and infrastructure for these programs.
7) Wisconsin's agricultural base has provided opportunities for ethanol production initiatives supported by SEP. Ethanol implementation was promoted by use in the state car fleet and pumps at state facilities were modified to distribute ethanol. According to the experts interviewed, this has led to an extensive ethanol industry in the state.

B. Vehicle initiatives: Some states highlighted the role of SEP-supported education and information efforts for advancing vehicle-related programs. Some examples include:

1) New York's SEP-supported vehicle initiatives have included a focus on natural gas engines and fuel cell projects. In addition, the SEP-supported development of a state-wide infrastructure of alternate fuel stations stimulated the development of thirty alternative fueled fleet projects across the state within eight years. State experts cited the joint SEP components of aggressive educational efforts and infrastructure development as the key foundations that led to the expansion of its alternative fueled fleet operations.
2) Utah has expanded its SEP-supported natural gas initiatives to include hybrid vehicles. Recent SEP initiatives have also included diesel retrofits for the entire state school bus fleet.
3) Virginia's SEP staff focused on educating lawmakers about hydrogen fuel cell technologies, which led that state to become an early adopter of these technologies. The state has since established active and productive hydrogen fuel cell development programs and has worked with GM and Honda on fuel cell demonstration projects. Virginia has also used supporting the development and use of propane fuel cells to power electric motors. These were SEP-driven initiatives that, according to the experts interviewed, would not have happened without SEP-based expertise, infrastructure, and funding.
4) Wisconsin's electric vehicle infrastructure development has begun with SEP-funded maintenance training to increase capacity for servicing such vehicles. The state also provides SEP-supported electric car educational and promotion programs.

C. Other transportation programs: A number of other transportation-related programs have been supported by SEP. These were either fully SEP-funded or substantially relied on SEP-supported staff expertise. A few examples include:

1) Arkansas used SEP support to develop a ride sharing program as well as a vanpool program that now has 60 vehicles. SEP funds were also used to assist inter-modal transportation authorities' efforts to maximize freight service and improve transportation energy efficiency for local businesses. An LED traffic light signal program supported by SEP has reportedly been very successful in saving energy.
2) Wisconsin pioneered software development for the synchronization of traffic lights as an SEP-funded program. Traffic light synchronization programs have since become common across the country and many of them are based on Wisconsin's SEP-funded software. The "right turn on red" program to reduce fuel consumption began as a demonstration project fully funded by SEP. In addition, Wisconsin's SEP-funded staff have helped develop multiple programs to increase commuter bicycling.

4. IMPACT OF SEP FUNDING CHANGES ON STATE CAPACITY

Over the years, total levels of SEP and SEP-related funding (PVE, ICP, Competitive SEP grants, etc.) have fluctuated. One explanation for this is that the priority assigned to energy efficiency and renewable energy has changed with different state and federal administrations. Additionally, economic trends affecting federal and state budgets have affected SEP allocation levels. These changes have had an effect on the ability of the states to develop and implement energy efficiency and renewable energy programs and to establish policies under which these programs function. As would be expected, in general, capacity tended to be greater, more services were offered, and a larger number of end-uses and market sectors were addressed during periods of strong SEP funding.

The focus of this chapter is on how states have coped with the changes in funding levels that have occurred over time. Many of the interviewed experts noted that periods of contracting budgets required hard choices about staffing and services. These choices impacted not only the state's capacity to design, manage and implement programs and projects but also the resulting accomplishments, and speed of accomplishment, within their programmatic areas. Half of the 24 states interviewed indicted that there were times in their SEP implementation history that they had to lay off key staff critical to their state's reservoir of energy efficiency and renewable energy expertise. The remaining states indicated that they were able to allow attrition to keep staffing levels consistent with funding streams or that they had moved staff from SEP funded to non-SEP funded efforts. Regardless of the way in which a state adjusted staffing levels to match available funding, the SEP budget changes directly impacted state capacity to implement programs and initiatives which save energy or increase renewable energy supplies.

During the interviews, the states that had to give up key staff or adjust operations to match funding streams were asked what impacts those changes had on their capabilities, programs and services. The following responses were provided by the interviewed managers.

1. Closed our office and merged with another organization.
2. Laid-off some of our experienced / skilled management and staff including:
    a. Senior program managers, staff and support staff;
    b. Key administrative and support staff;
    c. Engineering managers and technical support staff;
    d. Key policy and program advisors and technology experts.
3. Shifted duties to remaining staff and focused efforts more narrowly.
4. Reduced the number of projects.
5. Stopped offering or significantly reduced programs or program services related to:
    a. State energy planning and planning support for Governor's office;
    b. Influencing or supporting state policy or legislative initiatives;
    c. Auditing, engineering and technical support services;
    d. State energy consumption and use tracking;
    e. Building standards and enforcement;
    f. Renewable energy and solar programs;

   g. Emergency energy planning;
   h. Developing energy efficient building codes and standards;
   i. Testing appliances and building new appliance standards;
   j. Small business support programs and efforts;
   k. Schools and hospitals energy efficiency support and technical assistance;
   l. Responding to information requests from stakeholders and consumers;
   m. Promoting energy efficiency and renewable energy;
   n. Most services other than renewable energy programs;
   o. Grant programs and brick-and-mortar programs;
   p. Transportation programs;
   q. Local governmental technical assistance and support efforts;
   r. Residential services;
   s. Education, outreach, public information efforts;
   t. Measuring energy impacts;
   u. One-on-one help to key market actors.
6. Lowered staff uniformly across most programs funded by SEP.
7. Reduced program scope and contracted with third party venders.
8. Relied more on un-funded others to help deliver services:
   a. Relied more on volunteers to help offer services;
   b. Relied on other state energy offices for information.
9. Moved from efficiency and renewable energy to economic development projects.
10. Replaced technical expertise and services with small grant managers.
11. Focused only on those things that were legislatively mandated.

The extent of staff changes over time ranges from the loss of a few people in states with small state energy offices to large and significant staff changes involving the departure of the majority of people working in SEP-funded and supported programs, as shown in Table 13 and Table 14. Table 13 illustrates that staffing levels in the Fall of 2009 were only slightly above the lowest staffing levels experienced during the life of most state energy offices (see Table 14). As of late 2009, most energy offices had between five and ten full time SEP staff compared to staffing levels that were much greater at their peak. As a result of those reductions, many states reported a loss in experienced personnel and expertise and the need to cut back the delivery of programs. However, many states also reported that the knowledge gained and educational materials developed over the years can often be applied to new programs or to expand existing programs, subject to available funding. Managers reported that the new ARRA funds are being placed into the state energy offices and are being managed by the remaining experienced staff in those states that have been able to maintain their core capabilities.

Table 13. SEP 2009 Full Time and Part Time Staffing Levels By State

State		Number of full-time SEP staff Fall 2009*	Number of part-time SEP staff Fall 2009*
Arkansas		6	0
Arizona		8	20
California		3	
Connecticut		0	5
Delaware		6	1
Florida		7	2
Idaho		5	3
Illinois		6	1
Kentucky		8	0
Louisiana		10	8
Maine			
Michigan		5	10
Minnesota		6	12
Mississippi		9	0
Montana		0	10
New York		0	18
Oregon		3	4
South Carolina		15	4
Texas		15	3
Utah		4	0
Virginia		5	1
Vermont		2	1
Wisconsin		3	1
Wyoming			

*Empty cells = Don't Know

Table 14. SEP Historic Full-Time-Equivalent Staffing History By State

State	Highest Number of FTE SEP staff*	Year		Lowest Number of FTE SEP staff*	Year
Arkansas	6	1992		4	2005
Arizona	51	1990		12	2008
California					
Connecticut	83	1981		2	2004
Delaware	12	1985		3	2002
Florida	90	1978-82		4	2003
Idaho	8	2000		3	2006
Illinois	30	1990		17	1983
Kentucky	14	2000		2	2008
Louisiana	11	1995		8	2004
Maine					
Michigan	55	1985		9	2005
Minnesota	160	1981		6	1995
Mississippi	18	1990		8	2008
Montana	12	1978-82		0	1990
New York	30	1994		6	1998
Oregon	10	1999		4	2008
South Carolina	18	1989		12	1996
Texas	35	1995		15	2010
Utah	15	1992		3	2006
Virginia					
Vermont	30	1985		3	2008
Wisconsin	15	1982		3	2007
Wyoming					

*Empty cells = Don't Know

5. SUMMARY OF SEP EFFECTS ON CURRENT CAPACITY

As reported by the state experts interviewed for this study, the State Energy Program's resources have largely built the foundation on which states have constructed their energy efficiency and renewable energy capabilities and launched their portfolios of initiatives. According to our respondents, SEP funding has been and continues to be one of the most important resources, if not *the* most important resource, for establishing and maintaining the capability of the states to design, manage and implement energy efficiency and renewable energy programs. While not every state owes all of their current capabilities to SEP, most states interviewed indicated that SEP provided the base on which most of their accomplishments rest. States repeatedly pointed to examples in which their SEP-funded initiatives established critical policy and regulatory support foundations, or where the SEP efforts were instrumental in establishing and maintaining the expertise that was essential to the progress made in their state.

States with limited energy efficiency and renewable energy funding other than SEP reported that it is their state's SEP funding that has allowed them to build and maintain expertise and capability over the years. States with moderate levels of non-SEP energy efficiency and renewable energy funding typically reported that their SEP funds have enabled them to obtain the additional funding necessary to establish, manage, and direct their other initiatives. States with significant levels of non-SEP funding, including those that offer larger portfolios of services, reported that their SEP funds helped establish the legislation for those efforts, helped manage and oversee those non-SEP activities, helped provide technical assistance and advice to the regulatory agencies that oversee those efforts, and/or helped expedite those undertakings in other ways. In other words, the state SEP-funded efforts have helped to enable the non-SEP initiatives. In many respects, SEP has served as an energy efficiency and renewable energy incubator for the states' energy efficiency and renewable energy portfolios. The words that interviewees used to describe the SEP contribution include the following:

- It is the seed that started and nurtured the state's efforts.
- It is the foundation on which our programs are built.
- We would not have an energy office without SEP.
- SEP jump-started our state's efforts.
- SEP built the energy efficiency and renewable energy road that we are going down.
- SEP funding built our state's energy office and programs.
- Everything we did and accomplished was SEP-funded.
- SEP is responsible for our energy efficiency and renewable energy capacity.
- We would not have built capacity on our own; we would not have done it.
- Our state would be severely crippled without SEP.
- SEP is the bedrock on which state energy efficiency and renewable efforts rest.

Comments like these were made by almost every interviewed professional, including current and former SEP managers, state legislators, managers in charge of non-SEP programs, state energy

office managers, policy managers and others. From their perspective, SEP has not only built capacity within the state energy office, but that capacity has spilled over into building non-SEP funded initiatives as well, multiplying SEP effects beyond the SEP borders.

The vast majority of the state experts interviewed expressed the opinion that SEP is the foundation for their energy efficiency and renewable energy efforts. This was the case even where the managers interviewed are responsible for more than just SEP and have responsibilities over efforts that have much larger budgets than their SEP-funded efforts and where the interviewees no longer manage their state's SEP programs. For example, California has arguably the largest of the energy efficiency portfolios in the country, with total energy efficiency and renewable energy funding that far exceeds most other states[4], yet the California experts interviewed reported that SEP funding is a key capacity-building resource for their building codes and appliance standards initiatives. At the other end of the size scale are states like Vermont, which reported that their public benefits programs and building code changes would not have occurred without SEP and that SEP provides the resources to oversee and guide those efforts. In between are states like Illinois and Minnesota which reported that SEP guides not only their SEP-funded initiatives, but also their public benefits programs. In these and the vast majority of the interviewed states, SEP is seen as a key driver of state capacity, management and capability which allows them to design and implement a variety of SEP-funded initiatives as well as manage and support efforts funded by non-SEP resources.

Almost every interviewee, across nearly every sampled state spanning the full range of programmatic areas, indicated that the skills and capabilities that their offices have built were due wholly or substantially to their SEP-funded efforts. States indicated that the spending rules associated with most of the grants that came through the federal SEP office were flexible enough that the funds could be applied to the areas of highest priority for each state, and that this flexibility allowed them to acquire the capacity that they now have. A number of states noted that SEP provided the resources to design and acquire approval for their public benefits programs and that their SEP-funded managers continue to oversee and guide those programs.

The capacity to build, manage and implement energy efficiency and renewable energy programs is dependent on an educated management team, supported by skilled professionals who collaborate on the initiatives undertaken within their state. These are the state's change leaders. SEP has been instrumental in building that foundation of expertise. The vast majority of states report that it is their SEP funds that have allowed and still allow them to attend educational workshops, seminars, classes, and conferences and to team with other states to develop tools for the fields in which they work. The SEP funds have allowed attendance at professional development events in which knowledge and skills are shared and where ideas, both successful and not so successful, are exchanged. State teams were able to use SEP funds to help develop tools that have become national standard practices in the field (HERS audit and home performance assessment tools for example).

While interviewees voiced a wide range of illustrative comments about the role of SEP programs within their individual states (see APPENDIX A: STATE RESPONSES BY PROGRAMMATIC AREA for programmatic-specific responses), they almost always pointed to the way in which

[4] ACEEE, The 2008 State Energy Efficiency Scorecard, October 2008, Report E086.

SEP has allowed their state to establish the foundational capabilities and then build on those capabilities. Yet none of the interviewees indicated that SEP has become irrelevant or no longer plays a critical role. Rather, just the opposite was expressed. While interviewees reported that past funding reductions made it more difficult to accomplish as much and that states had to slow their accomplishments or restrict their efforts, most state experts indicated that the SEP support has continued to be critical in their state because it can be used to meet their highest priority needs and fill essential gaps in their energy efficiency and renewable energy portfolio budgets. However, many state experts did note that SEP funding cuts have caused energy efficiency and renewable energy initiatives to be terminated and new opportunities to be bypassed.

During the interviews, managers were asked to rate their state's capacity to design, manage and implement programs in each of the key SEP programmatic categories identified as target areas for this study. As indicated by the median scores presented in Table 15 the states rated their capacity to design, manage and implement programs as an 8 on a 10 point scale for most of the programmatic areas covered by the interviews. States rated only three programmatic areas at a 7 or less, including technical assistance services, new construction services, and transportation initiatives. Overall, states consider their capacity to design, manage and implement programs to be strong, but they do not have as much confidence in their transportation and new construction capacity. In the remaining programmatic areas, states consider themselves to be operating at a very high level of technical capacity.

Table 15. State Capacity to Design, Manage, & Implement Programs

Programmatic Area	Median State Capacity Score	Percent of Capacity Caused by SEP
EE Information to Public	8	90%
Building Codes & Appliance Standards	8	90%
Transportation	5	90%
Technical Assistance	7	83%
Financial Support	8	80%
Existing Buildings	8	80%
RE Policy, Regulatory, Legislative Support	8	80%
New Construction	6	75%
RE development and deployment	8	78%
RE Information to the public	8	75%
EE Policy, Regulatory, Legislative Support	8	60%
Average of median score	7.5	80%

(1-10 Scale with 1 being very low capacity and 10 being very high capacity)

While the above-mentioned scores represent significant self-rated capacity, the attribution of this capacity to federal SEP (rather to other state efforts or contributions) is clearly evident. Across three of their primary programmatic areas, the state experts indicated that SEP is responsible for creating 90% of their acquired capacity. This includes the programmatic areas of providing energy efficiency information to the public, creating or up-grading building codes and appliance standards, and transportation programs. Similarly, states indicated that 80% or more of their capacity to design, manage and implement technical assistance, financial support, and existing buildings programs, as well as their capacity to support renewable energy policy, regulatory and

legislative initiatives came from SEP. Across all programmatic areas, states indicated that the large majority of their capacity was derived from their SEP-funded initiatives.

The information presented here is not meant to suggest that SEP has been the only resource that has helped build the states' capacity and capability. Required state matching funds and other contributions have also added to the expertise, knowledge, skills and abilities acquired. And some of the larger states indicated that SEP funds are a minor contributor to their state's current portfolio of energy efficiency and renewable energy efforts. However, even those states reported that much of their capability and capacity was built by SEP and that it was SEP that provided the ability to successfully acquire the additional funding streams. These same states reported that SEP funding has provided the flexibility to acquire additional resources and more effectively manage their application. Managers point out that most of the key management staff in the state energy offices are SEP-supported positions. That is, SEP is funding the managers that have built and continue to build state capacity for SEP and non-SEP initiatives.

Interviewed experts also report that the job is not done and that, in most states, there remains a significant gap between what has been done, what is being done, and what still needs to be done. These managers recognize this challenge and report being hampered by past federal funding cuts which hindered the achievements of state and national energy efficiency, renewable energy, and climate change objectives.

6. SUMMARY OF READINESS FOR THE FUTURE

A part of the interview with state-level experts focused on how their state's SEP-acquired expertise (compared to the expertise acquired from non-SEP efforts) is expected to impact their state's ability to acquire, design, manage and implement future energy efficiency and renewable energy initiatives. The responses to this question were similar across the states and across the different programmatic areas. Most state experts responded by pointing out that it is precisely because of the capacity built by SEP over the years that their state was in a position to conduct the program planning necessary for the submission of applications for SEP ARRA-funded programs and portfolios.

According to the vast majority of the interviewed experts and stakeholders, SEP is the country's energy efficiency and renewable energy foundation on which much of the current capacity to move forward is based. That is, states indicated that without the capability, knowledge, expertise and market operations information provided by or in conjunction with the SEP-funded efforts, their states would not have been able to put together an ARRA plan over such a short planning horizon, would not have had such a focused and well structured plan, or would have had a plan that did not reflect the state's needs or market conditions as effectively. Essentially, the respondents reported that SEP has provided a substantial portion of the capability that states now have to design, manage and implement energy efficiency and renewable energy programs and that this condition is also present even with the addition of other funding. States report that it is precisely because of the acquired capacity and the associated capability that the state energy offices have built that they are ready to move forward with energy efficiency and renewable energy programs, projects and initiatives. Several state experts reported that their ability to move forward with public benefits charge programs[5] was enabled by their SEP capacity foundation. Typical comments provided by the interviewed experts focusing on their state's ability to go forward with ARRA and other efforts include:

- SEP has already developed the capability in our office to move forward.
- Our capability is grounded in SEP; the platform is ready to move forward.
- SEP has already built the infrastructure to move forward.
- We have become national experts because of SEP.
- The partnerships, relationships, and networks are in place and ready to go forward.
- SEP was the seed that built the foundation that is now ready.
- Without SEP, we would not now be ready.
- We are ready to expand our efforts because of SEP.
- SEP has helped us move to where we are today; we are ready for the future.
- Because of SEP we can move these funds out the door to good projects.
- SEP is the lifeline of our future capacity.
- Without SEP and ARRA we would be eroding the capacity to go forward in our state.
- SEP has provided the in-house foundation of skills that help us advise, develop and deploy.

[5] Public benefits charge funded efforts are those that are funded via a fee added to customer's utility bills that are then collected and used to implement energy efficiency programs typically administered by utility companies or non-profit organizations.

- We are now trained and ready because of SEP.
- SEP is responsible for our foundation of future energy efficiency and renewable energy progress.
- SEP support created our state's capability for future development.
- We know what works because of SEP.

It is clear from the above comments, representative of the input received during the interviews, that the support provided by SEP has made a critical contribution to existing state capacity and that it is the platform from which future state efforts are being launched. Additional state- and programmatic area-specific comments regarding state readiness can be found in the detailed interview results presented in APPENDIX A: STATE RESPONSES BY PROGRAMMATIC AREA.

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2. Ingo Bensch, Energy Center of Wisconsin
3. Rebecca Craft, Consolidated Edison Company
4. Brian Henderson,* Energy Consultant
5. David Hill, Vermont Energy Investment Corporation
6. Steve Kromer, Consultant
7. Lori Megdal,* Megdal & Associates
8. Rick Morgan, Morgan Marketing Partners

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APPENDIX A: STATE RESPONSES BY PROGRAMMATIC AREA

POLICY, REGULATION, AND LEGISLATIVE SUPPORT

ARKANSAS: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity

In 1979, Arkansas' energy office helped establish the energy code for residential and non-residential new construction. The energy office developed the expertise and consensus necessary to create the code. Through the use of demonstrations and illustration of construction techniques, the code was updated in 1992 and then again in 2000 (see the Arkansas Building Codes and Appliance Standards section of this report). Arkansas's SEP initiatives also passed a right turn on red law in 1979 and added a left on red for one-way streets in the 1980's, and worked with federal authorities to institute this program nationally, expanding savings beyond the state.

In order to facilitate energy efficiency legislative efforts, SEP staff wrote the draft legislation creating the Joint Committee on Energy, which is centrally comprised of state legislators and continues to be supported by SEP. SEP staff understood the legislative process and how to work with stakeholders and interested parties. The General Assembly, with SEP support, has passed the Arkansas Energy Conservation Endorsement Act, which asks utilities to participate in and pay for energy programs. These efforts are helping the Energy Office leverage ARRA funds to support mutually beneficial energy efficiency goals. The state's Public Service Commission and the SEP managers are providing guidance to the utilities on this effort.

Arkansas was able to hire people from various professional backgrounds (e.g., physics, geology, engineering, etc.) so that sufficient expertise was available to move initiatives forward. According to SEP managers, without SEP-funded personnel and expertise, some initiatives would not have occurred at all and the rest may have developed, but much more slowly. The interviewed experts report that the SEP staff had to overcome the reluctance of some stakeholders to move forward on energy efficiency. Not everyone supported energy efficiency, but because it was not state-funded, it became a new revenue stream and Arkansas was able to make substantial progress that would not have otherwise occurred. In particular, Arkansas focused on new construction, retrofits, and behavior modification initiatives.

Summary of SEP Effects on Current Capacity

According to SEP managers, SEP and similar federal funding was the primary reason why the energy efficiency efforts in Arkansas have moved forward. SEP funding provided critical staff, organizational infrastructure, and established legitimacy within the state for addressing energy efficiency initiatives. The interviewed experts reported that without SEP, Arkansas would not have a state energy office or many of the energy efficiency initiatives that have been developed.

Summary of Readiness for the Future
According to SEP managers, SEP has set the foundation for the Arkansas state energy office's future efforts and has given them the expertise to move forward. Future energy-related activities will involve the development of energy related legislation and provide expertise to assist in workable energy initiatives. In addition, The Public Service Commission and the SEP managers will be developing energy efficiency programs to be funded through utilities with their active participation. Recent energy efficiency ARRA initiatives directly build upon SEP-funded expertise and programmatic foundations.

CONNECTICUT: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity
SEP funding has been flexible enough to allow the state to determine its own energy efficiency initiatives from a broad range of possible policy and program options. The flexibility offered through SEP funding has allowed Connecticut to hold its energy office together through the thin times but interviewed experts report that the state has lost some staff and expertise due to SEP budget reductions. The SEP office has been able to retain expertise in technologies related to energy efficiency, and more recently in renewable energy technologies. The availability of SEP funding has facilitated the addition of renewable energy knowledge bases to the already existing expertise in energy efficiency. It was the availability of SEP that provided for the continued existence of the Connecticut Energy Office and allowed the office to continue to provide energy services. Ongoing SEP funds have been pivotal to retaining a minimum core staff, but fluctuating SEP levels have interrupted overall staffing continuity over the years. For instance, SEP-associated staffing levels have varied from a high of over 80 full-time equivalent employees to only a few split-time employees. Nonetheless, managers note that this office would not have survived without SEP and similar federal support.

The state's policies and decisions to implement SEP-funded programs has built energy efficiency and renewable energy capabilities in the state. These have developed the expertise foundations needed to implement SEP-funded programs. The decision to implement the Rebuild America program allowed the creation of staff expertise within the services provided. The recent Building Operators Certification Program provided training to enrollees that allowed building managers to make informed decisions about how to operate their buildings. A third effective program involved a major promotional effort aimed at increasing awareness of energy efficiency in the state. This promotional program was well received by the public. However, limited funding terminated the program in early 2009. The limited SEP funding has been the major difficulty in developing statewide energy policies and legislative initiatives over the long term.

Summary of SEP Effects on Current Capacity
Managers report that the state would not have an energy office without DOE funds. However, managers note that the decreasing funding levels have curtailed progress in the state on energy efficiency and renewable energy developments, including in the area of policy and legislative

initiatives. Nevertheless, federal dollars helped keep the office alive during lean years, as at least, a minimum priority.

Summary of Readiness for the Future
Managers report that they have built and retained expertise in the area of renewable energy and that the office will continue to push renewable energy technology and implement more traditional applications such as solar panels. Managers fully attribute Connecticut's progress in this area to SEP, including the current expertise and infrastructure upon which to build in the future. However, that progress has been limited, largely due to fluctuating SEP funding levels. SEP foundations will provide the basis for ARRA initiatives, but the large infusion of short-term funding is challenging for the office to handle. More stable and sustained levels of future support would substantially assist long-term continuity of planning, capacity, and programmatic progress.

ILLINOIS: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity
Illinois interviewees report that they have become well known and respected as the state's trusted information on which state energy policy can be based. Managers note that it was the energy efficiency and policy support documenting the cost, impacts and implications of having a statewide energy code that allowed the passing of both a residential and a non-residential mandatory energy efficient building code. They report that it was the energy office's policy and impact analysis support that was able to push and acquire legislation to implement a public benefits funded energy efficiency portfolio in the state, implemented via the utilities with public oversight by the state energy office, among others. They note that it took a 10-year push provided by the state energy office in order to be successful in helping to acquire a renewable energy focus in state energy supply policy. The state energy office provided the policy analysis support that allowed the state to set a goal of a 25% reduction by 2025 in energy use and associated carbon emissions. These SEP managers are now working on a home labeling policy for the state among other initiatives.

Illinois developed these efforts by acquiring and applying a wide range of expertise within their state energy office. They report that the SEP funding helped them acquire skills, knowledge and expertise and work though a network of collaborators, allies and stakeholders to gain support for the efforts accomplished. They note that change is not easy, and change requires dedicated constant efforts and team building to succeed. They report needing to acquire an expert understand of energy technology for both energy efficiency and renewable energy as well as the expertise needed to document possibilities and potentials and move these from ideas to activities and accomplishments.

Summary of SEP Effects on Current Capacity
Illinois managers report that these efforts took time and did not happen overnight, but took years of work to achieve. They report that 90% of these achievements were as a result of the state energy office's policy analysis and intervention push efforts that were almost entirely supported by the federal funds provided though SEP and associated SEP funding with support from the

state. While they report that SEP and the associated funds seldom provided 100% of the funding used to accomplish these efforts, and they report needing to work with a wide range of stakeholders, that note that it was the federal funding that build the office, acquired the staff, gained the knowledge and expertise and put these to work to overcome resistance to change.

Summary of Readiness for the Future
Interviewed managers indicate that it was because of SEP that the state energy office and the managers and staff within that office were ready for the code changes that needed to be accomplished, ready for the public benefits programs that needed to be developed, ready with the public training that was needed, and ready when ARRA opportunities came to the state. They report that they were able to rapidly plan and launch ARRA efforts that will be successful at saving energy and putting people to work. Managers indicated that their readiness is a success story in itself, not only for Illinois and the state energy office, but for the federal support that has allowed that readiness to be constructed and maintained.

KENTUCKY: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity
SEP funding supported staff capacity and developed the expertise to provide energy efficiency and renewable energy information and advice to decision-makers, and to conduct the analyses of what was achievable for particular strategies. As a result, the governor now has developed a 7-point strategy that sets the path for an integrated and coordinated way to reach energy efficiency, carbon, and renewable energy goals. This strategy provided the foundation for the building of state programs and capacity, and provides a road map for the future.

The comprehensive strategy of the governor's 7-point strategy for Kentucky include energy efficiency, biofuels, and renewable energy as key elements because SEP managers have put these into the strategy. It also addresses carbon capture and current supply mix. Kentucky set a goal of 25% reduction in energy consumption through energy efficiency and the state's renewable energy portfolio standard supported by SEP analysis. Their strategies for reaching these objectives include supply sub-goals of 18% from energy efficiency, 5% from renewable energy, and 2% from biofuels as a result of SEP provided expertise.

SEP has also helped influence energy efficiency and renewable energy policy and legislation in other ways. For instance, it helped pass legislation for energy savings performance contracting (ESPC) in Kentucky. Also, House bills in 2008 included energy efficiency standards for state buildings, incentives for Energy Star homes, and incentives for renewable energy products as a result of SEP efforts. According to the state's experts, SEP staff provided the critical analyses and expertise that helped shape energy efficiency and renewable energy policy and legislation in Kentucky. However, these experts also report that Fluctuating levels of federal funding created challenges for assuring continuity of staff skills and expertise, which required administrators to carefully manage their resources to assure carryover of core capacity through the lean years. The wide fluctuations in SEP support over the years have created challenges. For example, one state energy expert noted that after years of developing relationships with DOE and the labs and industry, that capacity has eroded as SEP reductions curtailed opportunities to interact with

program managers across states. The loss of that network and the loss of regional offices has had a detrimental effect on state capacity.

Among the significant skills and expertise that SEP has developed for Kentucky's energy efficiency and renewable energy staff are, for example, technical capacity analysis, data synthesis and analysis, research potentials, mathematical and statistical analysis (including its use for projecting potential achievements), strategy development, and more.

Summary of SEP Effects on Current Capacity

SEP made it possible to develop the essential energy efficiency and renewable energy staff skills and expertise. This gave Kentucky the capacity and drive needed to develop energy efficiency and renewable energy policies and legislation. SEP also gave them the capacity to go after other funds, and the infrastructure to effectively and efficiently utilize energy-related ARRA support.

Summary of Readiness for the Future

SEP support created Kentucky's energy efficiency and renewable energy capacity, and provides the critical expertise and infrastructure necessary for its future development. More opportunities to interact with other states' energy offices and learn about their initiatives was cited by one state expert as a particularly valuable suggestion for stimulating future energy efficiency and renewable energy development. However, interviewees report that because of federal trimming efforts there is now less information sharing and cross-fertilization across different state energy offices and regions of the country and that this has harmed both state and national readiness for the future as the country tries to move forward.

MINNESOTA: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity

Minnesota has built a coordinated system for supporting state energy efficiency and regulatory support. The state energy office works in coordination with citizens and interest groups to bring energy efficiency perspectives and policy support information into the policy or legislative change arena. This approach works well in that the energy office brings perspectives that are supported by other stakeholders who are also active in the process. When the energy office detects resistance to it's' perspectives and recommendations, it works with the other groups to try to educate them or to adjust considerations and perspectives to reach a compromise that can be supported by enough stakeholders to accomplish the goal. When the office first started the SEP managers had to prove themselves to be reliable information providers. Today they are considered a valued part of the policy and legislative support framework and stakeholders know that the information provided by the state energy office can be trusted. For example, during the consideration to adopt wind energy as a viable energy supply, there was little information on the speed and duration of the winds across the state. The state was considering renewable policy in an information vacuum. The state energy office took on the job of mapping the wind to feed wind energy decisions. This mapping showed where wind energy could provide a reliable energy resource. The mapping was critical to the commission's decision to have the utilities install wind generation systems for the state's power supply needs.

During the state's push for the use of ethanol based fuels the state energy office needed to advise policy makers on the performance and reliability of the fuel before the state would support an E-85 fuel network. The state energy office took on the job of researching performance and reliability issues. The findings from these efforts allowed the state to support the development of an E-85 infrastructure across the state so that the fuel would be available to the public. Because of these findings, the state energy office adopted an E-85 support policy and began and information and educational effort to make people aware of the fuel and to assure them of the fuel's performance reliability characteristics in vehicles designed to use the fuel.

Another example of the SEP-funded state energy office supporting policy and regulation was the development of the utility's energy efficiency portfolios. The state energy office was largely responsible for helping to get the utility's energy efficiency portfolios up and running by providing analysis, planning and oversight for those efforts. Through these efforts the state energy office moved the focus of the utility programs from a revenue spending requirement for energy efficiency to an energy savings objective focused portfolio. The SEP managers in the state energy office was then able to work with the commission and other stakeholders to include municipal energy companies and the state's energy cooperatives into the energy efficiency program offering requirements. Minnesota was the first state in the country to include the municipal and cooperative energy companies in a statewide energy efficiency service mix as a result of the SEP provided support. The SEP efforts then moved to making sure that the programs and service offerings in the state were coordinated so that similar services were provided across the state regardless of the utility or company offering those services. Throughout these efforts the state energy office, using SEP funds along with other funding sources, built partnerships between the regulatory agency and utility companies and the state energy office. These efforts help assure that programs are well designed and operated and are focusing on their energy objectives. In a related effort, the state energy office worked with the commission to develop incentives and recovery approaches to compensate the utilities for their program's costs and their savings accomplishments.

Policy support was also provided by the state energy office in helping establish an organizational framework and office function for examining building codes and for updating those code to include energy efficient conditions in the codes. These codes went beyond the national model code and move efficiency to a higher level. The office also help move the codes to be adopted as mandatory codes for state buildings and is currently trying to have the codes adopted as mandatory codes for all buildings.

In 2003, the state energy office was asked to work to develop sustainable buildings guidelines and to benchmark state building toward those guidelines so that up-grade priorities could be established and focused on the worst buildings. These efforts lead to the development of state sustainable building guidelines that are today equivalent to LEED silver ratings. From these efforts, the office has been able to benchmark 5,000 public buildings within state and local government organizations. They have also built a benchmarking web site where people can find out how their buildings compare to others and how they compare against state code. The office has helped to set a policy that all state buildings should work to be 30% better than the required code.

The state's SEP supported energy managers, applying SEP acquired expertise also act as the climate change advisor to the state, advising on how much carbon reduction can be achieved through energy efficiency and renewable energy and helping to design carbon reduction objectives.

Another wind energy associated SEP influenced policy initiative by the state energy office was a change in utility supply acquisition approaches to acquire renewable wind energy. The state energy office worked to require utilities to buy wind energy from small wind farms, providing a revenue stream to those renewable energy producers. So far this policy has allowed 200MW to be available to the distribution system from small wind farms.

Managers report that though these efforts, and others, they have acquired a great deal of diversified professional skills and expertise, including engineering skills, code development and assessment skill, auditing skills, performance contacting and savings analysis skills, technology potential analysis skills, ability to convey concepts and benefits in a way that people trust those ideas, educational skills, behavior change approaches, physical science and building science knowledge, ability to apply physical concepts that lead directly to policy changes and legislative initiatives and other skills.

Summary of SEP Effects on Current Capacity

According to interviewed managers, the above-cited policy support and legislative initiatives were a direct result of the SEP funding provided to the state energy office and the 20% match provided to that office by the state of Minnesota. While other organizations and funding sources were also involved, the state's perspectives along with the development of documentation to support the initiatives were predominantly provided via the SEP-funded efforts. Managers noted that the staff who accomplished these efforts were paid with SEP funds and have been for over 30 years. These managers point to the continued funding, though SEP, ICP, PVE and other SEP funding sources as the primary resource on which these efforts are based. Managers noted that Minnesota legislative members understand the important of energy efficiency and renewable energy, but would not have had enough agreement to fund these initiatives without the federal SEP support. They point to the low levels of funding that the policy makers have historically provided to the state energy office and the need for the office to rely on federal funding to undertake the support efforts required. One interviewed expert put it this way: "we would not have built this capacity, we would not have done this on our own, and we would not have gone down this road without SEP." The other interviewed experts from Minnesota agreed with this perspective.

Summary of Readiness for the Future

Interviewed managers report that the SEP initiatives build the state energy office and have brought that office to a level of expertise that the tools and skills to move forward with energy efficiency and renewable energy initiatives are already on board and ready. Managers report that they are already moving forward with net-zero concepts and are planning and implementing ARRA approaches and systems that move the state forward into a high efficiency low carbon environment. The managers interviewed all report that they have the people, the skills and are ready and able to more as far as their funding sources will take them, and that this capability was largely acquired via SEP funding.

MISSISSIPPI: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity
According to the Mississippi experts, SEP fully supported the creation and development of activities in their policy, regulation and legislative support programmatic area. In the late 1980's and into the 1990's, Mississippi conducted several statewide conferences to assist with energy planning and policy development efforts of the state. The primary focus was on economic development and environmental protection via energy efficiency. These were successful, with two major conferences and a series of workshops that covered a wide range of topics, including but not limited to energy planning, alternative energy, fossil fuels, policy, energy efficiency management, economic development, and energy education.

Policy development was also influenced in Mississippi by the State Energy Management Program (SEMP), which required state agencies to report levels of energy consumption in state buildings to the energy office. In turn, this data were analyzed to better understand what could be achieved, and this analysis guided subsequent energy efficiency decision-making. State agencies in Mississippi are required to have an energy management coordinator responsible for the energy efficiency in their respective state buildings, and procurement regulations for state purchases now also reflect energy efficiency requirements.

The energy office also assures that Mississippi complies with federal energy legislation. Moreover, it promotes special state-level initiatives that mirror federal ones (e.g., Clean Cities and Rebuild America), and develops support for an array of energy efficiency efforts.

One area where they have not been as successful as they had hoped is in influencing state building codes. Interviewed experts report that they were not able to get the state's building codes up-dated to a level of energy efficiency that they should be. Mississippi currently has only the ASHRA code, which they report as being out-dated. Interviewees noted that others have developed more efficient codes for state buildings but these have yet to be applied.

Summary of SEP Effects on Current Capacity
According to the interviewed experts, without SEP, Mississippi would not have accomplished these objectives. Managers report that all of Mississippi's capacity in this area was developed from the SEP; all of the knowledge, skills, expertise, and initiatives were made possible because of SEP.

Summary of Readiness for the Future
The capacity developed from SEP provides us with the expertise and infrastructure necessary for future progress; it is the foundation on which our progress rests. Interviewees report that the rate of continued progress in the state will be directly tied to the level of future SEP support.

MONTANA: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity

SEP staff have been involved for many years in developing Montana's renewable energy portfolio. For instance, they conducted wind assessments and monitoring, which guided planning for these resources. SEP was instrumental in generating data in 2003-04, which helped influence a senator to advocate for related initiatives for Montana.

SEP staff also conducted the analyses on the need for the benefits charge funded program and what could be accomplished from that effort. They were also central to generating the support necessary to make this legislation and regulation happen. They used SEP and SEP matching funds to sit on groups and committees that helped plan utility and other programs. They also provided important testimony and support to the utility commission, advising them on what the universal charge system should look like and what it should do. Interviewees report that these efforts were substantially influenced by SEP and they consider them SEP results.

SEP staff skills cited as particularly valuable by one state expert included economic and other quantitative analysis, policy analysis, research skills, management skills, and the ability to integrate information into decisional frameworks.

Summary of SEP Effects on Current Capacity

SEP in Montana was able to provide the policy analysis and influence the direction of these initiatives. They guided decision makers on what would work best, and had the expertise on how to implement these programs.

Because they used SEP as a match for general funds, Montana's initiatives may have begun without SEP but would have developed to a much lesser extent, would not have been as well focused or as well designed and would not have the current set accomplishments.

Summary of Readiness for the Future

The staff capacity and infrastructure that SEP generated lays an important foundation for the future. Because they operate in a political setting, funding levels and related rates of energy efficiency and renewable energy progress can fluctuate.

One state expert noted that increasing interest and priority for issues such as climate change, energy efficiency, and air quality has enabled Montana to bring such expertise into a single office. That, in turn, has improved their ability to develop the staff capacity and programmatic success needed for ongoing progress in these areas. The state expert added that this office is well suited for future energy efficiency planning and for moving into the climate change planning function and note that this is substantially a result of SEP.

UTAH: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity
Interviewees report that Utah's state energy office provided the key expertise for the development of the state's energy policy. The energy office utilized the expertise it has developed to provide data and analysis in support of policy making. The office assisted in the creation of energy efficiency awareness and opportunities in various programmatic areas. SEP provided the support for initiatives to legislators, provided supporting expertise and necessary information.

The Governor's Blue Ribbon Panel on Climate Change utilized the SEP-funded staff to develop inform and assess policy options. The result of these efforts resulted on the current policy for building renewable energy capacity in Utah.

The Utah energy office has been able to provide energy efficiency expertise and provide quantitative skills and analytic skills in support of energy efficiency policy development. Interviewees report that it was the on-going SEP funding that provided the continuity of staff and the ability to retain a core of skilled staff that allowed Utah to maintain the ability to provide Energy Efficiency policy analysis and support.

One of the most successful programs has been the renewable portfolio standard (RPS) with Utah-specific goals. While SEP has been instrumental in these efforts, interviewees note that Tax credits and incentive programs to develop the industry were negatively affected by the limited availability of SEP and other funds. They report that the major limiting factor for the success of policy developed programs and accomplishments has been the limits on funding and other resources and at times a lack of legislative support without supportive funding.

Summary of SEP Effects on Current Capacity
With the availability of SEP funding, Utah has been able to develop its expertise and establish its credibility. Interviewees report that without SEP funding, the Utah energy office would not be able to participate in energy efficiency policy development or impact regulations related to energy use issues.

Summary of Readiness for the Future
Utah's energy office depends on SEP funding for continuity of expertise in a broad range of areas. This continuity of expertise is necessary for the office to remain a resource for the legislature when policy is being discussed and decisions are being made. Managers report that they have expert skills and capacity and are ready for future efforts but they note that their readiness for the future is tied to the level of SEP and other funding received.

VERMONT: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity

Vermont has used its SEP-funded effort to inform public policy decisions across a number of policy initiatives. Managers point to the use of the state energy office's work in establishing the Efficiency Vermont organization and the efforts undertaken through the organization. These managers note that it was the state energy office director and key staff that pushed for Efficiency Vermont as a new and innovative way to develop and offer energy efficiency programs across the entire state. This approach has now been replicated in other states that have moved to independent providers of energy efficiency services. These market changes came from the efforts pioneered in Vermont that were started and guided by the state's SEP-funded managers and directors. Managers note that it was their SEP-funded efforts and work with state policy decision makers that allowed the legislation supporting the Efficiency Vermont to go forward. Following this pioneering SEP-developed approach, the state energy office SEP staff helped form and establish Efficiency Vermont and implemented that approach. SEP-supported directors and managers then presented the approach at national conferences and meetings, allowing others to emulate the Vermont approach. This SEP product has become a national model. Managers noted that they are now involved with moving Efficiency Vermont to operate more like a regulated utility company.

Another SEP accomplishment is the 1997 residential and the 2005 non-residential energy efficient building codes in Vermont. These efforts were led by the state's SEP-funded managers and the staff of the state energy office. Vermont assigned an SEP-supported manager with the responsibility to change the model energy code so that it was reflective of Vermont's conditions. It was that SEP developed code that was passed in the state. According to the interviewed managers, it was the SEP-supported managers that pushed these codes forward in the state and the people who moved these energy efficient concepts into state code and regulation. The state office was also involved in proving training to key stakeholders about the code changes and how to build to meet those changes. Managers noted that with the new ARRA funds they are going to update their codes to be even more efficient. They are also going to use ARRA funds to implement a compliance effort in the state to make sure that the energy efficient codes are followed.

The interviewed managers report that SEP-funded efforts were instrumental in developing the state renewable energy policies and the initiatives that developed as a result of those policies. Likewise the state became involved in supporting and demonstrating the use of ethanol as a transportation fuel as a result of SEP-supported policy decisions to move in that direction. Managers note that federal funds provided through the SEP were used to reduce the costs for renewable energy systems in state schools buy paying for the cost of the feasibility studies and for developing models that assessed potentials in the state.

SEP funding was also used to improve the knowledge, skills and expertise of the people who lead these policy initiatives for the state. Managers report being able to attend workshops and conferences and to interact with others to not only acquire the additional skills, but also to share the knowledge and expertise they have with others as well. They note that SEP provided the funding source to expand the knowledge and skills of the managers and staff who accomplished these initiatives. Manager's report building their knowledge of energy efficiency technologies and potentials for the state, learning about construction practices and the benefits from different construction approaches and practices and what would be cost effective to move into the new

energy efficiency codes. Managers were able to learn what needed to be done within the state to acquire substantial savings and to develop ways of financing these efforts though utility and public funding approaches. However, these managers also report that in the last several years these educational efforts have been reduced as the national meetings and conferences and technical exchange efforts have been cut. They note that innovation is spread via communications between professionals and these are not yet back to where they need to be.

Summary of SEP Effects on Current Capacity

Managers note that these policy and policy-supported initiatives were developed, directed and supported by SEP-funded directors, managers and staff working in the state energy office. Interviewees report that these were key policy accomplishments that would not have been developed and pushed without the key people supported by the SEP funds. Managers note that while other funds were added to Efficiency Vermont, for example, it was the SEP-funded directors and key managers that accomplished these pioneering efforts and provided the examples for others to follow. Managers are not sure what they would have been able to accomplish without the SEP funds for the people and the acquisition of the skills to progress in the state. Managers reported learning that while studies help determine what can be done, nothing can be accomplished until projects are implemented and funds are allocated to project-related accomplishments. They noted that the use of SEP helped get funding to accomplish key initiatives, such as Efficiency Vermont.

Summary of Readiness for the Future

Interviewed managers report that SEP funding provided the groundwork and laid the foundation for the accomplishments in Vermont, and is the primary funding source for the current and future policy initiatives. Managers report that their SEP-funded staff are leading the ARRA planning and are leading the policy change considerations for how Efficiency Vermont is structured in the time ahead. They are also leading the code updating and change efforts. Managers report that they are ready for these efforts and other future efforts because of the foundation that has been built with SEP funds. Managers have learned what works and what is needed to make projects and programs work to acquire energy efficiency, renewable energy and carbon reductions.

WISCONSIN: POLICY, REGULATION, AND LEGISLATIVE SUPPORT

Historic Development of State Capacity

According to Wisconsin state energy experts, the SEP initiative provided the funds to hire staff with energy efficiency expertise and develop the additional expertise necessary to implement energy efficiency programs, and to develop related policy analysis capabilities. The availability of SEP funds provided for the purchase of demonstration materials, provided opportunities to attend professional skill-building conferences, and otherwise helped staff acquire the necessary knowledge to develop energy efficiency policy.

Wisconsin's state energy office developed many specific programs and systems to enable the Office to develop policy initiatives and monitor implementation of energy efficiency measures. For instance, the Office developed a price monitoring system and a weather monitoring system to track and analyze energy usage. The Office developed purchasing specifications and

approaches to purchasing for state government facilities and Wisconsin state government business decisions. Without the availability of SEP funds, Wisconsin's energy office would not have been able to implement these standards and specifications, and would not have been able to propose legislation and incorporate energy efficiency requirements into design and purchasing specifications.

As a result of SEP funding, the Wisconsin energy office has been able to incorporate Energy Star as a requirement into the specifications for the purchasing of equipment by Wisconsin state government. The incorporation of Energy Star into Wisconsin state government purchasing requirements has motivated equipment and appliance dealers in Wisconsin to change stocking practices to include a broad range of Energy Star qualified equipment. The change in the Master Specifications for Wisconsin state government purchasing has improved the energy efficiency of state facilities. It has also improved the energy efficiency of non-state government facilities that purchase products consistent with the requirements of Wisconsin state government. The broadened purchasing requirements for Energy Star qualified equipment have increased the sales and usage of energy efficient equipment.

The availability of SEP funds has helped support continual monitoring of energy efficiency specifications for equipment to assure that the energy specification work well over long periods of time.

The Wisconsin energy office has influenced legislation to improve the energy efficiency of Wisconsin. Wisconsin was one of the first states to ban the wire wound or transformer type of inefficient fluorescent lamp ballasts. Banning inefficient ballasts expanded the market for the energy efficient electronic ballast and the rapid market penetration of the energy efficient T-8 fluorescent tube common in the market today. Wisconsin banned the use of old fashioned magnetic ballasts as a violation of Wisconsin law. The elimination of the magnetic ballasts was done through legislation banning the sale and not through code requirements. The legislative approach was found to be very effective.

The Wisconsin energy office not only promoted the incorporation of Energy Star into the Master Specifications for new construction, but was also actively involved in the incorporation of Energy Star requirements into the procurement requirements for appliances and other equipment purchased by various Wisconsin state agencies. This includes university facilities and other taxing authorities that utilized the lower prices for equipment available through the Wisconsin state purchasing authority. This equipment included the Energy Star requirement for boilers, air conditioners, motors, and other energy-using products.

Energy office personnel attended conferences on daylighting and assisted in the design of daylighting projects in state government facilities to demonstrate that daylighting worked well. The energy office participated in experiments and the evaluation of daylighting in the energy office facility and in the building housing the Wisconsin Public Utility Commission. The Energy office assisted in the development of daylighting and sustainability requirements for all new state government buildings and the requirement that all new state government buildings be LEED certified.

The energy office demonstrated that many energy efficiency projects could be funded through maintenance budgets rather than capital improvement budgets. Budgeting utilizing maintenance funds speeded the conversion of exit lights to energy efficient LEDs from fluorescent or incandescent lights.

The energy office facilitated the switch from T-12 fluorescent lighting to the more energy efficient T-8 lighting. More recently, the T-8 lighting was converted from the standard T-8 to the newer high performance T-8 lighting utilizing the Consortium for Energy Efficiency high performance criteria. An innovative aspect of this newer lighting is utilizing high color temperature lighting with 5000 degree Kelvin T-8 tubes. This higher color temperature appears brighter and has allowed the use of fewer tubes with a corresponding reduction in electric usage.

As a demonstration of the effectiveness of CFL lighting, all of the incandescent lights in the State of Wisconsin Capitol building were replaced with CFLs. The success of this CFL replacement program led to a program to demonstrate the availability and effectiveness of an incandescent bulb replacement program in the small retail trade commercial sector. This demonstration project provided evidence for the large untapped potential for energy efficiency improvements in lighting in the commercial sector. This hands-on direct install program provided a broad range of wattages, sizes, types and color temperatures to interested small commercial businesses to demonstrate the availability of suitable and appropriate CFLs to improve the energy efficiency of small businesses.

The Wisconsin energy office has developed and produced the annual publication Wisconsin Energy Statistics. This publication is utilized for the tracking of energy use in Wisconsin as a resource for estimating the effectiveness of various energy efficiency measures.

The energy office also established a database of coal available for mines across the US. The database was the basis of the decision to pass acid rain mitigation legislation for Wisconsin coal-fired electric generating plants and the decision by Wisconsin's electric utilities to convert to low-sulfur coal after suitable conversion of coal burning utility generating boilers and modification coal burn characteristics. The expertise gained from the power plant modification provided a new business opportunity for Wisconsin's electric utilities to market their power plant engineering expertise across the US to utilities planning to convert their coal burning electric generating plants from high Sulfur coal to low Sulfur. The environmental benefits from the reduction of acid rain were an impact of the efforts and expertise facilitated through the availability of SEP funds.

Summary of SEP Effects on Current Capacity

With the availability of SEP funding, Wisconsin has been able to develop its capacity to monitor ongoing utility energy prices and other energy prices. Wisconsin has also established the capability to monitor weather severity and its impact on energy usage. The weather monitoring capability provides the information necessary to monitor and validate the effectiveness of energy efficiency programs. According to the interviewed experts, SEP has help Wisconsin acquire a comprehensive and extensive staff of experts with the knowledge and capability to help move energy policy forward and they have developed the reputations for providing reliable information.

Summary of Readiness for the Future
Wisconsin's energy office has established a reputation and expertise in energy efficiency policy development and regulation development. The energy efficiency monitoring programs and systems currently in place provide for future program development and the ability to forecast their effectiveness. Wisconsin has established a strong foundation for moving forward into programs funded through ARRA and in other areas related to energy efficiency or funded through other sources. Wisconsin has access to the information needed for future policy development and has the framework in place for the implementation of effective policy and regulatory requirements.

ENERGY INFORMATION TO THE PUBLIC

ARKANSAS: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity
The funding provided by SEP enabled Arkansas to establish its energy office in 1974. One direct result was that SEP funding enabled Arkansas to develop the capacity to design and implement energy efficiency educational programs. This capacity has been strengthened over the years as greater expertise has been acquired to such a degree that the energy office is now seen as one of the key energy efficiency educational providers in the state. The energy office's ability in this area has allowed it to obtain new educational service funding from the state's utilities.

According to SEP managers, this new funding is permitting the energy office to go forward with additional educational efforts. These efforts have included K through 12 programs as well as energy education demonstrations and presentations to a wide range of stakeholders and consumers. The energy office's projects have included energy efficient discovery exhibits for children, and funding and judging at science fairs where energy efficiency is a theme.

The energy efficiency components within the state energy office's educational program's includes a strong energy efficiency push. For these efforts, Arkansas uses a marketing firm to provide expert behavior change marketing via the state's website. The state energy office provides educational and informational outreach through its Earth Day activities and newsletters. The office also forms partnerships that help deliver energy efficiency messages and education through general awareness campaigns. The SEP-supported energy office also provides energy efficiency seminars and training for businesses, business associations, and related organizations. These services provide the education they need to consider their energy options and make informed energy decisions.

These efforts are SEP-funded efforts. Arkansas was able to utilize SEP funding to obtain and train people already skilled in energy education. The program was also able to fund skill development efforts for industrial managers who have experience and knowledge in energy

efficient industrial equipment and methods. Arkansas has been able to increase the skill level of its energy education personnel by enrolling them in training courses and workshops and attending conferences, workshops and certification programs such as the Certified Energy Manager program.

According to SEP managers, one of the currently operating programs that have been very successful is the program with the University of Arkansas Cooperative Extension Service. The Co-op Extension produces a newsletter called Energizing Arkansas that has been very effective. Arkansas has had a successful media campaign for the past two years utilizing TV spots focusing on energy efficiency messages. A physics program was also adopted at the 8th grade level in Littlerock. However, the SEP funding was cut and this program was discontinued.

An important component of Arkansas' energy education effort is the information and education activities included in the state's Energy Emergency Management Plan developed to respond to energy emergencies. Because of SEP, Arkansas has a working energy emergency plan that allows increased education and support efforts to the state's citizens during energy emergencies.

Summary of SEP Effects on Current Capacity

According to SEP managers, the vast majority of Arkansas' energy efficiency educational efforts have been and continues to be SEP-funded efforts. According to the interviewed experts, without SEP funding, Arkansas would not have an active energy efficiency educational effort, and would not have had a state energy office. According to SEP managers, there was not a lot of support for the energy office without the funds to establish and operate the office and to fund its initiatives.

Summary of Readiness for the Future

According to SEP managers, SEP funding has allowed the state energy office to become the state's energy educational experts. The office will continue to implement and when possible expand these efforts as additional support becomes available. As part of the Arkansas future efforts, the state energy office plans to build on current residential and non-residential educational efforts and expand demonstrations with more deployment of demonstrations directed toward continued education and improvement in codes.

DELAWARE: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity

SEP funding enabled Delaware to develop its capacity in this area. However, funding reductions in the 1990's resulted in staffing decreases from 12 to 3 positions, which significantly affected capacity development in this area. That impact continues today, with current staffing at 4 positions to cover all energy efficiency and renewable energy activities. This reducing capacity leaves energy education as a part-time activity provided as available resources allow. While SEP has been critical to assuring energy efficiency and renewable energy development in Delaware, the low staffing levels have limited the time available to specifically address education outreach activities. While Delaware has developed some education outreach capacity, interviewees report that there is more demand for educational services than they are able to provide.

There are several education outreach services that SEP has helped develop. Delaware provides some education on renewables with contractors, some training for the Energy Star program, public speaking with schools and civic groups, and some outreach at the state fair. There are no specific featured programs or curriculum; rather, education activities are more typically ad hoc. The Junior Solar Sprint (model solar cars program) at the junior high school level has been a success over the past 15 years. Delaware used to be involved with more conferences and interstate networking opportunities, which were very effective avenues for increasing capacity, but such activities have essentially been eliminated since the SEP funding reductions of the 1990's.

Summary of SEP Effects on Current Capacity

According to the experts interviewed, without SEP funding, this office would not exist in Delaware. All of Delaware's development in this area has been possible because of SEP support. In particular, SEP has directly helped with staff support. SEP was also cited as providing some programmatic support, but more specific information was unavailable.

Summary of Readiness for the Future

SEP is the lifeline for Delaware's future capacity. It is essential to enabling Delaware to continue its efforts in this area. In the short term, ARRA stimulus funding will allow them to keep two staff members that they would otherwise have lost. Nonetheless, long-term capacity is directly tied to SEP support.

KENTUCKY: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity

Interviewed expert report that SEP support was directly responsible for developing all of Kentucky's energy efficiency and renewable energy staff capacity and programmatic initiatives. A particular success has been the schools program, which changed both the attitudes toward energy efficiency and renewable energy in the state and the energy usage of the schools. A substantial portion of Kentucky's progress has come since 2000. Information about many of these programs is available online at www.energy.ky.gov/dre3/default.htm.

In early 2000 and into 2001-02, Kentucky started taking a hard look at the number of Energy Star buildings. They had two, and wanted to do better. Kentucky committed to promoting Energy Star and started working with school systems to develop high performance buildings, with some districts reporting savings as high as $250,000 annually attributable to this program. Initiatives included hosting workshops about high performance buildings, and educating architects, engineers, administrators, principles, and superintendents on the value of high performance buildings. The energy efficiency programs for schools in Kentucky used SEP support to develop the pilots and to subsequently expand, and ARRA support will develop this further.

Kentucky established a consultant to advise school districts how to set up an energy plan that is cost effective. The consultant also helps them understand how to audit energy bills and to

understand their energy use and the conditions impacting that use. Kentucky subsequently set up an awards program to recognize programs that were successful. That was then written into legislation for all K-12 schools requiring them to enroll in the program, and they now have over 100 schools districts into this program. Kentucky is currently using ARRA dollars to expand and improve this program.

Kentucky has also showcased high performance buildings, which they report has helped increase interest each year. This ultimately created considerable integration of these approaches into Kentucky's schools, and led to their first Energy Star and LEED schools. LEED certification establishes a building as constructed to sustainably meet rigorous energy efficiency standards. Kentucky is now moving to include net-zero buildings. They currently have 22 Energy Star buildings, which includes 12 K-12 public schools, as well as some commercial buildings, hospitals, banks, and court houses.

Kentucky also developed a land grant program to support an extension agent that promotes energy efficiency practices and products throughout the state. They go to at least 50 events per year, including fairs, co-op meetings, garden shows, and conferences. In the process, they contact 750,000 people per year with energy efficiency information. Kentucky also utilizes a 3000 square foot exhibit and have offers workshops on high performance homes. They have hired South Face Energy Institute to come in and do one-day residential and two-day non-residential energy efficiency workshops in the state.

They provide information on how to build energy efficient homes that has resulted in more of these homes being built in Kentucky. Moreover, they provide HVAC inspector and other continuing education credits. Kentucky's energy office was able to convince state policy makers to adopt Energy Savings Performance Contracting (ESPC) resulting in increased ESPC projects. Kentucky has also offered workshops and audits through the University of Louisville with recommendations to municipalities and commercial (med and small) via the engineering college. Kentucky also offers workshops via this program to help manage energy in schools via O&M and enhanced building operations approaches.

Kentucky has utilized additional energy efficiency partnerships and networks. For instance, an SEP manager reports that they utilized NEED projects (National Education Energy Development) to connect with 300-400 teachers per year, and thousands of students per year. They have taught students to take light meter readings to measure use, and has used that data to help acquire daylight savings. SEP was used to help fund the Kentucky Green and Healthy Schools initiative that seeks ways to improve energy efficiency

Kentucky has worked with Industries of the Future and with DOE on heavy industry projects. . SEP managers report that this collaborative information sharing with industry to look at common problems with energy and energy use has helped heavy industry and manufacturing improve energy use.

Kentucky has also introduced alternative fuels and bio-fuels initiatives. They report generating over 100 schools buses via another grant, and have worked with the state fleet to use bio-fuels.

All of the skills and expertise that Kentucky needed for their energy efficiency programs were SEP grounded and involved information and educational initiatives. A non-exhaustive list of the skill areas developed include: energy audits, networking, materials development, software use, energy savings analysis, understanding technologies (both residential and nonresidential), engineering analysis (e.g., for alternative fuels, wind, and solar), Energy Star requirements, grant management, program administration and management, ESPC analysis and costing skills, partnership development, and more.

Summary of SEP Effects on Current Capacity

As one state energy expert put it, "Everything was SEP acquired; everything we did. We would be in a dismal situation without SEP and ARRA, period." All the skills, capacity and infrastructure staff development and programmatic development came from SEP. The bottom line, according to a state energy expert, is that none of Kentucky's energy efficiency programs, skills or related capacity would have occurred without SEP.

Summary of Readiness for the Future

According to the interviewed experts, SEP had a profound impact in Kentucky and is directly responsible for laying the foundation for this state's future energy efficiency and renewable energy progress. The skills and infrastructure that SEP created enabled Kentucky to effectively and efficiently utilize ARRA support. Future SEP support levels will continue to have a significant impact on Kentucky's energy efficiency and renewable energy progress.

MICHIGAN: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity

SEP has enabled Michigan to develop a large clearinghouse on energy efficiency information and education. They have eight information centers across the state that SEP supports, which provide information and education to the general public.

In the 1970's, clearinghouses were their major effort. In the 1980's, they helped develop all the Investor-Owned Utility (IOU) energy efficiency programs. The state energy office merged with the Public Service Commission in 1986 to help them plan, approve and oversee the state's demand-side management (DSM) programs. The office provided a number of SEP supported managers to work with the IOU's to set up their DSM plans and operate their programs. SEP support helped get these projects off the ground and into the market. SEP managers also help structure the evaluation efforts for these programs The DSM programs were successful in capturing significant state-wide energy savings, supported with SEP management and oversight.

Michigan also used SEP to provide conferences, workshops, and tours of renewable energy facilities to generate awareness and support. They also provide small grants to groups that host conferences and fairs, and utilize these for getting energy efficiency information into the market, often reaching 5,000 or more people at each event.

SEP support developed staff knowledge, skills, and expertise of energy efficiency allowing for transfer of information to a wide range of consumers. In some cases, people who developed this expertise in the state energy office later moved on to work for utilities and other organizations taking their SEP acquired skills with them and applying them to non-SEP efforts.

Summary of SEP Effects on Current Capacity

SEP was the primary funding source for all of these energy efficiency and renewable energy initiatives and related capacity development. According to the experts interviewed, prior to SEP no one in the state of Michigan was providing energy efficiency and renewable energy information or education assistance to the public. SEP established a core group of professional expertise and the infrastructure for information transfer and for ongoing development.

Summary of Readiness for the Future

The core expertise and infrastructure developed through SEP has enabled Michigan to respond more effectively and efficiently to ARRA opportunities. As one state energy expert put it: "[This has] enabled us to move forward right away saving lots of time. Otherwise, we would not be ready; we would not have been able to plan the ARRA spending as effectively to get the biggest bang for the buck."

MINNESOTA: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity

Minnesota has implemented a wide-ranging, compressive, public-focused energy efficiency information and education effort using SEP funding. This effort involves the development of an information center with its own phone lines, websites, and mail center. The office provides workshops, seminars and outreach efforts supported by print and mail capabilities. The office provides materials and technical support for both non-residential and residential buildings. The center provides materials and instruction on how to do energy efficient building construction and retrofit projects and how to effectively manage energy use. The office provides training to builders and trades-people on energy efficient construction practices. Training is provided on air sealing, insulation in attics, ceiling and sidewalls, duct performance and sealing, and other aspects of a total envelope performance system and integrating humidity control strategies. Staff train on how to select and install energy efficient equipment and how to do energy efficient retrofits and upgrades and how to build to Energy Star specifications and how to build both an efficient home and a healthy home. The state trains in code enforcement and compliance and how to build to code conditions and how to exceed code requirements. The office trains engineers and contractors on energy efficient approaches allowing them to serve their customers while saving them energy and costs.

They provide information on solar energy and wind energy and provide information on bio-fuels and the use and performance of these fuels. Managers report that the SEP-funded office has received national awards for its NEED program as well as it s K-12 educational program in Minnesota school systems that are building a foundation of energy efficiency within the population. Managers also report that they have been able to gain state support for renewable E-85 efforts and have been able fund special projects that have supported the distribution and use of E-85 as a viable fuel in the state.

Managers noted that they have been able to acquire a great deal of skills and expertise as a result of SEP efforts, including engineering skills, materials development skills, building physics, science and performance knowledge, partnership building and presentation skills, software writing and modeling skills, and materials development and delivery skills. They have developed skills and approaches for working with policy and lawmakers and educating them on efficiency concepts approaches and benefits. Managers noted that they have had to become writers, editors, physical science engineers, materials specialists, behavior change experts, planners, developers and designers and most of all effective listeners, guiders and educators. The interviewed managers also noted that it was from the state's energy office and the SEP foundation built within the state that the state's energy efficiency initiatives from the utilities and the utility regulatory commission are based. That is, the skills and professional expertise were instrumental in moving the state forward with utility programs that reduce energy. Managers note that they are key advisors in these programs and processes for acquiring cost effective energy efficiency resources to Minnesota.

Summary of SEP Effects on Current Capacity

The interviewed managers fully attributed the information, education and training services they have provided over the past 30 years to SEP funding. They state that the SEP funds that established their offices and funded their staff provided the foundation for the services that they provide. Managers note that the staff that they have, and the training that was acquired by these professionals, has been SEP funded. The resulting materials that they provide and the training that they provide has also been SEP funded.

Managers reported that without SEP, they would be decades behind where they are today and would now be facing building durability and performance problems. This state would be consuming far more energy than the state now consumes, and would be pumping much more carbon into the atmosphere. Managers noted that without SEP, Minnesota would be resistant to making the financial commitment to improve the lives of their citizens through energy efficiency and the benefits it brings. Managers also report that without SEP, the state would still be in the 1970's with respects to its buildings, building designs and energy systems. Moreover, their economy would be disadvantaged by higher-cost energy. Managers report that they would not have had an energy office or have been able to offer energy programs or services, or they would have had a much smaller staff with less capable short-term staff operating without the support to effectively improve efficiency in the state.

Summary of Readiness for the Future

The interviewed managers report that this state would not have been able to adequately plan for or respond to ARRA funding without the foundation built by SEP. They report that their office would not have had a knowledge base to know what to do or how to do it. SEP provided the seed and helped the office grow with skills and knowledge embedded within a professional and well-respected staff that were fully capable of designing and launching on the ARRA initiatives. Managers noted that they have the organizational, management and operational framework, staffed with skilled experts, which provide a valuable infrastructure for future energy efficiency and renewable energy initiatives.

MISSISSIPPI: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity

Mississippi has a strong outreach program, which was initially developed in the 1980's, including involvement with the National Energy Education Development Project (NEED, summarized online at www.need.org/info.php). Mississippi's NEED program enabled them to deliver teacher training and workshops for teachers to use in their classrooms.

That foundation kept Mississippi's information programs alive during periods when management wanted to decrease Mississippi's focus on energy efficiency. They started networking during the down years and worked with other organizations and associations. That enabled them to add a new person with the SEP funding and focus on energy information and outreach again, including an increased focus on the NEED program. They also worked with employers and went into businesses and presented energy efficiency information. Today, much of their information is delivered online, although they continue to provide presentations to organizations and in school classrooms.

There are several different energy efficiency and renewable energy information programs that have made an impact in Mississippi. One valuable tool that they acquired was geographic information system (GIS) software, which mapped data for energy projects and for developing energy emergency plans. This included data for utility, oil well, gas and pipeline projects. This was also used to focus their efforts on the parts of the state where they would be most productive, and directly assisted efforts to get competitive grants. Consequently, GIS became a tool for economic and business development. Thus, what began as an energy efficiency informational tool progressed to other advanced uses.

Mississippi has also utilized the SEMP program, which mirrors FEMP (Federal Emergency Management Program) at the state level. This has been a good program with useful tools for energy management of their state buildings. Mississippi used SEP funds to build staff and acquire the software to determine what actions to take. They then contracted with Oak Ridge National Laboratory and updated the software, and got audit software to assess energy use and opportunities in state buildings.

They also developed Rebuild Mississippi, which mirrored the Rebuild America program, to provide technical assistance to targeted groups and provide grants for rebuilding Mississippi. This focused on the small commercial and manufactured housing sectors. Additionally, Mississippi's Biomass program targeted the agriculture sector. This was launched from their SEP-funded biomass potential and feasibility study. They developed projects from this, which grew into the Mississippi Biomass Council that is now operating on its own. They are now a quasi-governmental nonprofit organization whose mission is to push and plan biomass in Mississippi.

Another successful initiative in Mississippi is their combined heat and power (CHP) program. Also known as cogeneration, CHP generates electricity (and/or mechanical energy) and thermal energy in a single, integrated system. Mississippi's CHP Center was started with SEP funds and

provides technical assistance to help businesses understand and look at the use of CHP in their facilities. They now serve as the repository of CHP information in their state.

Mississippi's performance contracting program is targeted to public agencies (i.e., state government buildings and schools), and has measurably improved the energy efficiency of these buildings. Information about many of Mississippi's other energy efficiency and renewable energy programs can also be located from a directory of links on that website.

One program that did not reach expected levels of success was the Million Solar Roofs program. Mississippi provided training on the installation of solar water heaters, but this program did not move from pilot program to actual installations. They did not reach a level where this became an embedded market effort. What they learned from this was that handling such ventures on their own is less effective. They have since moved to coordinating such activities with others, for instance through trade shows and other venues.

Summary of SEP Effects on Current Capacity

According to the interviewed experts, without SEP, efforts to develop energy efficiency initiatives in Mississippi would have been severely crippled at best, or would not have been addressed at all. The initial state legislation in the late 1970's enabling energy efficiency initiatives would not have occurred without federal funding. In the absence of SEP funds, Mississippi was not going to initiate any energy efficiency or renewable energy activity.

SEP efforts have created or greatly improved Mississippi's ability to offer energy efficiency services. They are now able to tap into every energy-consuming sector in Mississippi (residential, consumer, industrial, etc.). Mississippi is now able to build successful services and programs for these markets, and this office is able to stay focused on energy efficiency without being sidetracked by other objectives. This was made possible by the skills, tools and resources developed through SEP.

A non-exhaustive list of some energy efficiency expertise and skills developed through SEP includes: technical expertise and ways to save energy; program design and development expertise; moving from concept to design, and to organization and implementation; preparing information and marketing materials that change behaviors; training and presentation; team building, coordination, networking and partnership; contracting and grant development; project management, priority building, and program development.

Summary of Readiness for the Future

The skills, tools, resources, and programmatic infrastructure for future energy efficiency and renewable energy efforts were all developed through SEP support. The capacity created through SEP has positioned Mississippi to more effectively and efficiently respond to future opportunities, and lays a critical foundation for future progress. The rate of progress will be substantially tied to future levels of SEP support.

SOUTH CAROLINA: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity
According to the interviewed experts, the USDOE SEP funding is directly and wholly responsible for an extensive range of energy efficiency and renewable energy education programs in South Carolina.

South Carolina provides auditor training and technical workshops to get technical expertise into the market. Among the technical workshop topics are: boiler, HVAC, lighting, etc. South Carolina also trains builders on energy efficient construction and green building construction.

Training is also provided to teachers in the summer on energy efficiency and renewable energy, enabling these teachers to teach about energy efficiency and renewable energy in the schools. This training is estimated to serve approximately 200 schools each year. South Carolina also provides guest speakers to the schools to help educate students directly via the K-12 program, with a particular focus on 6th grade. South Carolina provides many more public speaking and presentations to a wide variety of organizations from both the public and private sectors. They also put on home shows and conferences, and provide displays about energy efficiency and renewable energy. SEP managers also serve on numerous panels and committees, and further provide information via many media appearances throughout each year.

South Carolina further provides energy efficiency and renewable energy information and answers questions through its website and its 800-number. The website provides information for every type of consumer and organization, with links to state and federal sources that provide further assistance. The website attracts over a million hits from 80,000 unique visitors annually.

SEP also supports publishing energy data, fact sheets, and an energy management report for South Carolina. In this state, stakeholders want to know the results of what they are doing. For instance, when school teaching and home show initiatives were unable to measure their results well, they were cut when SEP funds were reduced in the 1990's. The energy education in the schools capacity has not recovered since that time. In contrast, the web site has been an increasingly effective tool, and the workshops and training have been effective as well.

Summary of SEP Effects on Current Capacity
Interviewees report that without SEP, none of the efforts described in this interview would exist in South Carolina. They also report that the state energy office would not exist without SEP and note that such programs and services are not available anyplace else in South Carolina without associated non-state financial support.

Summary of Readiness for the Future
The sustainability of these programs and services in South Carolina, and future progress, is directly dependent on SEP support. Managers report that without financial support their state would not have the energy support service now provided.

UTAH: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity
The Utah Energy Office was funded through SEP and with associated funding, such as PVE. This funding provided the backbone of all of the Utah Energy Efficiency programs. The SEP funds provided the ability to develop experts in the field of energy and energy education. Over the years the Utah Energy Office developed these skills and expertise utilizing such sources as NREL experts for training sessions through conferences and workshops. All of the training was provided or influenced by SEP.

Because of SEP funding, Utah has been able to provide workshops, hold training sessions, provide information to consumers via telephone and on the internet. The Utah Energy Office does presentations to groups on energy efficiency and weatherization energy efficiency improvement measures. The Utah office also provides energy efficiency education to schools through a K-12 program. There is a specific program directed at state government employees called Think Energy designed to get state employees to cut energy consumption in state office buildings and in their homes.

Summary of SEP Effects on Current Capacity

Interviewees report that if it were not for the SEP funding, Utah would not have developed these programs, skills or expertise. The SEP training and development of expertise was directly responsible for the success enjoyed by the Utah programs.

Summary of Readiness for the Future
Utah's Energy Office has established a base of skills and expertise so that Utah can build on the base developed through SEP for future programs available from federal funds such as ARRA. These resources will be used to provide training and information to consumers through sports sessions and other linkages. This program will involve a "green team" that will do presentations at basketball, soccer, baseball and other sports events. These educational programs will coordinate with the utilities in Utah to provide linkages between interested parties.

VERMONT: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity
The Vermont Energy Office was funded directly by SEP. However, this funding has been substantially reduced in recent years, impacting both programs and capacity.

Vermont's interviewed experts report that if it were not for the SEP funding, Vermont would have had few energy efficiency information and education programs. The energy office would have concentrated primarily on regulatory efforts. SEP funds provided for the development of the knowledge and skills in the energy efficiency area. The SEP funds allowed the development of expertise on how to get information to consumers. It was through the use of SEP funds that the energy office developed newsletters on energy efficiency, was able disseminate information, and develop, provide and distribute Press Releases on energy efficiency topics.

The Vermont Energy Education Program (VEEP) was a very successful program for the distribution and information on energy efficiency to schools and to the general public. A particularly successful program was staff visitation to schools and the development and delivery of a K-12 program. The loss of SEP funding will severely limit these programs in future years. If energy efficiency information and education is to continue in Vermont, many of these programs will have to transfer over to Efficiency Vermont and the Vermont utilities or find other funding to support these efforts. However, managers report that the high level of training and development of expertise in energy efficiency information was directly responsible for all of the success enjoyed by the Vermont programs.

Summary of SEP Effects on Current Capacity

Vermont's Energy Office, via SEP funding, has established a base of information and education delivery skills and expertise and has the skills and expertise to provide a wide range of information services. The state has provided energy newsletters and outreach efforts to schools and to the public. However, since the reduction in SEP funds, the Vermont Energy Office has had to stop the use of newsletters that reached a wide range of consumers, and recently has had to stop their outreach to schools. Their current informational activities are presently confined to the posting of energy efficiency information on a website.

Summary of Readiness for the Future

Since the reduction in SEP funds, the Vermont Energy Office's current and future energy efficiency information and education activities will be limited to postings on its website. The skill base remains and other outreach could potentially be reinvigorated, but there are no plans to expand into other informational or educational initiatives in the foreseeable future. The state is considering its plans and options for ARRA, but at the time of this interview these had not been finalized.

WYOMING: ENERGY INFORMATION TO THE PUBLIC

Historic Development of State Capacity

SEP funding provided Wyoming with energy efficiency and renewable energy training opportunities that enabled the state to develop and provide reliable, accurate information to the state's citizens. This training primarily targeted key decision-makers within the state's schools and other public buildings. Energy education training has been provided each month within different areas around the state. The statewide School Facilities Commission was trained to provide training to all of the key personnel within the state's educational facilities. Although the training was targeted at decision-makers within school facilities, the training was expanded to include both the private and public sectors. This training covered a wide range of equipment operations and control systems, including the use of daylighting as well as the use of wind and geothermal energy systems. In addition, training is provided for LEED certification, understanding total building energy-related operations costs and how to reduce energy consumption and costs through the use of new technologies and improved systems and system controls. Training on energy efficient building operations is provided to building facilities managers responsible for buildings operations and energy costs. The training is designed to

cover a broad spectrum of market actors so that the expertise can be maintained as people change jobs and assume new responsibilities.

One of the SEP educational programs trains people on how to perform energy audits, and how to implement measures identified in the audit. This successful program established a skill level sufficient to assure reliable savings estimates. Another successful program was the Roping the Wind program. The Roping the Wind program is an annual training event (ropingthewind.org) for Wyoming citizens. Wyoming also has an SEP-supported Big Wind program for large-scale farm businesses and a Little Wind program for residential-scale installations. These programs provide training, technical assistance and support services made available through conferences, seminars, training and education. Wyoming also has SEP-funding conferences targeted the legal profession so they could learn about legal issues and help facilitate the installation of wind generation facilities without unnecessary legal roadblocks. Other assistance is provided to obtain LEED certification for liberties and schools. The energy office showcased these buildings to the public as energy efficient examples in an effort to bring energy efficiency concepts into the market place.

According to SEP managers, Wyoming also has a strong effort to implement energy service performance contracting (ESPC) into the schools and public buildings sectors. The energy office was the change agent that led to the incorporation of ESPC in Wyoming and its adoption across the state as a valid and reliable way to achieve energy and cost savings. The focus on the education sector has resulted in making schools and school buildings more efficient and 22 new facilities were built to very high efficiency standards.

Through the use of SEP funds, the energy office was able to hire trainers to develop expertise in energy efficient controls and control systems for HVAC systems and for renewable energy systems, including their installation, use and maintenance.

Summary of SEP Effects on Current Capacity

According to interviewed managers, without the availability of SEP funds Wyoming would not have been able to develop a wide range of expertise in energy efficiency assessments and there would not be the strong focus on energy efficiency that is prevalent across the state today. Managers report that without SEP to assess and encourage and provide oversight to ESPC projects, the state would not have moved in this direction and there would be no state public sector ESPC projects.

Summary of Readiness for the Future

According to the interviewed managers, the SEP-funded initiatives provided the knowledge, skills and expertise across a wide range of energy technologies and control system that is now allowing the state to plan future initiatives that are based on their SEP acquired expertise. Managers report that it was the SEP efforts that have provided and that continue to provide the foundation on which most energy efficiency initiatives influenced by the state's energy office are based. It has been the energy efficiency and renewable energy knowledge foundation for the state of Wyoming and has established the platform for future efforts.

FINANCIAL SUPPORT SERVICES

ARIZONA: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity
Interviewees report that there were two forms of SEP-funded financial support services provided from Arizona's state energy office. First, a loan program for non-governmental buildings uses SEP funds for a revolving energy loan approach to energy efficiency. According to SEP managers, Arizona had to terminate this program due to SEP and other budget cuts. However, with the embedded capacity in the state energy office managers report that it can be reestablished if new funds became available.

In addition to the loan programs, there were two separate grants programs for communities with populations greater than or less than 70,000. The grant amounts were approximately $15,000 per year covering 10 to 20 grants. SEP and the associated PVE funds provided the resources needed to establish these programs and pay for the program's support staff who managed and tracked the grant disbursements. The support staff went to workshops to gain knowledge and develop program and financial expertise, and Arizona's energy office provided cross training for other staff to help support the efforts. The SEP funds also increased Arizona's ability to manage these programs by gaining expertise on the use of financial tracking software and allowed the state energy office to build financial support skills and expertise.

Summary of SEP Effects on Current Capacity
According to SEP managers, without the availability of SEP financial support, Arizona's current projects as well as its past initiatives in these areas would not be possible. SEP directly supports staff positions, training and other expertise development activities, as well as programmatic development.

Summary of Readiness for the Future
According to Arizona SEP managers, the experience gained in the development and implementation of energy efficiency projects for schools, state buildings, agriculture, and renewable energy programs can be directly transferred to design, develop, initiate and implement new programs funded through new sources of funding such as the new ARRA-funded programs. The programs Arizona is now looking to go forward with are grounded on the SEP foundation that the state's energy office has established over the history of SEP.

CALIFORNIA: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity
The SEP, PVE[6] and ICP[7] funded California Schools and Hospitals program was the first program in California that offered energy efficiency loans to participants. Interviewed managers

[6] PVE: Petroleum Violation Escrow, administered through the USDOE SEP office
[7] Institutional Conservation Program administered through the USDOE SEP office

report that this SEP-funded program set the foundation for offering financial support for energy efficiency improvements in California that other efforts followed. They report it was the SEP program that provided the experience and expertise needed to be comfortable with and reliably offer energy project related financial support services in the state. This program offered non-secured loans to cover energy efficient retrofits and new construction projects that reduced energy use in the state. The loan payments were to be used to pay back the loans and generate a financing stream for future projects. The program's staff provided engineering and financial analysis, energy audits, and architectural design services to help participants understand what changes could be made while saving enough money to pay back the loan and provide a positive cash flow to the participant. SEP funding covered the cost to fund program staff to assess the savings for small projects and to contract advanced audits and assessments for large complex projects. The loans were structured to not start the pay back stream for six months after approval to allow the project to be completed and to start the participants into a positive cash flow position. The project proved successful enough that it was expanded to include renewable energy and distributed generation projects.

Interviewed managers report that their program has become so successful at providing loans for energy efficiency projects and obtaining the loan payments that their bonding ability now allows 3 to 4 dollars of loans for each dollar of SEP and other funds received. That is, the bonding authorities, considering the risks of payments and the history of performance, are providing a funding stream able to capture 3 to 4 times the energy savings and carbon reductions than what could be acquired by waiting for loans to be repaid before additional loans are issued.

Managers report that while the amount of SEP dollars placed into the program are small, and help assess the projects ability to save energy and return a positive cash flow, these aspects are important for the program. Managers noted that without the SEP acquired ability and tools to assess and approve projects and the financial support for distributing loans, it would be difficult to approve the amount of loans provided. That is, while SEP is a small contributor to the total program and funding stream, it is an important part of the program management and operational processes and progress. These same managers reported that the SEP funds were used to establish the program and the project assessment and financial management and monitoring approaches while the SEP-PVE funds were used to fund or increase the amount of funds going out as loans. Managers' report that it was the success provided through these efforts that were used to successfully argue for increased funding from the state of California, expanding the program's impacts. They note that all of the management and staff used to build, staff and support this program were SEP funded, and they attribute the success of the program to SEP. Managers report that without the SEP funding steams they do not think that the current expanded loan program would have been approved. They note that it was the addition of the SEP-PVE fund, added to the ICP funds and program processes that built their financing programs and got them working well for over 30 years.

Managers report that the SEP funds allowed them to acquire loan analysis expertise, auditing and technology assessment skills, engineering and performance assessment skills, bonding expertise, build trade ally relationships that were able to help stabilize and grow the program. In addition, they were able to acquire financial and financial risk analysis skills, as well as the skills needed to convince participants, policymakers and stakeholders that the programs could work.

California managers view the SEP-initiated financing program as their shining star that significantly increased energy savings. Managers credited the flexibility of the SEP funds and the ability to match funds with project financing opportunities as contributing to this success.

The interviewed managers reported that they have also learned some unexpected things from the program. Specifically they learned that in some cases free services are not valued as much as services that participants have to pay for; they learned that it is better to go after bigger comprehensive projects with large paybacks rather than a greater number of small projects; they learned to obtain financial commitments from participants before going too far down the planning road so that projects are successful and get past the planning process, and they learned that projects that have up-front buy in from management and a commitment of resources progress much faster than others. The managers attribute the learning of these lessons to SEP.

Summary of SEP Effects on Current Capacity

The interviewed managers asserted that the financing program would not have been implemented without the SEP funding that allowed the staffing and loan efforts to be implemented. Managers reported that it was these SEP initiatives that launched California's energy efficient financing programs and enabled the addition of state funds to grow the program. One manager noted that "SEP built the road we traveled with these programs; without the SEP road we could not have gone down it." These managers noted that without SEP, California would be implementing only grants, codes and standards programs.

Summary of Readiness for the Future

Managers report that because of SEP and the experience and expanded capabilities provided by adding additional resources, they are now ready to expand the program and increase energy savings and carbon reductions. This program has set the platform for operating effective financing programs and California is modeling the ARRA financing initiatives from the experience and processes developed from the early financing programs. The process and the success of this process is allowing California to distribute ARRA funds in a way that rapid savings are being achieved from projects that are rapidly being implemented. California has already committed ARRA funds to new projects and is among the first in the United States to move ARRA funds into new savings initiatives because of the platform established by the past programs. Without the SEP financing program and the experienced gained from expansions to this program the managers report that they would be less able to carry out an expanded and more complex financing programs through ARRA. At the time of the interview $25 million in ARRA funds have been allocated to new projects based on the SEP-funded experience. California has used it extensive experience to finance energy efficiency project using revenue bonds and has developed a level of expertise and financial performance through energy efficiency financing that California is able to acquire large bonds capable of supporting several millions of dollars in multiple projects that provide a positive revenue stream to participants while paying back the loans. SEP set the stage for these accomplishments.

FLORIDA: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity
Managers report that Florida has developed a number of initiatives in this area. Prior to 2004, all of Floridian's capacity in this area was developed from SEP and related DOE funding. Among these initiatives, Florida offers rebates and grant incentives, which are 90% influenced by SEP. These rebates and incentives reach various sectors, including the alternative fuels, agriculture, hotels/motels, land use planning, transportation, buildings, and education.

One focus has been Florida's Institutional Conservation Program (ICP) targeting schools and not-for-profit hospitals. They have provided grants in 67 counties for schools and not-for-profit hospitals that have improved energy efficiency. Florida has provided $20-30 million yearly into these programs, supported by SEP/ICP and other funds.

The solar rebate program has provided rebates for both residential solar water heaters and photovoltaic (PV) solar. Florida has also offered tax incentives and SEP staff have assisted with these programs. They have also supported tax incentives for biofuels. Florida's alternative fuels program focuses on conversion to compressed natural gas (CNG) partnerships with local governments to convert to liquefied natural gas (LNG). The CNG program was cited by one state expert as a particular success. Florida's CNG fueling program currently serves police departments and municipal fleets. Florida also developed financial decision support tools that local governments can use to better understand potential savings, and what it would cost (e.g., for performance contracting).

Summary of SEP Effects on Current Capacity
Prior to 2004, no general revenue dollars were used in the energy office. SEP and similar DOE funding provided the foundation for everything developed and implemented by the state energy office.

Summary of Readiness for the Future
Past SEP support has built the current capacity and directly assisted in developing programs that Florida now has the in-house capacity to run. It also provided the capacity and infrastructure to facilitate implementation of ARRA and other future programs.

MINNESOTA: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity
Minnesota managers report that they have used their SEP funds to develop, manage and implement a technical support initiative linked to a loan component that helped improved the energy efficiency of public buildings. The loan program was developed and managed by SEP staff using SEP funds to design, manage and operate the program, and PVE funds to help write-down the value of the loans so that public buildings could be retrofitted with energy saving technologies. Manager's report that their program helped them acquire the knowledge and

expertise to understand public building retrofit decision making, financing and budgeting requirements, payback needs and helped them better understand how to tailor technical assistance services linked to a funding mechanism that together help reduce the costs of the loan and the associated payback to capture the install decision and to acquire the energy savings and the associated carbon reductions. It also helped them understand program participation barriers, lease and financing options and improved their ability to design financing services.

Summary of SEP Effects on Current Capacity

Managers report that the effort was an SEP-funded program, and that the coordinated multi-SEP funding sources allowed them to offer the program and the financing support service. The program ran for 20 years, but has been discontinued due to budget constraints and competing demand for other energy services.

Summary of Readiness for the Future

The experience gained from the financing service has allowed the state energy office to plan for future initiatives with alternate funding mechanisms as new resources from ARRA or other sources become available. They note that they now have the ability and expertise to design and offer financing and financial support services and programs as a result of their experience with this program and other SEP programs and projects.

MONTANA: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity

Montana's state buildings program started with PVE stripper funds in 1989. Those funds were also used to establish a bond program to renovate Montana's state buildings. The departments then repaid the bonds from their energy savings to continue renovating more buildings. In 2007, Montana used general funds to help improve their bond ratings. They also had oil and gas funds (exporter), so they did more drilling and pumping and received more funds that could go for energy efficiency improvement. According to the interviewed experts, SEP was the bedrock for all of these achievements. These initiatives continue today, and the energy office plans to do more in the next two years (with ARRA funds) as they have done over the past 18 years.

The second major financing initiative is Montana's alternative energy loan program. Using SEP staff expertise, Montana uses their air quality violation funds and loans these funds to consumers and businesses for renewable energy projects, up to $40,000 per loan. The office has provided over 100 loans, which, according to the Montana experts, is a significant accomplishment for a small state. The office now wants to expand this program because loan demand is outstripping available funds. Thus far they report distributing $3 million, with an additional $1.5 million from ARRA expected to be loaned within six months. SEP managers are used in two ways. First, the managers take applications and deal with the banking contractors. Second, SEP technical managers review the renewable energy systems for technical aspects to make sure it will work as expected.

For both of the programs above, state managers had to go to the state legislature to gain approval. SEP policy managers helped craft the legislation and testified before the legislature.

Additionally, Montana's Climate Change Action Plan was based on their SEP-acquired knowledge and capability. The Action Plan was accepted in a large part because of this expertise and their ability to plan for the state's energy efficiency and renewable energy needs.

Montana also has a Green and Clean energy tax credit program. The governor started tax credits for a wide range of green energy and non-polluting initiatives. SEP managers played a central part in writing the bill for the governor and helping to get it passed. This stimulated cleaner energy initiatives and enabled installation of new power lines that helped reduce energy. Montana also had energy efficiency tax credit rules, which relied on SEP staff to specify what qualifies for tax credits (examples include levels of insulation, window type, furnace efficiency levels, sheeting and infiltration materials, etc.).

Montana reports that they have gained considerable capacity because of SEP. They have built an array of skills, including engineering, economic analysis, cost effectiveness analysis, marketing, administrative, organizational, and management skills, and more. All of their skills, expertise, and programmatic capacity was built on SEP. One state expert notes that SEP has enabled them to sustain continuity of progress, which now helps them keep costs low because this foundation helps them operate more efficiently today. They also report that they are able to employ people not only in their office, but also in the offices that support implementation efforts.

One state expert particularly emphasized the value of the engineer and cost effectiveness analysis skills. As that person put it: "The engineering analysis needs to be good. If you get this right, then it works well. We got this right. It allowed us to look at the cost of doing nothing and not moving forward. This was a very good strategy and they saw the increase in state costs [that doing nothing would have brought]." For instance, in the long run, state building programs would have cost more, saved less energy, and produced more carbon.

When asked about constraints or limitations for existing programs, one state expert noted that they would like to invest money faster, but have had to move slowly with bond spending in order to maintain a positive cash flow. They have had to do projects more slowly than they would have liked. They have had to slow processes, from the audit through the design and implementation phases, because of bond spending limitations and the need to pay back the funds. Nonetheless, even with this constraint, managers report that the program has been successful.

Summary of SEP Effects on Current Capacity

Interviewees report that SEP has been the sole or primary driver for all of Montana's programs. The recently developed Climate Change Action Plan was based on SEP-supported expertise. Montana's governor and the President met and agreed on the action plan, and that helped them gain federal support. The state's targeted need areas include schools and main street businesses. SEP has given them the expertise to address those areas, but funding limits have thus far not allowed them to fill this particular need.

Summary of Readiness for the Future
SEP established the infrastructure, expertise, and skills capacity to address future energy efficiency initiatives, including ARRA. While ARRA will help fill some short term funding gaps, further support will be needed to meet the anticipated future needs.

OREGON: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity
According to the interviewees, the Oregon state energy office has a long and established SEP-funded history of providing financial support initiatives for its citizens that stretches over 30 years starting in the 1970s. The state energy office has used its SEP funds to enact both residential and business energy tax credits for the installation of energy efficient measures and more recently for hybrid electric vehicles. Tax credits have gone from 1,000 per year to now over 50,000 per year acquiring substantial energy efficiency improvements and carbon emissions reductions. These credits cover a wide range of residential energy efficiency technologies that are proven energy savers. In addition to residential appliances and technologies that are above Energy Star standards, these credits also include new and innovated – but market proven measures such as duct sealing, hybrid and plug-in vehicles, wind energy power systems and geothermal heating systems. According to the interviewed managers these initiatives were developed, managed, staffed and implemented using SEP funds.

In addition, SEP funds are used to train and certify contractors to specify and install energy efficiency upgrades and retrofits in the state. And the office provides outreach and information programs to let people know of the state tax credits, the technologies and improvements that qualify, the people who are certified to make those improvements. It is a comprehensive coordinated approach. It is also one of the best-known programs both in the state and nationally because of its ability to save energy and reduce carbon emissions. It is an SEP product according to the interviewed experts responsible for these initiatives.

The SEP-funded staff researched the technologies to make sure that they are energy saving so that they can be assured of their efficient performance and incorporated into the initiative. Managers report they determine what to include in the tax rebates, when to include it, and when to end it. The program tracks all tax incentives received, what was acquired, and estimates the energy savings and carbon reduction achieved. They continually examine the technologies to make sure they are specifying the right technology from a savings perspective but also from a reliability perspective. According to Oregon managers this effort has outperformed most all other states in the ability to move energy efficient purchases in the market other than the use of mandatory codes or standards.

These efforts have also placed the energy office in the position of being requested to advise other states and organization on which technologies work and which do not. They are also asked to share their tax incentive approach and the SEP-funded responsibilities that make this work with other states considering similar efforts. These managers also report that because Oregon is out in front of most other states, leading the energy efficient market adoption movement, they are also

spurring market adoption beyond Oregon as other individuals and organizations take the same actions. They also report that their efforts, which have won them international recognition, have earned them a place at the national appliance standards development table. That is, Oregon's SEP efforts are now influencing national appliance standards. The recent availability of ARRA funding is now allowing Oregon to move these same technologies into the low income and public building sectors as well. Managers also note that their experience with energy savings technologies and the experience of their population have enabled the state energy office to move several of these technologies into the state building codes and appliance standards significantly multiplying the energy savings and carbon reductions.

Managers report developing a significant staff expertise and associated skills, including; performance analysis skills, physical application and thermodynamic analysis skills, engineering and mechanical system skills, training and educational enhancement skills, application processing skills, understanding of the state's tax laws, skills pertaining to changing codes and standards and market influence skills, database development and management skills, performance reporting expertise, policy and legislative development skills and other skills necessary to effectively manage the program. Managers report that to implement the program they have also needed to learn to network and establish relationships with appliance dealers, retailers, and market actors. They have had to work with the market actors to get Oregon labels put on the applicable appliances because these have to perform above Energy Star levels which are not considered energy efficient enough on their own, to quality for the Oregon tax incentive. Oregon has moved beyond Energy Star in order to push the market to be more efficient.

Managers also indicated that the program has helped them learn valuable lessons. They were not prepared for the large volumes of people who wanted to participate and were not ready for the popularity of the program from the Oregon citizens. They needed to hire temporary staff to handle the flood of applications that came in and set up more efficient management and tracking system. They also learned that some technologies may be too complicated for people to understand and follow needed guidelines. They noted that duct sealing and heat pumps are technologies that may or may not save energy (depending on specific installation conditions) and people may not be informed enough to know when they need to seal ducts or convert to a heat pump.

Summary of SEP Effects on Current Capacity

The interviewed managers report that the Oregon tax incentive program is an SEP developed program. While multiple funding sources are used, the program is designed, staffed, managed, processes, and tracked using SEP funds. Without SEP funding managers report that they would not have the funds to run this program. They report that with the ARRA funds from SEP they are able to expand their initiatives and go deeper and farther than without them and if SEP were removed they do not know if or how the program would survive.

Summary of Readiness for the Future

The Oregon managers report that the SEP funds provided the resources to establish and operate the program, but also established the foundation of expertise to be able to ramp-up the program for ARRA and for when other funding sources are available. They report that they now have the skills and partnerships and relationships and trust to move up to the next level and were able to

respond to ARRA initiative requirements rapidly and with confidence in the ability to achieve the national objectives. The SEP programs built this capacity.

SOUTH CAROLINA: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity

SEP support has directly enabled South Carolina to develop a significant portfolio of loan and grant programs that stimulate improvements in energy efficiency and renewable energy. Many of those target state agencies, local governments and school districts, although some have been for private industry. The primary focus has been on increasing capacity rather than one-time improvements.

Many different programs were successfully developed from SEP support. One capacity building approach was a grant with a university to develop an intermodal transportation system (sea, rail, truck, etc.). There has also been significant grant work with Clemson University in the agriculture area, e.g., supporting technical assistance with farm machinery (especially tractors), poultry and swine farms (barns and handling waste), and conservation tillage equipment loaning.

Special projects grants have supported building codes. That has included recommending improvements and providing training. South Carolina has also offered industrial assessment and technical grants. A sales tax credit for manufactured housing was initiated in 1992. A rebate program was also developed for residential installation of solar water heating.

A lighting efficiency grant program for schools is targeted to low-income districts, and offers financial support for improvements and provides auditors. This was cited as a particularly successful program. Another high impact program has been the use of recycling grants. Essentially, this is a major competitive grant program created to help local governments develop both recycling capacity and waste-to-energy initiatives. Additionally, energy accounting has been a high impact area with school districts, state agencies and universities.

South Carolina has had a successful loan program for state agencies, local governments, non-profit organizations and schools. A second loan program had been developed for private businesses targeting energy efficiency and renewable energy development, but was not as successful and was discontinued a short time later. The private industry loan program would need a different structure and more staff time to work better, but South Carolina has chosen not to pursue that further. More successful initiatives involving industry and the private sector include South Carolina’s Biomass Council and their Solar Council. The Clean Cities program has also helped considerably. One key result of these initiatives was the further development of staff expertise, which in turn improved the state’s future capacity in these areas.

Many of the programs and initiatives that South Carolina developed originated from what they learned from other states at national conferences. SEP support was instrumental in making this possible because there was no state-level funding available for such activities. An additional advantage of SEP support in the absence of state funding was that the state often gave this office the flexibility to pursue whatever their energy staff thought was best.

Summary of SEP Effects on Current Capacity

SEP support enabled South Carolina to steadily build its programs and staff expertise. That core continuity, despite significant SEP fluctuations over the years, was essential to progress. According to the interviewees, "SEP has had a huge impact. In fact, without SEP, all of these initiatives would not have gotten significantly off the ground, and most or all of South Carolina's initiatives would not exist today."

Summary of Readiness for the Future

SEP has positioned South Carolina to utilize the state energy office's expertise to more effectively take advantage of ARRA stimulus support and other initiatives. Managers report South Carolina utilized the expertise it developed from those loan programs to design ARRA stimulus programs that build on those foundations. If it did not have the SEP experience, South Carolina could not have acted as quick and as responsively to ARRA. Managers report that South Carolina's long-term future progress is directly tied to continuing future SEP support levels.

TEXAS: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity

Texas has used SEP funds to set up, manage and operate one of the best performing energy efficient loan programs in the United States. The Texas Loan Star Program started as a small demonstration program using SEP and PVE dollars to get the effort launched and tested. This program makes energy efficient project loans to public institutions in Texas, including local governments, schools, and others. The program charges 3% interests and is able to increase the amount of capital loans as the loans are repaid. The loans are made to projects that have a 10 year or less payback, and have average loans for projects that pay back over 5.7 years counting only the energy savings (rather than total savings) as the return on the investment. The program and the loans are required to be cash positive for the local governments so that they are always in a position to be saving more than the cost of the loan, providing a net positive return to the local government for each month of the loan over the loan period. The managers report that they have never had a bad loan. The loan can cover new equipment, equipment controls or new construction that is energy efficient beyond standard practices.

This program has now operated for 20 years and has processes over 200 loans and currently has active loans totaling $126 million dollars from an initial investment of $95 million in PVE seed funding provided by the USDOE SEP office. As the loaned funds are paid back, they are re-loaned to accomplish additional energy savings and carbon reductions. The program is now self-supporting and has loaned out a total of $286 million in energy efficiency improvements over the 20 year life of the program. Managers report that this is a shining star SEP program.

The interviewees reported that they have learned several key lessons for success from this program including: to define the payment amount and approach very clearly so that there are no disagreement on the loan payments; require a performance bond for the loan payment to assure

payments over the life of the loan; clearly define the payment dates including the date for the first and last payment and all payments in-between; set a policy for who gets loans and new loans in what order as the payments are returned so that the new loan approvals and distributions are established clear policy; define the payback period for each piece of equipment or change so that all parts of the project have program-compliant payback periods; require that all equipment and changes have a positive cash flow over the life of the loan and over the effective useful life of the equipment so that the loan is paid before the equipment is replaced.

Managers report that they have been able to acquire and build the skills needed to successfully operate the program. They indicated that they have expert skills in a number of areas that were acquired via SEP support, including; technology assessments, energy savings analysis, engineering expertise, procurement expertise, demand savings analysis, control systems and system configuration, contract management skills, loan and loan processing and payment tracking skills, financial and technical risk analysis skills, evaluation and project metering, monitoring and verification skills, partnership relation building skills, technology performance and reliability knowledge, cost effectiveness and net savings assessment skills and other areas of expertise building.

Summary of SEP Effects on Current Capacity

The Texas managers were very clear on the influence of SEP on this program. They state that this program would not have existed without the SEP dollars to design, manage and support the effort, and the PVE dollars needed to seed the launch of the programs and acquire the first loans. They state that this shining star program would not have occurred without the SEP funding sources. They note that Texas would not have put up the $95 million dollars to launch an energy efficiency loan program to governmental organizations.

Summary of Readiness for the Future

Managers report that they have established a model approach for loan programs and have the skills and expertise to implement it well. They are already supplementing the program with ARRA funds to expand the program's reach and impacts. They are ready to grow the program because of the SEP-acquired expertise and experience. The program is serving as the launch platform for a $100 million expansion from ARRA, and they have the capacity to grow more should additional funding be available.

UTAH: FINANCIAL SUPPORT SERVICES

Historic Development of State Capacity

Interviewees report that SEP provided the foundation for Utah's energy efficiency programs. SEP funding provided the training to develop experts with energy auditing skills and with expertise in energy and energy efficiency. These experts developed skill in performing net present value analysis and determining pay back periods for energy efficiency and renewable energy programs. The training led to the development of experts who could provide the information that people needed to make decisions and provide the technical knowledge concerning what would work and what would not work. Design assistance and technical assistance are also available from the energy office.

Some of the specific programs Utah developed were grant and loan programs for local government and schools. These were very successful for those that chose to participate. Grant programs have been more successful in Utah than loan programs. Managers in that state report that grants are easy to administer, implement and report that they work well and achieve energy objectives. Grant programs are particularly well for units of local government and for non-profit organizations.

However, the loan program encountered difficulties with local schools being reluctant to go into debt and the program encountered implementation problems when testing the use of commercial energy efficient loans. Utah does not currently offer an energy efficiency loan programs.

Summary of SEP Effects on Current Capacity

Utah currently concentrates on grant programs and providing technical and design assistance. Managers note that these initiatives, but successful and less than successful are SEP supported projects that would not have occurred without SEP.

Summary of Readiness for the Future

Managers report that they are ready for future financing programs as new funds are acquired. Future efforts in this areas are planned to focus on state owned buildings and schools through its grant services program.

TECHNICAL ASSISTANCE SERVICES

CONNECTICUT: TECHNICAL ASSISTANCE SERVICES

Historic Development of State Capacity

Connecticut's energy office has provided technical assistance through it SEP supported office and via the Rebuild America program. The SEP office brought in experts from the Rebuild America team to promote high performance schools. The program provided energy audits, coupled with technical advice and equipment recommendations, to municipalities. These services identified technical opportunities in government and school buildings that when implemented would save them energy and operational costs. The office also had a program for state government buildings that provided energy assessments and technical assistance to up-grade equipment and provide access to financial resources to accomplish those actions. According to the interviewed managers, the most successful technical assistance programs provided by Connecticut's energy office has been the Rebuild America Program and providing Builder Operator Certification training. However, SEP managers report that successes have been limited due to limitations on funding. The Rebuild America Program provides audits and technical recommendations to a wide range of clients enabling them to upgrade to higher efficiency equipment. The Builder Operator Certification training provides hand-on classroom training to

building owners and operators so that they have the skills and knowledge to operate their buildings efficiently.

Connecticut has relied on SEP resources to design and deliver the office's technical assistance services. However, when the SEP funding resources declined, Connecticut was forced to reduce the availability of these services. Connecticut has been able to retain some of the skills necessary for the delivery of technical assistance services and is able to reestablish these programs if additional funding becomes available. The managers report that the state is not likely to devote resources to these efforts on its own, leaving these services to rely on future funding to be offered.

Managers report that Connecticut's energy office built its expertise utilizing SEP funds. SEP provided the funds and opportunities to bring experts to Connecticut, train staff and facilitate technical service expertise and team building. SEP was responsible for Connecticut's ability to assemble a staff with the necessary expertise and skill level to offer technical assistance services. PVE funds provided the carrot to attract and acquire staff; SEP provided the funds to train them. The state's energy office was able to obtain an expert staff, including some with an engineering background who were building equipment and operations experts. The office developed a staff with a wide range of expertise in energy efficiency, renewable energy technology, solar energy, alternative fuels vehicles, energy efficiency retrofits for institutional buildings and staff with expertise in grants management and administration. As SEP funding levels declined, much of the expertise was lost as they moved on to other employment.

Summary of SEP Effects on Current Capacity

Managers report that without the availability of SEP funds, Connecticut's energy office would not have existed. The office has been able to retain expertise in providing technical assistance based on skills developed in delivering high performance buildings. This expertise is available for a wide range of energy efficiency and renewable energy technology programs. However, with declining funding levels, the role of the energy office has diminished. The availability of SEP funds allowed the state to provide additional funds to these efforts through Connecticut's in-kind matching funds, however these funds relied on SEP to maintain the basic services.

Summary of Readiness for the Future

The technical assistance expertise developed by SEP provides the opportunity to reinvigorate programs and to move forward if sufficient funds become available. Managers report that Connecticut has been slow to move forward with ARRA funding because of the administrative requirements associated with these funds and uncertainties about how these can be provided. However, the expertise developed through the availability of SEP funds has enabled the state's energy office to move forward with the management of ARRA grants. The interviewed managers report that it was the SEP-funded state energy office that was able to move forward with ARRA planning to the extent that their remaining level of expertise permitted. In these planning efforts, various past initiatives have been reviewed and the programs that are considered especially productive have been identified so that future ARRA or other efforts can be focused on programs that are known to work.

ILLINOIS: TECHNICAL ASSISTANCE SERVICES

Historic Development of State Capacity

Illinois reports a strong history in providing technical assistance to its citizens that goes back to the start of the office in the 1970's under the SECP Act. Technical assistances services have had a long and productive history in Illinois. However, since 2003 Illinois has offered a wide range of technical support to its citizens. Managers note that SEP has funded design assistance services to architects and building designers through the Illinois Design Assistance Program headquartered at the University of Illinois. This program advises and assists building specifiers in designing energy efficient and green buildings such as LEED certified structures. The focus on this service is on energy efficiency.

SEP-funded assistances is also provided to the utilities and the public utility commission for the development and operations of the state's utility-provided public benefits portfolio of energy efficiency programs. The state energy office provides oversight and guidance to these efforts based on the office's 35 plus years of program implementation experience. The state energy office was directly involved in establishing the legislation for the public utility portfolios and in helping to set the budgets for these programs, "bringing Illinois from 49th in the United States for per capita energy efficiency spending to 5th in the United States." According to the interviewed managers, the SEP funds were and continue to be instrumental in this technical assistance.

Illinois also offers SEP-funded Building Operator Certification training. This award-winning program trains building owners and operators on how to operate their building to use less energy. This program offers advanced training to building operators and covers a wide range of building technologies and energy management system. Training is also provided to code enforcement officials and builders on how to build to meet the state's building codes. The SEP-funded training helped to allow the building industry to understand the codes and to be able to build to their specifications. It also helped local officials understand how to monitor and test for compliance and to understand cost effective ways to check for compliance. According to the interviewed managers, this training was critical to the process of moving the codes from being out-dated voluntary codes to mandatory energy efficient codes, with reduced the resistance to the code change obtained by educating stakeholders how to meet the code. Managers report that it was the SEP-funded efforts that worked with the Governor's office and the state legislature to have both the residential and non-residential building codes become mandatory statewide codes. Managers report that while the codes are focused on energy efficiency, they are also non-restrictive for higher level local codes. The new state code sets the minimum foundation for energy efficiency and allows local jurisdictions to go beyond the state code to higher levels of efficiency. The office now works directly with local governmental units to educated, train and push for the adoption of stronger energy efficiency codes.

The SEP-funded effort were also instrumental in working with the Governor's office to issues an executive order requiring all new state buildings to be LEED silver or better, essentially establishing a higher efficiency code via executive order. It was the technical support from the state energy office that provided the information needed to decide to issue this order.

Managers note that the SEP-funded Schools and Hospitals program allowed the state to acquire strong engineering and technical assistance capability within the state energy office. This expertise is provided to the education and health services sectors to acquire more energy efficient buildings within these sectors.

The Illinois Industrial Development Center is supported by SEP funds as is the Chicago Energy Resources Center. These organizations provide engineering and energy efficiency support services to a wide range of private, non-profit and public organizations to help increase the energy efficiency of buildings and operational systems. The SEP efforts help fund the engineering support services from these organizations. In addition, the office provides technical assistance for the application of wind energy system and for solar system engineering assistance. These are all support by SEP funds.

The Illinois Lights for Learning program and the K-12 NEED program provide in-classroom educational and training efforts to children so that they can improve the energy efficiency of their homes. Illinois evaluation results document large savings from these efforts.

The interviewed managers report that their state energy office has been able to acquire substantial skills as a result of SEP, these include; energy engineering skills, econometric analysis skills, building simulation and modeling skills, renewable energy assessment and engineering skills, regulatory support and analysis skills, an understanding of public and private sector energy decision making and expert knowledge about energy markets and technologies, education and training skills, materials development expertise, code and code change knowledge, networking and stakeholder alliance building skills, energy auditing skills, evaluation expertise and many additional areas of expertise.

Summary of SEP Effects on Current Capacity

Illinois managers report that without the technical expertise developed under the SEP-funded initiatives they would not have been successful at pushing forward with the state's public benefit funded energy efficiency portfolio, and would not have been successful at making the residential and non-residential building codes mandatory statewide codes. Interviewees noted that it was the managers within the state energy office that successfully brought these initiatives forward. Without these efforts, managers report that the Governor's office and the Legislator would not have supported these changes. They noted that the public benefits portfolio took years of documentation and policy pushing by the SEP managers. They report that there was strong resistance to the code changes and it was only by the support and training offered via the SEP funding that the codes gained enough support to become mandatory. Managers also report the state efforts to push for the executive order for all new buildings to be LEED silver or better came directly from the state energy office as a result of the SEP efforts and staff initiatives.

According to the interviewed managers "Without the SEP and the associated funding sources Illinois would not now have 90% of its programs, practice and energy services or the accomplishments that we have achieved. We would not have filled the gap if these resources were not available. We would have an energy efficiency service vacuum. It was the federal funding that started the office and built the capabilities we have. We would not have an Illinois energy office without this support."

Summary of Readiness for the Future
Because of the foundations of expertise built in Illinois as a result of the funding streams from the SEP, managers report that they are now trained and skilled programs designers, managers and implementers with a high level of expertise across both the energy efficiency and renewable energy fields. Managers report that they were able to rapidly plan for $100 million in new ARRA programs and projects because of the capacity they have acquired. They credit the SEP-funded initiatives and the years of skill and capability building as the primary reason why the state was ready for the ARRA funds and why they are able to offer and help others offer programs. As one manager put it; "because of SEP we were already the experts in the state." They report being ready to do more when additional funding support is available.

MISSISSIPPI: TECHNICAL ASSISTANCE SERVICES

Historic Development of State Capacity
Interviewees report that Mississippi is one of the first states to use SEP funds to help design the HERS rating system in the United States to be used by state energy offices for assessing the energy efficiency needs and saving potential of their residential structures. While a limited focus home rating system was already in development for use by HUD and the large federal lending organizations, that tool focused on incorporating an energy rating into a loan availability calculation, rather than identifying and prioritizing opportunities for improving the energy efficiency of owner-occupied homes via state-offered assessments. The states recognized that an energy auditing tool was needed for their state programs and wanted to have the real estate valuing tool modified to serve as an SEP home assessment tool. To make the real estate valuing tool of value to the state's SEP residential programs, seven states worked with the USDOE, HUD and other organizations to have the tool modified to meet the state-specific needs. According to the interviewed managers involved with those efforts, seven states teamed with the federal agencies and industry support organizations to accomplish that mission. Those states were Alaska, Arkansas, California, Vermont, Virginia, Colorado and Mississippi. These SEP-funded state offices helped to bring the real estate valuing tool up to the needs of the states to become the HERS auditing tool now in use by thousands of auditors working across the country within the majority of the states in the United States. Mississippi and the other five states joined with HUD and USDOE to improve the rating system so that it could be used by trained energy auditors to assess the different levels of energy efficiency under the weather conditions specific to each state or user area. According to interviewed managers, the funding that was used by the states, including Mississippi to support this effort was their SEP funds.

Interviewed managers report that the auditing tool was needed to help identify energy savings opportunities in the state's homes, and allowed their SEP programs to work with a great number of homes to improve their level of energy efficiency. Managers note that HERS is now operating and saving energy in about 40 states and is helping to identify opportunities in thousands of homes a year. This effort has moved to a national rating system with its own network of users and subscribers (see www.natresnet.org). The tool has been improved over the years as a result of user feedback by the state energy offices and other users and the RESNET organization in which the audit tool managed has built a national database of rated homes.

Managers report that this is now one of the most successful technical assistances services provided by SEP programs and other service providers. It is one of the most used energy rating – auditing - benchmarking residential performance analysis tools in the United States. The interviewed managers noted that much of this use and improves has occurred via the state energy offices and the SEP funds that have supported these efforts.

Summary of SEP Effects on Current Capacity

These managers report that without the SEP funds and the SEP staff within these early pioneering states, the states would not have had the ability to join the HERS development team to focus the efforts on state's needs, that brought about the early development the more useful HERS tool, and later the widespread use of the tool. We note that these managers are not saying that they were responsible for the total development of the HERS tool, but do claim to be the pioneering states that saw the value of an audit tool and the states that worked with USDOE, HUD and the supporting organizations and contractors to accomplish this objectives.

Managers noted that while there was a real estate valuing tool in use prior to the SEP involvement, it was the state energy offices funded with SEP funds that helped move the tool to be a successful home rating, auditing and performance assessment tool. These managers noted that without the SEP funds, they would not have been able to contribute to the development of the HERS rating tool. This was a tool in which contributions and support by SEP allowed that tool to become a valued assessment tool across the United States.

Summary of Readiness for the Future

Mississippi reports that the HERS tools, in combination with other tools and expertise is why the state is in a position to go forward with ARRA and other initiatives that can be funded. Managers note that building the kind of capacity to build energy efficiency into a state takes years of developmental work. They note that SEP was and is the developmental tool that Mississippi uses to plan future initiatives and be capable of supporting those initiatives.

SOUTH CAROLINA: TECHNICAL ASSISTANCE SERVICES

Historic Development of State Capacity

South Carolina provides a wide range of energy efficiency technical assistance across numerous projects. They have developed a wide range of knowledge across a wide range of technical issues. Their technical staff includes engineers, and that strong engineering expertise was cited as a particular strength.

South Carolina has developed capacity to do commercial and industrial audits well using in-house staff and contracted auditors. The level of audit activity decreased as SEP funding levels declined, but they anticipate resurgence with ARRA stimulus funds. Assistance to private and public facilities ranges from, for example, doing energy plans for organizations and businesses to prescribing what to install and change. Requests for their assistance now outpace their capacity; however that will be alleviated for at least the short term by ARRA support.

South Carolina also provides technology recommendations and conduct economic analysis, including payback and return on investment (ROI), for the client/customer/organization. South Carolina also responds to over 1,000 technical requests annually received from their website.

The energy audits and analysis programs have both been very successful. South Carolina tracks what is implemented and reports that they have achieved tens of millions of dollars in documented savings. They obtain a commitment from an organization it funds in advance of doing an audit. For instance, if South Carolina pays $3,000 to conduct an energy audit, then the organization must pay $1,500 of that cost. However, if the organization implements the audit's recommendations, then it can recover the $1,500 from the state once the energy efficiency measures have been installed. The analysis that this state's energy office provides regarding energy efficiency investments is a valued service for non-residential organizations.

South Carolina is also very active in providing technical training. This includes training on energy technologies and technical training to acquire green jobs into the market. They formed the South Carolina energy efficiency training collaborative, which includes the state's energy office, the governor's Office of Economic Opportunity, the state technical college system, and the state's Department of Commerce.

Summary of SEP Effects on Current Capacity

Managers report that without SEP support, there would be no state energy office in South Carolina. "All of the energy efficiency technical assistance is attributable to SEP support and would not have happened without SEP." SEP allowed them to acquire staff, train them and offer technical assistance services.

Summary of Readiness for the Future

SEP support enabled South Carolina to steadily build its' staff expertise and services. That core continuity, despite SEP fluctuations over the years, was essential to progress. South Carolina's future progress is directly tied to continuing future SEP support.

UTAH: TECHNICAL ASSISTANCE SERVICES

Historic Development of State Capacity

One of Utah's technical assistance programs is a program that targets services at government buildings, building managers and other decision makers. This program provides technical assistance, information and recommendations on energy efficiency improvements.

Another technical assistance program is the renewable energy program. This program reaches out to a wide variety of residential and non-residential buildings owners and operators, state government facilities and national and state parks. This program offers technical assistance on the type and performance of renewable energy technologies that can work at their facilities.

The skills developed by the Utah Energy Office included auditing skills, and expertise in energy and energy efficiency. Training in the form of technical assistance was obtained through NREL

experts at conferences, workshops and other forms of training. All of the expertise and skills were obtained as a direct result of SEP/PVE funding.

Utilizing SEP funding, Utah is able to provide technical assistance in the K-12 education area, provide energy efficiency documentation and teaching aids for classrooms. Utah has created partnerships with Utah utilities. Utah is also doing residential and non-residential code training and has updated the building code. Utah's energy office also provides support for updating the current code for industry, code officials, and the legislature. This office promotes updating current codes. The office also provides technical support related to energy efficiency for committees of the legislature and for code officials.

Utah has an extensive renewable energy program that gathers statewide wind speed information via a 22-tower network of wind monitors and a loan program for wind speed monitors.

The state's energy office is working with various Utah alternative transportation fuels groups and funds alternative fuels education. These education programs target managers of state and local government vehicle fleets.

Summary of SEP Effects on Current Capacity

It is through SEP funding that Utah has developed its technical assistance programs. Managers report that "SEP/PVE funds allowed all of this to be done." Managers report that when SEP funds were cut and the Utah Energy Office was down to a few people, Utah was able to provide services or direct people to needed services and information. As the Energy Office was reduced in size, the Office continued to provide support and technical assistance. However, managers report that there were difficulties in reacquiring expertise after losses in personnel required as funding was cut.

Summary of Readiness for the Future

Utah's energy office has established a base of skilled staff that is self-sustaining. Utilizing these skills and expertise, the energy office is moving into areas funded through ARRA. Utah will target a few areas and programs that have demonstrated to ability to field good programs. Managers report that SEP built the foundation that makes these efforts possible.

BUILDING RETROFITS AND NEW CONSTRUCTION

ARIZONA: BUILDING RETROFITS AND NEW CONSTRUCTION

Historic Development of State Capacity

In order to illustrate the benefits of energy efficiency for existing buildings, Arizona state government initiated SEP-funded demonstration projects in state government buildings. According to Arizona SEP managers, these projects have demonstrated the effectiveness of energy efficiency technologies in many ways, including: how to identify potential cost saving

projects; how to create energy efficiency specifications; how to implement a project; how to monitor energy savings and document the savings achieved; and how to use information to promote additional projects. Arizona's energy office offers training programs focusing on energy efficiency in buildings through the use of workshops, presentation to various organizations and through working with utilities and with utility programs. SEP-supported workshops are provided to facility managers within Arizona's state agencies, and Arizona used its energy office SEP resources to train personnel to perform energy audits of state facilities and make recommendations for changes or upgrades.

According to SEP managers, this was critical for Arizona because the state energy office was able to get Arizona to pass legislation requiring state government facilities to reduce their energy usage by 15 percent. SEP and the associated PVE funds were used to develop this initiative and push it forward for Arizona's state energy efficiency program. Energy efficiency is now required in state facilities because of what SEP managers were able accomplish. To support these efforts, Arizona's SEP funds were utilized to develop a core of energy service performance contractors (ESPC). The ESPC firms provided the funding to implement projects and the state energy office was able to confirm that the savings could be achieved. According to SEP managers, the state energy office became the independent experts to help decision-makers agree to move forward. After prequalifying ESPC vendors, the state energy office developed a list of prequalified firms that was used by state government facilities. After initial successes, the program was expanded to local governments who use the list of prequalified ESPC vendors. These were all formed and pushed forward with Arizona's SEP program efforts.

Arizona also used SEP-funded efforts to move beyond governmental buildings. In order to enlarge the program delivery, a revolving loan fund was established for non-government buildings. Following this success, the program was expanded to include the installation of renewable energy technologies. The ESPC program was able to continue and expand the service provider base using firms of size varying from 2 to 100 employees. Arizona was then able to build up the state's service delivery infrastructure within the private sector to respond to the state's increased needs. Unfortunately, according to SEP managers, this successful program and the increased energy savings were discontinued when SEP funds were cut. If additional funds become available, this energy services provider program can be restarted and expanded.

During the 1990s, Arizona's energy office had a community energy program that traveled the state doing detailed studies assessing government buildings, analyzing billing data and working with local government personnel. This assistance was provided to local governments when the local government did not have sufficient staff expertise. Currently this local government program is limited to an information-only program, so financial support services are not yet available. This program will be expanded if additional or new funding sources become available.

According to Arizona SEP managers, one of Arizona's most successful SEP-supported programs has been performance contracting. The program enabled Arizona to complete large projects that would otherwise have been impossible to fund. These large projects have been concentrated in the two large state universities. As a result of these programmatic efforts, energy costs have been reduced even as the total number of buildings has increased.

Summary of SEP Effects on Current Capacity

SEP funding has provided the core staff and infrastructure for the development and implementation of current programs. It was the SEP that provided the funds to hire staff and train them in energy efficiency as well as to develop and support other programs in the state. These personnel, trained and funded through SEP funds, formed the core of the Arizona energy office's program design, development and operational services. According to SEP managers, without the long-term availability of SEP/PV funds, the state of Arizona would not have been able to establish and develop the expertise that currently resides in the state's energy office.

Summary of Readiness for the Future

According to Arizona SEP managers, the core staff and program structures developed under SEP funding are providing and will continue to provide for the initiation and ramping up of new programs funded by new funds, such as the ARRA projects, when these new funds become available. The energy expertise of personnel in the state energy office are now providing for the future incorporation of LEED certified buildings into the specifications for new building construction.

Future activities will incorporate informational material already developed and incorporated into ongoing programs but Arizona will expand availability and broaden distribution through the use of the internet and other forms of electronic media while limiting the use of the print media to significantly expand the reach of the energy office. The energy office will provide booklets, articles general information and power point presentations through its website.

CONNECTICUT: BUILDING RETROFITS AND NEW CONSTRUCTION

Historic Development of State Capacity

Managers report that the availability of SEP funds provided the opportunity to gain skills and expertise in the field of energy efficiency for existing buildings. The funds also provided opportunities to provide education in building energy efficiency and hire contractors to complete projects.

The state's energy office became experts on the use of many products available from US DOE. They used Motor Master and software available from Compressed Air Challenge to acquire energy savings. Connecticut developed the skills to implement these software tools and databases. The development of analytic skills, the ability to interact with contractors, grant and administrative skills, how to resolve technical implementation issues and utilizing physical concepts associated with using energy efficient equipment were all obtained through the use of SEP funds.

One of the most successful programs has been in the industrial program using Motor Master. This program and other programs devoted to the assessment of industrial technologies have yielded large impacts. The institutional and commercial buildings grants program (ICP) was a very successful program the yielded lots of energy savings to many organizations. Another

successful program has been Connecticut Climate Change initiatives. These initiatives focus on energy use in buildings and work with other state agencies to address climate change issues.

Connecticut has a focus on state facilities. Emphasis has been on electric measures with particular attention on lighting. Using EXXON and Stripper PVE funds Connecticut has had a focus on heating equipment replacement in K-12 schools. However, the limited funding available has directed the current program to boiler replacement.

Summary of SEP Effects on Current Capacity

Through the expertise developed with the aid of SEP funding Connecticut can deliver energy efficiency programs to the existing buildings sector. Managers report that "one limiting in applying our SEP acquired skills has been in dealing with other state agencies that do not focus on energy efficiency."

Summary of Readiness for the Future

With the experience gained through the Rebuild America Program, ICP and use of PVE funds, Connecticut knows how to move ahead to field programs that will be effective in meeting the challenge of Climate Change. The plan for the future is to direct 40% of the available new funds on energy efficiency projects in state government facilities.

FLORIDA: BUILDING RETROFITS AND NEW CONSTRUCTION

Historic Development of State Capacity

Managers report that part of their building retrofit and new construction expertise includes their involvement in demonstrating how to build to code and through it storm-associated initiatives. In 2008 Florida's energy office was transferred to the Governor's Office (within the Florida Energy & Climate Commission). Prior to that move, SEP staff had a significant role with building codes in the Department of Community Affairs. During these years they worked with the building codes and standards units and the energy centers to apply for building code projects. That enabled them to develop demonstration projects for code changes. They also hired a code change support person to help run these demonstrations. These efforts resulted in code changes for Florida that improved energy efficiency, that were was SEP supported. SEP and block grants will continue to help support future code changes.

Managers report that another building related SEP initiatives used stripper well PVE funds to integrate energy efficiency into the audits of homes being assessed for storm damage or structural integrity so that they could be repaired using more energy efficient approaches. This resulted in energy efficiency improvements within the hazard and mitigation changes occurring about five years ago, however, is no longer going on today. The energy efficient storm associated hazard mitigation efforts would not have occurred without SEP. More recently, with ARRA, Florida has become more active with residential retrofit programs and is substantially increasing efforts in this area.

While Florida still has this capacity, currently SEP funds are now focused more on schools. State energy efficiency funding is reported to now be at $20 million and SEP is supportive at

$1.5 million. Thus, while SEP has built much of the state's expertise in energy efficiency in the past and managers report that this effort was and is still significant, Florida's is not heavily dependent on SEP to sustain its energy efficiency efforts because of the level of funding associated with SEP.

Some of the energy efficiency skills capacity that SEP helped develop includes: understanding of technologies, understanding codes and code operations, and coordination with universities and other organizations. The understanding of code and technical issues research on the inspection side helped pay for energy efficient improvements to homes, and inspectors applied their skills to energy opportunities.

Summary of SEP Effects on Current Capacity

Florida's SEP experts report that SEP has influenced building retrofits and construction practices by accelerating the development of energy efficiency code changes in Florida and that SEP helped these efforts via demonstrations and code change support. Managers report that without SEP, such changes may have eventually occurred, but would likely have been much later in time, perhaps after other research. Managers report that the degree of SEP impact is difficult to determine. For instance, one state energy expert suggested that leadership commitment is another critical factor to progress and that with strong leadership advances can be made. However, manages report that some initiatives, specifically the hazard mitigation effort (funded by stripper well PVE funds), would likely not have occurred at all without SEP-related funding.

Summary of Readiness for the Future

Florida's experts report that SEP helped lay the foundation for Florida's current capacity and future potential. The substantial state-level support for energy efficiency efforts better enables it to sustain its progress through fluctuations in SEP support levels and has helped Florida be ready for future initiatives as funding improves.

NEW YORK: BUILDING RETROFITS AND NEW CONSTRUCTION

Historic Development of State Capacity

Interviewed managers report that New York's initiatives in this programmatic area were first formed using SEP funding. And, they note that the NYSERDA itself is an outgrowth of the federal SEP program. They point to the success of the NYSERDA organization within the field of energy efficiency as an SEP success. They report that SEP funds started the state's existing facilities initiatives by focusing efforts on existing buildings during the 1970's and 1980's. In the 1980's, the office was applying $1.5 million a year from SEP helping to save energy in buildings. In 1995, the office had 9 SEP-funded individuals focusing on existing buildings. New York has since built the SEP effort into a $285 million set of program initiatives staffed by 55 individuals applying resources from multiple funding sources. They attribute this office and its growth directly back to the SEP funding sources and the flexibility of SEP funding, which allowed New York to focus on where they could best match resources to needs. These managers note that the core technical and building energy services are the "poster child" of the existing building services now being offered. The office is still seen as an SEP-formed and managed office, even with the additional funding received to expand services and initiatives. Managers

note that while they are now mostly funded by system benefits charges, the efforts are still focused and operating as they were when the office was formed with SEP funds. As one manager put it, "our office is an SEP outgrowth."Yet they note that SEP continues to be an important part of the programs focusing on existing buildings.

The SEP efforts provided a wide range of technical assistance services and were a pioneer in developing and offering fuel neutral energy audits. The addition of SEP dollars to the office's service mix means that they can apply the SEP dollars in a fuel neutral way that allows them to achieve higher savings than without the ability to use SEP dollars. Managers report that the SEP funds allow them to stretch their System Benefits Charge dollars to go beyond electric savings and capture non-electric energy savings. They report that without SEP funds their ability to save energy would be significantly hampered and cause them to focus almost entirely on acquiring electric savings and not having as great an ability to implement strategies that acquire the most energy savings per dollar of program resources.

Managers also noted that the SEP program started the state's schools program that focused energy efficiency assessment services at the state's schools and helped them specify and fund measures to improve the energy efficiency and lower operating costs in the state's school systems. They then expanded this successful schools program to include state buildings. They were then able to improve the program by offering performance contacting assessment services, greatly expanding the savings and accomplishments provided by SEP. They note that it was SEP funding that allowed the state to do independent ESPS assessments and allowed these projects to both improve performance and increase savings. These managers attribute the ability to grow an energy efficiency industry in the state to the SEP-funded efforts and the years of program and service development work that were supported by SEP. Managers noted that prior to SEP New York was like an "energy wild west show" with a lot of "energy saving projects not being done or not being done well". The SEP-supported efforts enabled the state to establish a service offering platform that people trusted and can continue to trust.

New York managers report that they were able to use SEP funds to build a level of expertise "next to none," and acquire and develop professional skills and expertise in program design and delivery, technical assistance and assessment skills, and use their acquired building expertise to save energy and reduce carbon emissions. They developed financial assessment and analysis skills and developed processes for prioritizing programs and initiatives. They learned how to focus and spend resources to capture the most savings per dollar of resources. They learned how to build energy efficiency loan programs and how to handle financial tracking and project monitoring challenges. They developed time management skills so that they could focus on projects that would rapidly pay off with large energy savings. They became experts in energy engineering and energy physics learning how to manage and control energy and how to use it wisely. These skills allowed New York to establish a wide range of energy programs and projects all stemming from SEP.

New York points to their Energy Smart Schools program as one of the state's shining star programs that was developed by SEP. This program was built as an informational and behavior change program "because that is all that SEP would fund in the early days." However, as time passed, New York was able to expand this SEP initiative to include assessments and

performance contacts and financial analysis support, among other services. They were able to guide schools away from poorly performing retrofits and focus them on effective strategies that substantially reduced energy use. They were able to benchmark buildings to the point where 35% of the state's school building have been benchmarked. They have built school "energy report cards" that tell each school how they are doing compared to others. These services have already achieved a 20% reduction in state school buildings during a time when enrollments were going up. They report that school administrators now come to them for these services and "line up for our help". This SEP program has become such a hit that it is being expanded to include industry, commercial real estate, waste water, hospitality industry, health care, universities and colleges and local governmental buildings. These managers report that these efforts are all SEP developed. These managers report similar stories for their program-associated marketing and outreach efforts, allowing them to reach more homes, businesses and organizations reducing energy use and carbon emissions.

Managers report that the SEP efforts have helped them improve not only SEP programs but all New York programs. They indicated that over the years they have learned that people do not think in terms of individual technologies, but rather consider energy use and efficiency from a greater perspective, requiring New York's programs to focus more on the customer's facilities than on any specific technology. This realization has allowed New York to consolidate its programs into four market focus areas inducing; existing buildings, new construction, technical assistance and loan programs. Managers report that the funds from SEP are able to be focused on the energy needs rather than being restricted to only one type of energy or a few types of electrical technologies. Instead, they report that SEP has allowed New York to expand their accomplishments and add flexibility to what they can achieve, leading to greater savings and carbon reduction for the state's residences and businesses.

Managers noted that SEP has helped them move from a savings projection based initiative to providing services that focus on cost effective achieved savings in which actions are incented based on their actual savings; a substantial improvement according to the interviewed managers.

Summary of SEP Effects on Current Capacity

New York managers were very clear about SEP's role in building state capacity and skills. They put it very simply: "Without SEP and the offices and service built from these funds we would now not be doing any of what we do." They note that SEP was "way out ahead of what everyone else was doing and we were able to build our energy services platform with our SEP resources." They note that it was SEP that built their office and their approaches. These managers report that NYSERDA would be focusing on research and development projects rather than the large and diversified mix of services focusing on existing buildings (among other services). They also note that without the SEP built programs and services, and the expansion of these via other funding sources, the state would now be in a much worse economic position because of the energy and dollar savings achieved and the jobs that energy efficiency has contributed to the state. They note that NYSERDA and the state's programs represent a maturing of the SEP initiatives and an outgrowth of the SEP platform constructed in New York.

Summary of Readiness for the Future
The interviewed managers said that we are now "in a perfect storm" in which the economy is in trouble the climate is moving to a crisis mode, all while energy prices are going higher and higher. These managers point to energy efficiency as one of the few roads leading out of the storm. They note that SEP allows them to put people on the road leading out of the storm.

Managers note that New York has build a great deal of expertise on how to capture and sustain energy efficiency savings and they are using this built up expertise to plan and move forward with ARRA projects as well as system benefit charge projects, all of which they say are grounded on the acquired skills from SEP. They report that New York is moving forward with new initiatives in data centers, industrial processes and a wide range of customer, market and building types. They report now moving forward building programmatic services to increase the state's level of energy efficiency and decrease the amount of energy to sustain the economy. They report that it was SEP that started New York down this path and continues to be the states key planning resource. The interviewed managers report that SEP has made them ready to not only focus on a wide range of potential initiatives, but to pick out the best initiatives on which the future needs to be built.

BULDING CODES AND APPLIANCE STANDARDS

ARKANSAS: BUILDING CODES AND APPLIANCE STANDARDS

Historic Development of State Capacity
Managers report that Arkansas' energy office has had an effective relationship with its legislature for many years. In 1979, the energy office helped establish the energy code for residential and non-residential new construction. The office assisted in developing consensus and moved the code forward. Through the use of demonstrations and construction techniques, the code was updated in 1992 and then again in 2000. The energy office has two people who are experts in building code development and use. The office has supported these efforts using SEP funds, including code updating efforts. The SEP has allowed the codes to stay current and move to higher levels of energy efficiency. The updating effort is a bi-annual process. The efforts supported by SEP funds helps conduct the assessments and helps support the decisions needed to keep the codes updated.

However, the SEP efforts do more than help update the codes, these funds also provide educational support to code officials and other code stakeholders to keep them informed on code changes and how to build or inspect to meet the codes. Education and compliance training is a particularly important component of Arkansas energy efficient code activities because Arkansas does not have an energy efficient code enforcement mechanism. These efforts are all handled at the local level, where there is little money for staff development and training, and in many cases little enforcement effort.

The development of energy efficient building codes is an activity with a continuing and ongoing interest. The energy efficient code experts in the energy office give many presentations on current code activities and requirements as an educational activity. These speaking engagements keep the code implementation moving forward and move the code toward greater building efficiency levels. Arkansas is currently working to establish a certification system for meeting the Arkansas building energy efficiency requirements.

While there is no effective enforcement mechanism in the state, the SEP-supported Energy Efficient Building Code Certification program requires that builders must place a certification seal on homes to certify that the home passes the provisions of the state's building code. The energy office provides public education on the importance of the certification and the need to verify that the home has been certified. Without SEP funding, Arkansas would not have been able to establish an effective building code program, update the codes to reflect changing needs or support the current frequency of updates and upgrades.

Because of the historic support from SEP funding, Arkansas has been able to develop expertise in building codes and establish positive relationships with builders, code officials, and trade organizations. These positive relationships did not exist to this extent prior to SEP and there was little support for energy efficient codes. These conditions were changed as a result of Arkansas' SEP-funded code education, training, and outreach activities that emphasize the importance of building energy efficiency codes and their implementation. Arkansas' energy office was able to show that codes reduced costs for the occupant and owner and that there was a need to have energy efficient buildings. However, what Arkansas could do was restricted by the amount of SEP funding available. There were no state funds to launch or support these efforts, so the state's energy office had to rely on SEP for the inclusion of energy codes and energy efficient code updates in Arkansas. Arkansas would have been able to place greater emphasis on building code development, implementation, and enforcement if there had been greater funding and support from SEP funding. According to the interviewed experts from Arkansas, the historic level of SEP funding has limited Arkansas' capacity to move toward a higher level of energy efficient building codes. Likewise, reductions in SEP funding levels have eliminated Arkansas' Circuit Rider Program. According to SEP managers, that program was very effective in providing code information and training to local home builder associations. The SEP managers also state that while Arkansas could have been more effective, the effectiveness that was achieved at moving the code to higher levels of energy efficiency was a result of the SEP funds that were available.

Summary of SEP Effects on Current Capacity

Interviewees report that SEP has directly supported Arkansas' building code development and updating initiatives. "Without SEP funding, Arkansas' current capacity would be far short of current levels, and many initiatives would not have developed at all."

Summary of Readiness for the Future

The SEP foundation of expertise that Arkansas has built, and the training that the energy office has acquired and been able to bring to the market, has enabled the state to be in a position to move forward with more efficient building codes and to help the market build more energy efficient buildings. According to SEP managers, Arkansas' builder certification efforts will

provide for greater implementation compliance and code conformity and Arkansas will be able to bring more efficient codes into the state. The state's energy office will be focusing their efforts on establishing the need for code improvements and working with the legislature to modify and improve building codes. These are all possible because of how the energy office has been able to build their code support expertise as a result of SEP. The office can now move forward as new funding becomes available. As part of the Arkansas future efforts, the office will build on current residential and non-residential code efforts and expand demonstrations with more deployment of demonstrations directed toward improvement in Arkansas codes.

CALIFORNIA: BUILDING CODES AND APPLIANCE STANDARDS

California Building Codes

Historic Development of State Capacity

California's experts report that SEP has a long established history of helping to support the development of some of the United State's most energy efficient building codes (California's codes) and provide for the education and training of the construction industry in how to build to meet California's codes.

Interviewees report that SEP funds are used as supportive funds to help establish and maintain energy efficient building codes in California. California building codes are considered a national model for energy efficiency and are routinely updated to keep pace with changing equipment and energy savings opportunities. According to interviewed managers, the SEP funds are an important part of the code change and code updating process. In California, SEP funds are used to support code change cost effectiveness analyses. California code requires that changes be cost effective. As a result, all code changes must past a cost effectiveness test that allows the code change to be financially beneficial or at least financially neutral. That is, there must be enough energy savings to compensate for the cost associated with complying with the code change. The cost effectiveness assessment is conducted using benefit cost models linked to cost and savings calculations. The SEP funds pay for the research and expertise needed to update and run the benefit cost models so that the cost effectiveness financial analysis will be accurate. SEP funds are also used to develop code change compliance manuals so that people will know how to comply with the changing codes. In some cases these manual are complex, allowing trade-offs in the way building are constructed as long as the minimal required energy efficiency levels are acquired. The manual updates supported by SEP provide the information builders, architects, contractors and specifiers the need to determine if their buildings are compliant with the code. SEP funds are also used for training so that builders and specifiers know about the code changes and can understand them to the level needed to assure compliance. California considers education effort important so that people are able to change their construction practices to match the code. Some of the training provided is hands-on, in which the state shows builders how to build to meet the codes. SEP funds are also used to go back to those people who have been trained to see if they are building to the code requirements. This training also teaches people what to buy (the components and material that are code compliant) and instructs them on how to install the components to meet the code. SEP also funds field observations to see if the codes are being followed, and to test if builders know about and understand the codes requirements.

Managers reported that SEP funds were used to establish a builders training program that served as a nationally leading example of how to train builders to meet code requirements. This training was 100% funded by SEP.

The SEP funds have also been used to help code staff and professionals acquire the skill and expertise they need to assess possible code changes and to determine what code changes to make. They report SEP funds being used to acquire heat gain and loss calculation skills, to understand fenestration and window performance measurement and assessment approaches, to conduct infiltration analysis and to be able to understand and conduct cost effectiveness assessments and financial performance analysis. They report using SEP funds to acquire engineering skills to understand energy use and energy efficiency transfer mechanisms. SEP funds have been used to acquire training or to help support training costs. Managers report that California's energy efficient building codes are the country's leading statewide building codes, far exceeding the energy efficient requirements of other state codes. They note that SEP has been and continues to be a helping partner enabling the state to speed code changes and assure compliance at a level significantly greater than where they would be without the SEP funds. However, they also report that there are a number of new technologies and construction approaches that are in need of assessment to determine how the codes should be change in the future that California must delay because of funding limits. That is, California codes are less efficient than they could be with an increased ability to assess potential changes.

Summary of SEP Effects on Current Capacity

Interviewed managers report that California is serious about energy efficiency and would establish and maintain energy efficient building codes with or without the SEP funds. However, they also report that the SEP funds are a critical component of establishing and maintaining the state's building codes. They report that the SEP funds help speed code changes and assure that people are in compliance with those codes. They report that without the SEP funds they would not be able to focus attention on as many changes to the code or keep them updated to the level at which they operate. Managers report that without SEP funding, their code change objectives would have to be scaled back and become less ambitious, covering fewer technologies and construction practices. They report that they would not be able to have as strong a testing and compliance focus without the SEP funds. These managers consider SEP to be an important and critical factor in the state's ability to develop, maintain, and to progress into new, more efficient building codes. They report that while they would still have an aggressive code change process without SEP funding, it is a critical part of establishing the nation's most energy efficient building codes. The interviewed managers noted that the code change process in California is not constrained by building materials, construction approaches or energy efficient equipment, but rather by the level of funds available to take code change considerations through the code change process. They report that changing a code is an expensive and time-consuming process, requiring documentation, demonstration, and detailed complex performance analysis. They report that the funding available for this effort is the code change speed throttle. They report that the availability of SEP funds to support the code change process allows for faster, more comprehensive updates to the codes and increases the energy savings and carbon reductions that California is able to achieve.

Summary of Readiness for the Future
Managers note that the state of California has established a systematic approach for assessing new technologies and construction approaches and that this process is working. They note that the code change process, supported by SEP funding, is ready for the future and can continue to keep California at the forefront of the energy efficiency industry. However, they note that future initiatives are dependent on a stream of resources to support the code change process. They note that SEP is a part of that future and may be able to help update computer modeling software, assessment equipment and testing and up-grade current benefit cost assessment models to speed the code change process and enable more to be done. California reports that SEP has helped them move to where they are today. While SEP is not a major funding source in California it has helped ready the state for future efforts.

California Appliance Standards

Historic Development of State Capacity
In California, the SEP funds are used as supportive funds to help the state have stronger energy appliance standards. California has some of the most aggressive appliance standards in the United States and often is seen as the national model guiding appliance standards progress. While SEP plays a small part of this effort, managers indicated that it is still an important part of which both SEP and the state of California can be proud. SEP funds are used to maintain an understanding of the appliances available in the market, maintain an appliance performance database and to support the state's appliance standards enforcement efforts. SEP funds are used to conduct examinations and assessment to make sure that retail outlets are carrying appliances that meet or exceed California standards for energy efficiency. SEP funding is used to purchase appliances and conduct independent measurements of their energy performance to make sure that they comply with the standards. For this effort, California does not rely on the manufactures to provide test models that may be different than those sold in the stores, and they do not rely on the manufactures to tell them how efficient their models perform. According to the interviewed managers, California purchases the appliances off the retail floor just as any retail purchase is made. The units purchased are then sent to a testing lab to document the energy efficiency performance of the purchased units. SEP funds are used to cover the expenses of appliance testing. This information not only serves California well, but it is also shared with other states that need information to identify and recommend which appliances are energy efficient. That is, the California efforts impact not only California, but also other states that look to California for the information to make their appliance mix or purchase recommendations more accurate. In addition to financially supporting appliance testing, managers also report that SEP funds are used to acquire technical experts and analysis assistance to help determine which tests are needed, and to provide advice on how the test should be conducted.

Summary of SEP Effects on Current Capacity
Managers noted that while SEP is not a major funding source for California's appliance standards efforts, it helps speed and expand what can be tested, documented, certified and placed into a standard. Managers note that without the SEP funds, they would have to focus their efforts on fewer appliances and slow the process for moving equipment into their performance standards.

Summary of Readiness for the Future
Managers note that the state of California has established a systematic approach for assessing new appliances and plug load equipment and that this process is working. They note that the appliance assessment and standards setting process supported in part by SEP funding is ready for the future and can continue to keep California at the forefront of the energy efficiency industry. Like their codes updating initiatives, managers report that their accomplishments are not limited by the number and types of appliances in the market, but rather by the funding they have available to identify, test and move appliances into the state's standards. However, managers report that they will continue to assess new appliances and equipment and will continue to move more appliances into the state's standards. They report that the SEP funds have been a valuable contributor to the state's abilities and capabilities, and have helped to build a foundation for future assessments and updates. Should additional resources be available for these efforts, they can readily be expanded beyond current efforts to focus on more equipment to move California to a more efficient energy future.

CONNECTICUT: BUILDING CODES AND APPLIANCE STANDARDS

Historic Development of State Capacity
Interviewed experts report that Connecticut's energy office used SEP monies to fund positions related to providing energy efficiency services. The expertise that was developed provided for the establishment of energy efficiency standards and performance guidelines. The energy office funded a website where these standards are posted. Some of the specific initiatives include the development of specifications for high performance buildings and standards for new construction and the renovation of state government buildings and local schools. The energy office developed regulations for state buildings and schools utilizing state funds. These regulations specified energy efficiency levels above those required by the Connecticut energy efficiency building code.

The energy office was tasked by the Connecticut legislature to develop high performance building standards for state building facilities and local schools 20% stronger than ASHRAE 90.1of 2004. This was fully funded through the use of SEP funds. This standard is now in place.

Connecticut has been involved in the development of state specific standards since 1987. Connecticut has established lighting and ballast standards. Connecticut has also established energy efficiency standards for many. There is a web-based tool that determines which appliances that meet the California standards also meet the Connecticut standards. This includes large package air conditioners above 20 tons, commercial sized refrigeration equipment and freezers, bottle water dispensers, commercial hot food holding equipment, electric spas, swimming pool pumps, and residential furnaces and boilers. The furnace and boiler requirements are procurement standards for state facilities. This allows Connecticut to move forward without going through the DOE exemption procedure for establishing a new appliance standard. A particularly successful program result was the adoption of appliance efficiency standards adopted in 1987 and 1988. When forward momentum on appliance standards slowed at the federal level, the states began their own effort. California, New York, Massachusetts, Connecticut and Rhode Island all worked together to promulgate appliance standards at the state

level. Appliance manufacturers concerns over needing to meet multiple state level standards generated support for federal standards consistent across state lines.

The adoption of energy efficiency standards for state government buildings and schools required upgraded energy efficiency requirements for equipment and for construction practices. Equipment and buildings standards moved forward hand in hand. Connecticut has continued to develop and implement revisions and upgrades to its codes and standards for appliances, equipment and buildings.

The SEP funds provided for the skill development related to indoor air quality issues and methods for the determination of air quality. Other skills were developed in engineering analysis, establishing relationships with other experts and stakeholders, understanding processes and how to develop state specific regulations.

Summary of SEP Effects on Current Capacity

Interviewed managers report that without the availability of SEP funds, there would have been significantly fewer code and standards associated initiatives in the state and other less-knowledgeable agencies would have fielded and implemented less effective programs and built less efficient buildings. SEP was a strong component of the state's efforts.

Summary of Readiness for the Future

The experience and expertise gained through SEP funding allows Connecticut to move forward and continue to be productive in the field of energy efficiency. Managers report that the SEP-funded efforts helped the state gain the expertise needed for future programs and the state is ready for those initiatives because of SEP and other capacity building efforts.

LOUISIANA: BUILDING CODES AND APPLIANCE STANDARDS

Historic Development of State Capacity

Interviewed managers report that Louisiana's HERO program (Home Energy Rating Options) set the stage for advancing the codes in this state. It provided the information and the documentation needed to sell energy efficiency. It gave them the data to show how energy efficiency pays for itself and is the least expensive way to go. They had 10,000 homes and the data to clearly demonstrate that energy efficiency works and is needed in their state. Louisiana's state code covers not only new construction, but also covers retrofits as well. Thus, they were able to influence both new construction and major retrofits.

The Hero Program has trained raters using Rescheck and Comcheck. This program started before Louisiana had a code, and required that existing homes be improved by 30%, and new homes had to be 30% better than standard practice or code of the day. This program allowed them to understand and push building and renovation to be efficient. They have a lot of homes that are not energy efficient, and this program showed what the existing stock was like and justified the need for a state code.

The SEP program provided the standard building practice and showed that local areas with codes had better homes than the homes without codes and showed Louisiana where they lagged the market. The energy office was able to push for more efficient codes, and the insurance industry came along and pushed for better construction of homes. The state energy office was not able to get a code installed on their own, but when the insurance industry came in and demanded better construction to lower damage costs, they were able to get the energy efficiency aspects into the code and had the data to back up their position. It took the combined leverage of the insurance industry and the energy costs and savings potential to get this done. For commercial buildings, this was accomplished in 1999, and for residential buildings it was 2005. Louisiana is a home rule state, and managers report that they did have some parishes that had codes, but this was the first statewide code.

The energy office provided code guides to home builders to let them know how to build to code. Many of them did not know how to build to code, so this guide was key to influencing builders. It informed them not only on how to build to code, but also about why it is important for owners, as well as the energy supplies and costs to build to code. Louisiana has also had code conferences to inform builders, owners and other stakeholders about the code. For owners, they had booklets covering what owners needed to do to make sure their home is built to code. Thus, Louisiana had training for both the builder and the owner.

In about 2000, Louisiana SEP funded an effort to organize state and local officials, as well as related stakeholders, into supporting code changes. When the code became mandatory, the local governments had no code people, no code offices, and no code expertise. This group helped people learn about the codes and show them how to get people to do inspections and meet code certification requirements. This helped the local governments more effectively adapt to the new code.

One state energy expert noted several areas of staff expertise and skills capacity that resulted from SEP. One is the ability to work with a wide range of people and groups and interests to establish the need for energy efficiency initiatives, and to collaborate in getting things accomplished. That included consensus building and teamwork skills. This office also developed educational skills, in particular helping people understand that the cheap way up front is the most expensive way long term. These efforts helped show people that energy efficiency investments ultimately reduced overall costs. They also developed training skills, in that they needed to train builders on how to build to code. They also now have inspection and assessment skills, which help local governments understand how to make sure construction is built to code. Negotiating skills further enable them to present concepts in ways that allow changes to proceed. Political skills enable them to work with legislators who have different interests, and they needed to learn how to make their point in five minutes or less each time they made such pushes. Jurisdictional expertise helps them coordinate with each of the local home-rule conditions that work against state mandates so that they could determine how to get a statewide code implemented. Construction skills enable them to know what can be done and how to do it at a quality level. Marketing and outreach skills are utilized to get this information out to all kinds of people. The capacity that the state energy staff built for all of these skill areas was attributed to SEP.

Summary of SEP Effects on Current Capacity

According to the state experts, "SEP is responsible for developing Louisiana's current capacity." As one state energy expert put it, "If there had been no SEP funds, we would not have a state energy office and none of this would be done…This was entirely SEP funded."

"We are respected and we are the energy efficiency experts to know now. People listen to us. We now can work with the utilities and other organizations to move forward. We have developed all the contacts in all the code offices. We know the best ways to train and to move codes to higher levels. We know and have communications with the key code and code related people and organizations. We are now prepared to teach and cover what comes. We have the analysis potential to know what is needed and what works. We live in a moderate climate, so we do not have some of the extremes. The big cost is AC and poor construction. Now we have the expertise to teach and help support."

Summary of Readiness for the Future

SEP established the infrastructure, expertise, and skills capacity that lays the foundation for future energy efficiency initiatives, including ARRA.

MICHIGAN: BUILDING CODES AND APPLIANCE STANDARDS

Historic Development of State Capacity

The construction codes bureau is located in the Michigan Department of Energy, Labor, & Economic Growth, the same department as the state energy office. The state energy office's role has included training code officials and builders, and upgrading the codes and skills needed to assess opportunities. Code training has been described by one state energy expert as a "shining star" of high quality, with good attendance at these workshops.

In addition to training, this office also provides cost/benefit analysis as well as legal and legislative support. This has apparently been very helpful for overcoming resistance and with some legal issues. One state energy expert noted, "Our cost/benefit analyses were key to the adoption of new code changes. Without this, we would not have been as successful."

Michigan's first energy code originated in the 1970's and have evolved since. Code changes now require, by state law, cost/benefit analysis to justify improvements. They have to do the net benefit analysis for seven years payback.

SEP staff have also pursued other grants and EERE special projects. Information about their programs is provided online at http://www.michigan.gov/dleg/0,1607,7-154-25676---,00.html.

Among the skills SEP has developed in this office are: cost/benefit analysis, training for contractors and code officials, embedded expertise on code training and effects within other organizations, auditing and rating, technical analysis, engineering, and more.

Summary of SEP Effects on Current Capacity

As noted by the interviewee, "SEP funding supported all these activities; none of this is likely to have occurred without SEP. Of particular impact in Michigan has been the code training and cost/benefit analysis services."

Summary of Readiness for the Future

Managers report that SEP support has been critical to positioning Michigan for the future. That state now requires adoption of the latest codes with an assurance of compliance. They have grounded all of their future efforts on their past experience, expertise, and methodology. Managers report that SEP and its associated funding is the way they have done this. This has directly and substantially helped position them to make the new ARRA requirements for codes and standards and compliance into reality.

MINNESOTA: BUILDING CODES AND APPLIANCE STANDARDS

Historic Development of State Capacity

Prior to 1980, when the authority for building codes was transferred to the SEP-funded state energy office, the state used a voluntary building code that was not considered a strong energy efficiency-based model. The state placed the responsibility for updating the code under the SEP programmatic efforts. SEP staff were used to develop the code changes, document performance and testify to allow the code changes to be adopted. Through these efforts, the state energy office added stronger air tightness and mechanical ventilation requirements to the code and added make-up air requirements. These provisions where replicated in other states and allowed Minnesota and other states to move to more efficient, tighter, better insulated homes. These code changes allowed for the addition of higher efficiency space and water heating systems that used external air to feed furnace combustion and exhaust needs without creating internal pressure problems from ventilation and cooking and other activities. This change in pressure-associated requirements allowed the state to set high efficiency space and water heating systems as the code compliant condition. This innovative change to the codes was an SEP-funded initiative that impacted not only Minnesota, but several northern high heating degree states, so that sealed combustion space and water heating could be specified into code.

The SEP-funded state energy office then went on to establish more energy efficient guidelines for log homes, greenhouse, and up dated codes for inflated dome structures. They changed the codes for inflated dome structures so that internal pressures could be calibrated to the wind speed, assuring structural performance of the domed structures while greatly reducing energy needs. The office went on to update codes as more efficient equipment entering the market and was tested to assure reliability and performance. The office has also respecified fiberglass for low temperature performance so that insulation had to meet winter performance specification in this cold climate state. As part of the cyclic code change process adopted by the energy office, in 2000 the state adopted an energy efficient new construction and retrofit code that increased thermodynamic performance to higher levels of efficiency. The office has also set up a code information website that allows people to learn about the codes and to understand how to build to the codes. The office was instrumental in having the state adopt a policy to have all state

governmental building meet the most efficient applicable codes by 2010. While the code is now mandatory for state buildings, and state buildings have to comply with the code, the codes in Minnesota are still voluntary for the private sector and managers report that the state is one of eight states in the United States that does not have a mandatory code. However, according to interviewed managers, recently the responsibility for building codes and code updates has moved out of the energy office and into an office that focuses on building code updates and licensing. Since that time the energy efficient code updating process has not meet the expectations of the energy office managers.

Interviewees report that throughout this period the state energy office was able to acquire code and code updating skills and expertise and provide training to code officials, builders and other stakeholders including state employees responsible for overseeing code compliance in all state buildings. The skills acquired have been building science skills including the application of physics and engineering principals to buildings and how to transfer information to different types of audiences and stakeholders. They have learned how to effectively train and communicate code approaches to builders and code officials. They have become national experts on air flow and building pressure science and how to build healthy buildings that are also energy efficient. Managers have become experts in humidity conditions and controls and on cost benefit modeling of code changes and expected benefits. They have acquired skills in building science and in software writing to model code scenarios and have leaned to calibrate and test equipment to reliably evaluation codes and code changes. They have studied the influence of vapor barriers and wind barriers and how to use these systems effectively. These managers report that they have also traveled to other cities and states to train peers and to share the results of their code associated research. Training to the public has focused on understanding code requirements and how to build or retrofit to meet those requirements.

Managers report that there is resistance to updated energy codes in the state, and that not everyone is not on board with the need for energy efficiency within a required code. The energy office has needed to educate law and policy makers on the need for efficient codes, and has helped these stakeholders understand the economic and state benefits from energy efficiency codes as well as the benefits to owners and occupants. In addition, recent educational efforts and information have allowed lawmakers to better understand the implications of not have a mandatory building code, including the impacts of not having a mandatory code on the state's economy and ability of people to pay their heating and energy bill, and the impacts on the state's ability to obtain federal energy efficiency and renewable energy funding. The energy office managers are hopeful that the state can now pass a mandatory building code that is routinely updated to become more efficient over time and help improve jobs, the economy and the economic stability and growth of the state's population. SEP is leading this push in Minnesota.

Summary of SEP Effects on Current Capacity

The interviewed experts report that all of the state energy office's code efforts are attributable to SEP funding. "All staff working on this effort are SEP staff." The training and education received and provided were SEP supported. Participation in code stakeholder meetings and membership of ASHRAE code committees and networks were all SEP supported. Managers credit all of the energy efficiency improvements to the state buildings codes and the voluntary codes and the movement to mandatory codes to be a direct result of SEP. Managers noted that

the flexibility of the use of the SEP funds allowed the state to focus on improving the state building codes and moving the state to the pending adoption of mandatory energy efficient building codes. Interviewed managers report that Minnesota would not have moved the energy office into the code updating and development efforts without SEP funds to support that effort. They report that they would not now have a state buildings code or performance requirement. They also report that they would not have been able to educate state lawmakers on the need for a mandatory code.

Summary of Readiness for the Future

The interviewed managers report that the state is at a high level of readiness to launch new ARRA initiatives and have the necessary skills and expertise to effectively manage these new efforts. They report that the capacities and readiness of the state energy office is build on years of SEP-funded capability and expertise building to where they now have some of the most skilled and knowledgeable staff in the field. Managers report that they know what works and what does not; they know how to train and develop compliance skills and expertise within local governments and at the state level. They report that they have the partnerships and peer relationship established and that they know how to work with trade allies and people who are resistant to code change consideration. These managers report that it is because of SEP and the expertise developed under SEP that they are ready for ARRA initiatives and other potential efforts that can become available.

NEW YORK: BUILDING CODES AND APPLIANCE STANDARDS

New York Building Codes

Historic Development of State Capacity

Interviewees report that in the early years of New York's state energy office there was no national building code, and New York used its SEP funds to update the state building code. This was accomplished by acquiring code and construction expertise within the staff of the New York state energy office (New York State Research and Development Authority) and by contracting for code and construction analysis expertise. In addition, SEP managers and staff would discuss their code efforts and issues at regional and national code-associated meetings. Over the years the New York state energy office has also used SEP funds to develop in-house expertise and to establish partnerships and professional networks to identify analyze and support cost-effective initiatives. This allowed the SEP managers to examine what other states were doing and to share information about the various approaches for increasing energy efficiency in new buildings and rehabs. These efforts allowed New York to stay current in their understanding on various code change approaches, techniques and the results of those changes. In addition, the SEP managers would examine the various approaches developed in New York, or acquired via the information-sharing efforts, to determine which techniques were cost-effective and could perform within the various New York climates. As cost-effective and long-lasting code change opportunities were identified, they were incorporated into the New York building code by the Department of State when there was enough support for that change. The SEP-funded office was the organization that provided the analysis support needed to adopt a change.

Managers report that in the late 1990's, New York adopted the national building code and moved to support the 3-year updating cycle within the national building code as a way to streamline the New York code change process. However, New York continued to make changes to the code applicable to state conditions to reflect the New York climate and building environment. At this time, the SEP funds were used to assess what changes were needed to the national building code so that those changes could be adopted. The 3-year automatic updating cycle of the national building code allowed New York to focus its SEP efforts on the energy efficiency opportunities available within the national code without having to deal with a code change process associated with changing a state building code. In the last 15 years, the New York SEP office has directly participated in the national model code change process. This has allowed the state to have a direct role in helping to identify needed change and lets the NY managers work to adopt that change into the national model. New York has participated in the change effort for five code change cycles and each change has incorporated more energy efficient practices into the national code and therefore every state using the national codes.

With the SEP program resources and with other contributions, New York has been able to take a national leadership position regarding code change initiatives and not rely on following what other states have done. According to the SEP managers, New York and a few other states provide the code change leadership for the energy efficiency changes to the national code.

The New York SEP managers report that only the New York Department of State has the authority to adopt new or changed building codes for the state. The state energy office is advisory. However, the Department of State relies on the state energy office for a good part of the expertise needed to assess the changes needed in New York and to provide the recommendations for what to change. Much of this effort is conducted under the SEP banner. According to the New York SEP managers, the SEP funds also help them stay current on what other states are doing, especially California, and these other states keep track of what New York is doing so that good ideas and approaches are shared and improved. Over the years the state energy office has acquired a great deal of support within the state because of the code work and the professional way in which that work is done using SEP funds.

To help inform the building community when an energy efficient code change occurred, New York provided SEP-funded educational efforts to make sure that the building and code industry was informed of each energy efficient change and knew how to build to or inspect against that change. The New York SEP state energy office also funded workshops for code officials, publications of the code changes for builders and contractors and code officials, and training events for builders and architects. Last year New York trained 3,000 local code change officials and others. In addition, SEP funding has allowed New York SEP managers to attend national conferences, public hearings, and educational workshops to continue to build in-house expertise. According to the SEP managers, New York staff cannot attend or take part in professional development activities when out-of-state travel is involved. SEP funding is what SEP managers use to build their expertise and to take part in the national efforts that help bring about the code changes adopted in New York and replicated in other states.

The New York SEP managers have indicated that cuts in SEP funding have resulted in less effort placed into the development of new codes and code changes and this has resulted in model codes

and code updates that are less efficient than what could have been achieved. However, they also report that the achievements made to both the New York codes and the national mode codes have been substantial.

According to New York SEP managers, SEP resources enabled the New York state energy office to acquire a wide range of the skills and expertise needed to acquire energy savings though energy efficient code changes including:

- knowledge of how building and construction markets work and the roles and responsibilities of the various market actors,
- construction expertise and the understanding of the laws of physics as they apply to how buildings perform in different NY climate conditions and under different equipment and construction practices,
- testing and assessment abilities allowing managers to compare different approaches and strategies pertaining to specific code changes,
- cost effectiveness analysis approaches so that only cost effective code changes are adopted,
- information dissemination and knowledge acquisition so that key code officials and market actors and stakeholders are informed about the code changes and how to meet the new code requirements,
- partnership and professional networks formation to cooperatively work with builders, Contractors, architects, suppliers, owners and other code change officials who must support the change before it can be approved,
- code change and change documentation process, and technical standards requirements,
- how the code change process works in NY and how to make it work for energy efficient changes,
- how to make arguments to justify code changes in a way that is persuasive and convincing enough to gain support.

Summary of SEP Effects on Current Capacity

According to the SEP managers, the code change process is a reactive process. Change does not happen unless there is change pressure placed into the code change environment. There is resistance to change that must be overcome with persuasive arguments that have to be well researched and strategically placed into the change process. This is what SEP does to the code change process in New York. At the national level, the national model code is a reactive code. It only changes when the states involved in the national code change efforts push for a change. SEP provides the needed efforts to assess potential change and when it can be found to be cost effective and reliable, a case is built for that change and that change is pushed at the national level to move that change into the national code.

Summary of Readiness for the Future

New York SEP managers report that the past history and the extensive level of expertise and experience acquired over the years has made New York ready to move forward with ARRA and other initiatives. These managers report that they already know what they need to do and they already have a strategic plan that recognizes a need for additional code changes. New York already had the organizational structure, the staff expertise and the knowledge of what efforts

were needed before the ARRA bill was passed. What was lacking was a funding source to launch those efforts. The ARRA funding found a state that was prepared and ready to launch needed energy efficiency efforts. The managers credit SEP and the funding from EERE as the foundation upon which all the expertise within the state energy office was first developed. They report that SEP and other funding sources have built that expertise to be able to move the state of New York forward to meet the state's energy efficiency, renewable energy and carbon reduction goals.

New York Appliance Standards

Historic Development of State Capacity

The USDOE SEP was the funding source that allowed the state of New York to form and organize their energy office, acquire staff, and train that staff to deal with a number of energy needs. One of the first things the SEP managers did was identify the potential for significant savings via implementing energy efficient appliance standards. To launch this effort, the SEP managers identified three appliance groupings, including lighting products, central air conditioning and domestic water heating.

SEP managers realized that there were significant savings to be achieved in these three appliance groups. While the state energy office did not have statutory authority to implement state appliance standards (that is the responsibility of the New York Department of State), they acquired responsibility for assessing appliances, drafting new standard, and working with the New York Department of State. The New York SEP managers employed within the state energy office focused their assessment efforts on the three appliance groups and researched the range of products available in the market, assessed the potential for savings for those products, and drafted new standards for each of the three appliance groups. In order to expedite the adoption of the new standards, the New York SEP managers established partnerships with the Department of State managers who were responsible for approving and adopting new standards. This partnership served both organizations well and allowed the SEP managers to research the energy savings potential for appliances, conduct cost benefit analysis to make sure that the standards were cost-effective, and draft the standards that were needed. The Department of State then took those standards, confirmed the accuracy of the analyses conducted by the state energy office, and moved the standard to adoption. With these efforts, New York became one of the first states (if not the first) to pursue energy savings by setting minimum standards or energy efficiency for key appliances. Over the years, New York SEP managers have assessed a wide range of appliances and have developed appliance standards for 14 different types of appliances. As the market changes, and as new more efficient products are brought to the market, each of these standards are updated or new standards are developed so that New York maintains its position as one of the most energy efficient economies in the United States.

To support this process, the SEP managers developed educational materials and workbooks to help convey the standards to builders, contractors, architects, suppliers and to the general public. In addition, SEP conducted mystery shopping in stores and appliance outlets that carried the product lines to inform store owners when they were selling appliances that did not meet the new standard. While the state energy office did not have enforcement authority, these efforts helped improve compliance and educate appliance sellers of what products met the new standard. As

the internet came into frequent use, the energy office placed information about the standards and energy efficient appliances on their energy efficiency web site for wider distribution of the standards and applicable equipment.

Because of the flexibility of how SEP funding could be applied by the states, New York also used the SEP funds to establish peer relationships and professional networks with other state energy offices that were looking to implement similar standard in their states. These relationships and networks allowed the New York SEP managers to examine the work of other states and use that work to inform their assessment of other appliances that could save energy in New York. However, interviewed managers report that these efforts have been scaled back due to cuts in the federal SEP program made in the mid-1990's that continue today. According to the SEP managers, this reduction has resulted in less energy efficient national appliance standards because of the pre-emptive barrier of the national standard development approach. That is, the federal standards are guided by the most energy efficient standards at the state level. Delays in establishing state standards in New York have resulted in lower standards within the federal standards. Thus, the cuts to SEP in the mid-1990's have acted to increase the energy used in today's appliances both in New York and in the rest of the country.

As the New York SEP managers gained experience and developed considerable expertise in identifying appliances that saved energy, they continued to develop standards for the Department of State to confirm and adapt. As this process progressed, the New York SEP managers became known as the lead experts for the development of energy efficient standards in New York and beyond. This expertise was then applied to working with key legislators and policy managers to draft and pass new legislation expanding the use of energy efficient appliances to all state owned buildings through energy efficient purchasing standards. The SEP managers within the New York state energy office were the contributing authors and key expeditors of that legislation, impacting all state owned buildings.

In recent years the SEP funds were used to support a multi-state standards project that continues today. Today, this effort focuses on monitoring federal standards and rule making effort to identify opportunities for influencing those standards and rules. This has resulted in more rapid adoption of federal standards and in member states learning about a number of best practices for ensuring higher levels of compliance within the states. In the past, New York and a few other states pressured the federal government because of their lack of progress on national standards. This resulted in a negotiated legal agreement to accelerate a national appliance standard for a whole range of products. According to the interviewed managers, the DOE rule-making is a reaction to state initiatives. It is the states that initiate the efforts that lead to the national standards. The New York SEP efforts were instrumental in moving these standards forward at the federal level. Together, it is the individual state efforts working together to obtain energy efficient standards that convinced the manufactures to ask USDOE for national standards. According to the interviewed experts, these national efforts would not have happened without the SEP-funded state-lead efforts. New York managers noted that without the state's change efforts, along with the other SEP-funded push efforts from other states over the last 30 years, there would now be no national appliance standards. Managers note that currently ten of the New York-initiated standards have now moved to national standards.

According to New York SEP managers, USDOE SEP resources enabled the New York state energy office to acquire a wide range of the skills and expertise needed to acquire energy savings though energy efficient appliance standards including:

- knowledge of how appliance markets work and the roles and responsibilities of the various market actors,
- engineering expertise and the understanding of the laws of physics as they apply to how equipment can be engineered to provide energy savings,
- testing and assessment abilities allowing managers to compare the energy efficient performance of appliances,
- cost effectiveness analysis approaches so that only cost effective standards are adopted,
- information dissemination and knowledge acquisition so that key market actors and stakeholders are informed about the standards and can successfully apply them,
- partnership and professional networks formation to cooperatively work with manufactures, suppliers, dealers, retailers as well as other state department managers and professional staff who must support the standards before they can be approved.

Summary of SEP Effects on Current Capacity

According to New York SEP managers, these efforts would not have been launched and would not be maintained in New York to the degree that they are today without SEP funding and support. While New York does provide some level of non-SEP funding support to supplement these efforts, the federal SEP funds provide the resources to staff and implement their standards initiatives. The SEP funding allows New York to focus on a much wider range of appliances over a significantly shorter period of time than what would be allowed using state funds. The New York SEP managers noted that without the SEP funding, there would have not been an early lighting standard which set the playing field for the move to the other standards that followed. They note that without SEP funding to form and launch the New York standards, they are not sure that the state would have taken the initiative to set up a standards program or fund it enough for it to capture the level of energy savings it has achieved. They further note that without SEP, there would have been very little ability for New York to take the national leadership position it has held for many years, and this would have resulted in New York not being in a position to force national appliance standards.

New York SEP managers also note that appliance markets are not state markets, but instead are regional, national and in many cases international markets. Thus, mandatory appliance standards in the large states with large markets impact not only those states, but the entire country and beyond. As New York SEP-funded efforts increase energy efficiency in New York along with other key states such California who are pushing energy efficient standards, the markets react by producing more efficient equipment that is then shipped to markets well beyond the few states that are pushing the new standards. According to the SEP managers, it is the SEP-funded push within the states that is significantly propelling energy-efficient appliances. These state initiatives have pushed the market to produce more energy efficient equipment to not only meet those standards, but exceed them and allow for those standards to be updated as the industry reacts.

New York SEP managers also point out that the reductions in SEP funding that occurred in the mid-1990's resulted in a reduction in the number of appliances that the New York energy office could assess, and has expanded the period of time over which assessments and standards were developed. These managers note that not only has the funding reductions slowed savings in New York, but it has also slowed efforts across the country because New York has had to reduce its level of coordination and networking that has allowed other states to use the results of New York's efforts, and for New York to use the results from other states.

Summary of Readiness for the Future

According to the New York SEP managers, efficient building codes and appliance standard are needed in order for the state to reach its energy efficiency and carbon reduction goals. According to these managers, one-third of the state's energy efficiency and carbon reduction goals will need to be met via new and updated codes and standards. These managers note that the SEP-funded efforts have allowed them to acquire the skills and expertise, and has established the professional relationships and networks to move into the future with updated previous standards and new appliance standards that will help both the state and the country cost-effectively save considerable amounts of energy. These SEP managers note that New York has already launched on these efforts with some of the ARRA funding, and note that it is because of the foundation established by SEP, the state was able to move forward on new initiatives as soon as the resources were provided. According to these managers, New York already has the skill, knowledge, experience, expertise, networks and proven analytical capabilities established by SEP that is needed to support additional efforts as soon as funding is available to launch those efforts.

OREGON: BUILDING CODES AND APPLIANCE STANDARDS

Historic Development of State Capacity

According to the interviewed managers, the use of SEP funds for code change initiatives conducted by the Oregon energy office allowed the state to adopt some of the very first and most progressive building codes in the United States. According to the interviewed experts, these codes "made the industry stand up and recognize the opportunity that energy efficient building codes provide." Other states saw what could be done to save energy through up-dated building codes and followed Oregon by up-dating their own codes. In Oregon, SEP funds were used to look at the codes and recommend changes to those codes to make buildings more energy efficient. These recommendations were adopted into the current code. The SEP programs got the code upgrade process rolling and started the state down the energy efficient code change path. Managers indicated that much more needs to be done in Oregon; however, responsibility has been converted to utility contracted and managed efforts instead of SEP-directed efforts. Managers do not yet know whether this approach will improve codes more quickly, but are optimistic that these efforts can produce significant results if effectively implemented. Managers noted that the SEP efforts have shown what can be done if resources are effectively used, and note that there is now utility funding to assist these efforts. The utility contracted approach will serve as a market test to see if the codes move forward and capture increased energy savings and carbon reductions, and capture the cost effective savings available in the market compared to the SEP directed approach.

The skills acquired by the SEP managers allowed them to understand the code change process and to effectively work within that process to identify cost effective change opportunities and bring them into new codes.

Summary of SEP Effects on Current Capacity

According to the interviewed managers, the early code change efforts were a direct influence of the SEP funding and the activities of the Oregon energy office. The office was successful at moving the codes forward and increasing the energy efficiency of buildings built in the state. Now, the effort is in new hands. The SEP program fully expects that the codes will continue to improve and capture additional cost effective savings if these efforts are effectively directed.

Summary of Readiness for the Future

The SEP managers will work with the utilities and their contractors to help them understand the opportunity available and to try to push for stronger codes. They report that the primary block to building more effective codes has been available funding to build the documentation and supportive mechanisms needed. With the new funding from the utilities the state is in a good position to more rapidly achieve code changes that will improve the performance of building in the future as the codes are updated. The SEP program has set the stage for these efforts and will help these efforts move forward.

TEXAS: BUILDING CODES AND APPLIANCE STANDARDS

Historic Development of State Capacity

The Texas SEP-funded state energy office has a long history of coordinating the updating of building codes. The state SEP-funded staff have been involved in working to update voluntary codes as well as mandatory codes at various times over the years as Texas has moved from voluntary codes to mandatory codes. During these periods, the SEP-funded staff have helped assess the performance of energy efficient technologies and building practices and worked to include updated provisions in both the voluntary codes as well as more recently, the mandatory codes. SEP-funded staff have also been actively involved in training builders, architects, contractors and code officials each time the codes have changed on the provisions of the codes and on how to meet the code requirements or recommendations. These codes have changes every couple of years as the state moved from more and more efficient voluntary codes to more efficient mandatory codes. During these periods the state energy office and the SEP-funded staff have been directly involved in each step along this path in either a leading or direct supporting role.

When the state energy office was first established, Texas did not have a mandatory energy efficient building code that applied to private or public buildings. As a home rule state, Texas's perspective was that these issues were better served by the authority of local governments. In these early years, the SEP-funded staff worked under a state authority to adopt a voluntary code. The state energy office adopted the 1989 ASHRA 90.1 code for state buildings, and recommended that jurisdictions also adopt the efficient approaches and technologies in the code whenever they could. The SEP staff then provided training to both state officials and trade allies

to allow them to understand how to build to meet the updated code, and how to assure code compliance if applicable. In this period, the state adopted the code as a required code for state buildings. Each time the ASHARA code was upgraded, the state adopted the code changes for state buildings and the SEP updated their training programs to meet the new provisions of the code.

In 2001, Texas adopted a statewide building code and the need for training escalated beyond what the state energy office could provide. At this time, the SEP office partnered with Texas A&M University to expand training across the state to help local jurisdictions and effected trade allies understand and apply the new code. This partnership allowed the state energy office and its training partner to saturate the state with code training that consequently was in high demand because of the new law. The training was expanded to not just cover the new code provisions, but also to train on Energy Star new construction requirements and on how to meet green building standards such as those required for LEED certification. In 2007, the responsibility for code updates was transferred to the state energy office and the efforts continued to be supported by SEP funds. As a result of the transfer of code responsibility, the Texas code is updated every time the ASHARE model code is updated. At the same time, the statewide training program is updated to incorporate the code changes so that local governments, builder, architects, contractor and suppliers are trained on the new changes. Over this period of time, and currently, the SEP-funded staff within the state energy office are the key professionals that are responsible for updating the Texas building codes.

Interviewed managers report that they hired expert code managers for the state energy office and continued to build their skills and expertise. These managers had to understand the provisions of applicable Texas law and understand the code updating process and provisions at an expert level of capability. They needed to develop partnerships with state and local officials, as well as with code change professionals within the industry. They had to know how to use and apply analytical approaches to assess the implications of each code change, and to teach others on their use and application. They had to maintain an expert understanding of mechanical systems, technologies, control systems and use approaches. They had to maintain an expert understanding of construction practices and capabilities for both residential and non-residential structures. They had to assess costs and cost effectiveness, and be skilled enough to train other experts on the code and code provisions and methods of compliance.

Summary of SEP Effects on Current Capacity

The interviewed managers report that the state energy office and the code initiatives undertaken by the office have always been supported directly with SEP funds. They also report that the acquiring and maintaining of their levels of expertise is a result of the availability of SEP resources.

Summary of Readiness for the Future

The capability that Texas has established is fundamental to the ability to update codes and train stakeholders on those changes. Texas has established this capability as a result of SEP and this capability is now function well. It is fully capable of maintain that operation and can ramp up additional efforts as needed and as consistent with the available resources for that effort.

Managers report that they are skilled code professionals with an expert understanding of the Texas building codes and needs for changes and are ready for the future.

RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

ARIZONA: RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

Historic Development of State Capacity

According to Arizona SEP managers, SEP funding provided the opportunity to develop many different renewable energy educational and technical training workshops. The Arizona state energy office developed a workshop track directed at workforce expansion and skills development to provide the foundational infrastructure for renewable energy technologies and instillations in Arizona. Arizona considered workforce development and technical education an important component for building a renewable energy market, and the state energy office also developed renewable energy educational workshops for getting renewable information to the public. According to Arizona SEP managers, public understanding and acceptance was an important foundational element that had to be established so that Arizona had market demand and an industry able to support that demand. Arizona's energy office also developed an educational program for teachers so that information about renewable energy could be moved into the schools so that this became a part of Arizona citizens' knowledge base. The energy office also supported these efforts with demonstrations to increase public awareness.

According to Arizona SEP managers, one key component of Arizona's renewable energy education portfolio was educating the public about the potential for solar energy; as people did not understand that Arizona has very high solar energy potential. Arizona's energy office had to build this knowledge has moved many projects forward over the years as a result. For example, a high impact program was the development of the solar information and education program. The program provided videos and educational material in the 1990's at a time when these materials were not readily available from other sources. These materials were used for training in solar energy for teachers and for sending kids to the solar energy camp. SEP funds were also used to send kids from Arizona and six other states to solar camps.

The Arizona energy office's educational efforts were all SEP-funded or SEP-supported. According to Arizona's SEP managers, all of this - the training, the education the demonstrations - was a result of SEP. With the current SEP-supported solar infrastructure, Arizona has been able to facilitate the development of solar energy on Hopi tribal lands. In 1983 the Hopi Foundation (HF) was formed as a 501 (c) 3 non-profit corporation. Shortly after the formation of the Foundation, the State Energy Office applied SEP funds to train Foundation staff on solar energy theory, technologies and projects. This training resulted in the installation and use of solar energy systems on Hopi, Navajo, and Zuni Indian homes, as well as on a significant portion of Arizona's off-grid (without grid-connected power) homes near Flagstaff. As a result of the SEP-provided solar energy training and the resulting business development efforts the Hopi have

been able to implement an economic development business model for the promotion of solar energy and have been able to develop and offer other business services related to solar energy.

SEP has also helped Arizona lead the field in photo voltaic education and training. Arizona is often viewed as the best and most knowledgeable state in photo voltaic technologies. Arizona has provided training on the reservations in PV systems funded through SEP and Petroleum Violation Escrow (PVE) funds. As a result of the extensive experience in PV, Arizona used SEP funds to initiate PV planning efforts that resulted in establishing a statewide solar policy. Out of this effort grew Arizona's renewable portfolio standard. This renewable portfolio standard was specifically focused on achieving the policies established as a result of Arizona's SEP-generated and supported solar policies. According to SEP managers, the development of the Arizona solar portfolio standard was a direct result of the availability of SEP/PVE funding. And now, it is Arizona's policies, standards, education and experiences that are being used as the basis for the development of a national solar portfolio standard. According to SEP managers, these SEP efforts are having long-term state and national impacts.

The availability of SEP funding provided the opportunity to train Arizona's energy personnel in the knowledge and skill necessary for the development of Arizona's solar energy capacity. Personnel were sent to workshops and various classes; they developed expertise and became skilled solar experts; and Arizona successfully applied those skills and that knowledge and became a leading (if not the leading) solar state in the United States. Arizona's goal was to establish a skill-based infrastructure to facilitate solar capacity in the state. The SEP program funded the development of training materials and funded workshops and other skill building activities. The development of Arizona's training and educational videos on solar energy and its uses was funded via SEP. These videos received broad coverage on TV, were used in classroom presentations, and in various solar energy workshops. Arizona also developed many publications, educational materials and educational tools using SEP funds.

Arizona is a national leader in the development of solar energy. Its state energy office grew up with and contributed to the development of the solar energy industry. According to SEP managers, the office has developed a strong base of solar energy experts with extensive experience in the use of solar gain calculations, the design of solar energy systems, proper configurations of solar energy systems, human interactions and use of solar energy, costs of installations, maintenance practices, and other lessons that were learned. These skills and knowledge have lead to the successful utilization of solar energy, and this knowledge and skill base has been made available to other organizations and individuals not only in Arizona but across the United States.

Summary of SEP Effects on Current Capacity

Without the availability of SEP funding, Arizona would not have been able to develop its capacity to promote and develop solar energy thorough proper design, management, and implementation of solar energy systems. Without SEP, and what Arizona's energy office has been able to do with these resources, the promotion of solar energy today would require the hiring of personnel with little knowledge or skills in the use of the solar energy. According to Arizona SEP managers, most of Arizona's renewable energy expertise and skill level development was acquired through SEP funding, and the flexibility in the use of the SEP funding

was critical to the success of these initiatives. These funds and the federal rules for how states could spend them allowed Arizona to tailor its efforts to reach its state objectives. According to Arizona SEP managers through careful planning, design and implementation Arizona has enjoyed a high success rate in it is programs to promote solar energy.

Summary of Readiness for the Future

Arizona's core staff has been with the Energy Office for more than 20 years. This core staff was trained and developed through SEP/PVE funding. According to SEP managers, the core staff will allow Arizona to move forward with new initiatives and in the training of new personnel. As new funding becomes available, the infrastructure developed under SEP and the associated PVE funding has provided the foundation for successful programs, design and implementation. According to SEP managers, what Arizona now plans and now accomplishes is in many ways attributable to the SEP program and the USDOE funding.

IDAHO: RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

Historic Development of State Capacity

Idaho's interviewed experts report that the state of Idaho has used SEP funds for the development and operations of its renewable energy programs. The resources available from the US DOE - SEP has funded the development of renewable energy supporting materials for our technical assistance and outreach efforts, including phone calls, e-mails and other forms of public contacts. According to SEP managers, during the past year the Idaho Energy Office has provided technical support for 135 projects covering the full range of energy projects from gasification to hydropower. The office provides technical information and assistance to a wide range of renewable energy projects and initiatives across the state. There is a particular emphasis on providing support to the university and to citizens and businesses to promote and support renewable energy projects and to contractors or vendors who want to become involved in renewable energy initiatives in Idaho. According to SEP managers, the availability of SEP funds has allowed Idaho to develop expertise and fund technical support personnel for both the promotion and implementation of renewable energy projects.

SEP funds have provided for the administration of renewable energy programs, the development and deployment of projects, the organization of renewable energy conferences, and the establishment of professional workshops and educational efforts. These efforts have led to the development of professional networks with peers both in Idaho and in other states that have helped spread innovation within the market and helped speed adoption that helps move the development of the field. Relationships have been formed with industry professionals, equipment suppliers and renewable energy experts upon whom the successful development of projects rests.

Many specific types of expertise have been acquired by SEP managers and spread within the market as a result of the availability of SEP funding. The energy office now has experts that help in the development and use of anaerobic digesters, solar panels and other types of renewable energy technologies. The office has become familiar with various technologies, their performance capabilities and specific technical knowledge that improve long-term performance.

SEP funds provide for onsite inspections to assure quality installation practices and verification of operation for program-supported projects. The state experts have researched the use of biodiesel fuels and have developed information pieces and worked to make sure vehicle manufactures will not void warrantees when biodiesel is used. Program staff have worked with vehicle manufacturers and resolved warrantee issues that have facilitated the adoption and use of biodiesel fuels across the state in a way that has increased customer acceptance of the fuel as a reliable energy resource.

Idaho has had several high impact renewable energy projects. According to SEP managers, the University of Idaho has had a successful bio diesel energy research initiative supported by SEP. The program included fuels, systems and technology research. Another successful project has been the development of wood pellet combustion technologies to replace non-renewable fuels. There were also several successful hydro power projects supported by SEP that have helped increase the use of hydroelectric to where it now represents 60% of Idaho's electric generation. While SEP has not fully funded these projects, SEP has provided technical support and funding to account for 10% of the development of these projects. In addition, SEP has supported the development of co-generation facilities and a large waste-to-ethanol conversion plant.

According to SEP managers, there have also been SEP efforts that were not as successful as others in developing renewable energy supplies. For example, SEP resources were used to help support a large dairy herd anaerobic digester facility which fell short of its intended projection goals. These efforts have been valuable both for identifying what works and what changes are needed in other renewable projects to help make them work better and be more reliable. These experiences have helped Idaho build and implement more successful long term renewable energy projects and provide valued information and technical support to stakeholders.

Summary of SEP Effects on Current Capacity

According to interviewed managers, without the availability of SEP funds Idaho would not have the expertise that it currently has and would not be capable of fielding effective renewable energy projects. The state energy office would have limited expertise and would only be able to support small low-cost projects, consequently limiting the impacts of renewable energy. According to the SEP managers, Idaho would not have had a solar energy or wind energy program without SEP and would be substantially behind in helping the state more toward a renewable energy future.

Summary of Readiness for the Future

SEP funding has provided the development of an in-house base of skilled renewable energy experts that help advise, develop and deploy renewable energy projects and support the information and technical needs of developmental stakeholders. This core of expertise, supported by SEP funding, is what allows Idaho to plan for and move forward with larger projects or new initiatives. It is the expertise on which Idaho bases it renewable energy future.

LOUISIANA: RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

Historic Development of State Capacity
Louisiana's interviewed managers report that Louisiana does not have designated program offerings as in deployment programs, but they do have renewable energy information dissemination efforts. These are primarily in response to inquiries. They are frequently contacted and answer a number of questions and provide expert information.

Louisiana's wind resources are offshore. The energy staff has built considerable expertise in renewable energy. Their role is to provide reliable and accurate information that supports the efforts of others and to the public more generally. They quantify many of the benefits and approaches so people can make informed decisions.

The SEP supported energy staff helped get the solar tax credit implemented with a credit up to $25,000. Their office helped write the rules for the tax credits and built the tax credits rules in a way that assures good reliable systems are acquired and used. SEP managers wrote most of the tax incentive rules for Louisiana's revenue department.

SEP managers also work with private firms to identify where geothermal conditions are especially good for hot wells. The SEP managers provide information about the state's ability for solar PV to provide power. They also provide information and promote the development of biomass systems in this state. They work with forest products and the forestry association to get tax relief for proposed biomass facilities. They provide citizens with renewable energy and biomass information and show how much biomass energy Louisiana can provide via their farmers and crops. The energy staff work with the Commission to set up a renewable energy standard so that the utilities can acquire renewable energy resources to sell to their customers. The SEP Energy staff supported the development of the renewable energy standard with the Commission. These will be primarily biomass projects. The SEP managers also inform people of the economic analysis that shows how renewable energy can work in this state.

Along the way, SEP has developed staff expertise and skills capacity. Some examples include analysis skills, educational and presentation skills, networking and collaboration, marketing and information dissemination, and more.

Summary of SEP Effects on Current Capacity
Interviewed managers report that without SEP, none of this progress would likely have occurred. Managers report that beyond SEP and the required match funds, Louisiana has not on its own, invested any state funding into energy efficiency or renewable energy; this work has all resulted from SEP support.

Summary of Readiness for the Future
Managers report that the experience made possible by SEP has developed the energy efficiency and renewable energy capacity of this office. In other words, the SEP managers have become the energy experts that people in this state rely upon for energy-related information and assistance.

They have the knowledge base for what works, what an initiative will cost and what it can achieve. They can guide programs and policy as well. This knowledge base is the foundation for Louisiana's future energy efficiency and renewable energy efforts.

One state expert further noted that increases in conventional energy costs substantially drives interest in renewable energy, and thus impacts future projections regarding renewable energy.

MICHIGAN: RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

Historic Development of State Capacity

Interviewed managers report that in the 1990's, Michigan's SEP office escalated their involvement with the wind and solar energy sectors. They supported a number of demonstration projects and offered some incentives for wind turbine projects. There was a limited amount of SEP funding available for this, so these were small grants to get some wind energy systems up and running as demonstration systems. In 2002, SEP managers became more involved in public forums for sharing information on wind and working with the state outreach efforts. They provided more outreach and education at that time via the Great Lakes Renewable Energy Association, and on their own. More recently, the SEP managers have became involved with renewable energy policy and using SEP support, Michigan passed a renewable energy standard for the state. The Public Service Commission (PSC) was the lead on that effort, but the energy office provided support along the way. The energy office's previous tenure in the PSC (1986-1996) before moving to the Department of Energy, Labor and Economic Growth may have facilitated that partnership effort.

Michigan managers report success with the outreach efforts the SEP supported state energy office and its partners have provided. For instance, the Wind Working Group and the State Outreach Team have given 300 presentations on these topics, resulting in increased public support. Net metering is now in place and this office has supported these efforts. Michigan's $3 per watt incentive program was so successful that they ran out of money (budgeted at $300,000) in four months.

One initiative that has not yet achieved its intended potential is the Go Solar Workshops. While these have been well attended, these efforts have not yet translated into many system procurements. Managers report that they do not yet have the volume sales that they had hoped for in order to get the cost down. They would like to have generated more installations of photo voltaic (PV) and conductive solar hot water.

One state energy expert noted that over the past 12-15 years, this office has gained a great deal of professional expertise. Moreover, they have spread that expertise to other organizations, universities, and the state PSC. SEP has substantially helped them develop engineering skills and technical expertise associated with renewable energy technologies. Michigan's overall skill in renewable energy education was described as strong. This office has become the information gateway for the people of the state and for organizations. It was noted that SEP has folks who work in an area for a long time, who build expertise and relationships/networks that are critical to information dissemination. These networks help drive the state's renewable energy market.

Summary of SEP Effects on Current Capacity

Interviewed managers report that SEP was the seed for most all of these accomplishments. Managers report that without SEP, Michigan would likely have started from scratch in the late 2000's when the state elected a governor who wanted to move in this direction. "Because of SEP, we were ready." The office had already developed the expertise and infrastructure, and the experience to know what they were doing.

Summary of Readiness for the Future

Managers report that the past SEP efforts have positioned Michigan to move forward. SEP was essential to establishing the necessary skills, knowledge, and expertise. As a result, they are the experts in the state government and they have established the networks and relationships to more effectively utilize those skills.

MONTANA: RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

Historic Development of State Capacity

Interviewed experts report that one major renewable energy initiative is Montana's Alternative Energy Renewable Loan program. Using SEP staff expertise, this program obtains air quality violation funds and loan those funds to consumers and businesses for renewable energy projects up to $40,000 per loan. The SEP supported program has provided 100 loans, which managers report is a large number of loans Montana. The state energy offices wants to expand this program because demand is outstripping available funds. Thus far managers report distributing $3 million, and an additional $1.5 million to be available from ARRA is expected to be loaned within six months. The program relies on SEP managers in two ways. First, the state energy office receives applications and works with the program's banking contractor. Second, SEP technical staff review the renewable energy system for technical specifications and operations to make sure it can successfully work.

Managers report that Montana also has a green and clean energy tax credit program supported by SEP. The governor started a tax credit program for a wide range of green energy and non-polluting initiatives. SEP staff were central in drafting that bill for the governor and helping support the initiative in order to get it passed. This stimulated cleaner energy initiatives and enabled installation of new power lines that helped reduce energy. Montana also had energy efficiency tax credit rules, which relied on SEP staff to specify what qualifies for tax credits (examples include levels of insulation, window type, furnace efficiency levels, sheeting and infiltration materials, etc.).

Summary of SEP Effects on Current Capacity

Managers report that SEP support was vital to developing Montana's programs. In particular, it created and sustained the development of essential staff skills and expertise that was necessary to design and implement these programs. These were SEP efforts.

Summary of Readiness for the Future
SEP enabled Montana to develop the infrastructure and staff capacity to more effectively and efficiently guide its future efforts. The state is ready with skilled staff and management approaches because of SEP.

SOUTH CAROLINA: RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

Historic Development of State Capacity
Interviewed experts report that South Carolina has had considerable progress in the renewable energy development area on a wide range of initiatives.

The SEP supported state energy office formed the South Carolina Biomass Council, the South Carolina Solar Council, and the Palmetto State Clean Fuel Coalition (state level Clean Cities initiative supporting alternative fuel vehicle efforts). They have helped develop retail access to ethanol and biodiesels that sells to the public, and have lead the policy to use E-85 and biodiesel in state government vehicles. The interviewed managers report that the creation of five biodiesel plants in the state was entirely due to SEP support.

The state energy office also led the drafting of state legislation on tax incentives for renewable fuels and solar energy, and helped get these laws passed and implemented. Managers report that these efforts have moved the market in these areas and significantly facilitated new capacity in this state. There has been almost exponential growth in this area within the state. For instance, renewable energy capacity, landfill gas, and solar installations have doubled in 1.5 years. South Carolina has eight landfill gas operations that grew out of SEP legislation, and 60% of the gas needed for a BMW plant comes from their landfill gas project. Managers report that State SEP managers were directly responsible for all these developments.

SEP has also supported South Carolina's offshore wind energy development efforts. The interviewed experts report that SEP staff led this effort and leveraged additional state funds and utility funds to make it happen. The state also has launched SEP supported projects with their partners in the utility and university sectors to measure wind energy resources in coastal waters to acquire 80MW of offshore wind. SEP efforts are also supporting the assessment of the regulatory barriers to offshore wind generation, and SEP offers public education on the advantages and disadvantages of offshore wind. Now SEP is focusing on a wind farm study committee to provide staff support to the legislature in the same area.

The state energy office also provides technical assistance about renewable energy and information on how to use renewable energy in the state's businesses. This effort includes partnering with many others from the governmental, university, and private sectors to provide information and technical assistance to a wide range of groups and entities.

Managers report that one area that has not been as consistently as successful as hoped is South Carolina's solar thermal energy initiatives. The office has conducted demonstrations on public buildings, but have not yet been successful in getting these replicated. Solar heating in new

construction (thermal heating) has also yielded inconsistent results thus far in South Carolina. The state now has offered a small amount of solar heating tax incentives, but it is too early to determine their potential impact. However, manager's report that in general the demonstrations and rebates did not work as well as they had hoped.

Summary of SEP Effects on Current Capacity

Without SEP and PVE support, South Carolina managers reports that "we would have zero expertise in these areas or in other offices within state government, and none of these achievements would have happened." They have been able to hire people with good aptitude and interest in renewable energy, train them to a high level of expertise through SEP, and get them experienced in the field to the point where the SEP managers are now considered the state's renewable energy experts.

Summary of Readiness for the Future

Managers report that SEP has been the launch platform for all of South Carolina's renewable energy development efforts, and the SEP framework and managers are the nucleus for South Carolina's ARRA planning. Managers report that without SEP, the state would not have had the structure or ability to effectively or efficiently utilize ARRA support for energy initiatives. Over the longer term, managers report that SEP support will be vital to ongoing energy efficiency and renewable energy progress in South Carolina.

UTAH: RENEWABLE ENERGY DEVELOPMENT AND DEPLOYMENT

Historic Development of State Capacity

Interviewed experts report that Utah's energy office initially did not have significant expertise in renewable energy. Through the availability of SEP funds and the recruitment of newer staff, Utah was able to establish expertise in renewable energy and was able to target specific programs. The availability of SEP funds provided the opportunity to transition from managers who were generalists, to energy specialists within specific programmatic areas with corresponding backgrounds acquired through additional education in these fields of practice.

Managers report that without the availability of SEP funds and specifically PVE funds in the early years, it would not have been possible to promote renewable energy at significant levels. As PVE funding has declined, the ability of Utah to promote renewable energy has also declined. While some programs have been able to find other funding sources, the reductions in SEP funding has had a impact on the state's capacity.

Managers report that the Utah energy office has established a renewable energy capability in several areas. Utah has a wind energy anemometer loan program to enable businesses to borrow equipment to measure wind resource at their site. This program has been available for several years. A business can determine if their wind resource is sufficient for them to make a business decision to pursue wind as a resource.

Utah also has established a tax incentive program for small scale wind systems, solar hot water, passive solar, and other renewable resources. This program provides support for renewable

energy systems for residential and small commercial businesses. This tax credit program has been recently been extended.

Managers report that one of the most successful initiatives was to establish working groups on specific renewable energy topics. The working groups were able to leverage limited resources and pool their expertise into a critical mass that is helping to move projects forward.

Managers report that they have learned not to over-extend their efforts and to focus on the things that they can successfully accomplish. While there is a lot to be done, over-extending and focusing on too many efforts slows all efforts. After identifying a narrow range of priority areas, Utah was able to match and tailor SEP support to those priority areas. Managers report that the flexibility of the way SEP funds can be allocated and the technical assistance that these funds could provide was very helpful to the state.

Summary of SEP Effects on Current Capacity

Managers report that SEP funding has provided the infrastructure for the development and implementation of current renewable energy programs. The tax credit program is a particularly active current SEP developed initiative. The SEP supported wind energy anemometer loan program continues to provide site assessments and motivate investment in the installation of wind turbines in the residential and small commercial sectors.

Summary of Readiness for the Future

The SEP resources and the time spent evaluating the state's potential resources provided the information necessary for Utah to review the various opportunities across all of the renewable energy areas. This has set the state's future priorities and identified the state's needs. The working groups and the technical assistance efforts have significantly assisted in identifying areas that can be taken to the next level. These areas identified for development will be the subject of a new phase of program planning and economic analysis that will set the path for the state's future efforts

TRANSPORTATION

ARKANSAS: TRANSPORTATION

Historic Development of State Capacity

Interviewed managers report that the funding provided by USDOE SEP allowed Arkansas to establish its energy office in 1974. During these years the focus was on transportation fuels. One of the energy office's first efforts was a motor fuel management program. The office developed, established, and operated a statewide fuel allocation plan. The plan was established to be able to respond to energy emergencies. That capability continues to exist and can be activated should an energy emergency occur. Managers report that Arkansas is similar to other states in that it has a large amount of rural area and the fuel use per vehicle is greater than in other states. Arkansas also still operates a van pool program that benefits from SEP funds. The state government employee van pool had up to 60 vans and continues to provide ride sharing for

state government employees. The experience gained from the state van pool program has been utilized in the development of private sector van pool programs for the elderly providing them with energy efficient transportation services. The Arkansas van pool program receives supplemental funds through a rental car tax to supplement the SEP funds.

According to the interviewed managers, SEP funds were also used to assist in the coordination within Arkansas' inter-modal transportation authorities' efforts to maximize freight service and improve transportation energy efficiency services for local businesses. SEP funds were also utilized to develop and support other ride sharing programs and park and ride programs in the state.

Managers report that another effective program has been the development of an LED traffic light signal program. This program reduces the amount of electricity used in traffic lights and is a very strong energy saving program.

Summary of SEP Effects on Current Capacity

According to SEP managers, current programs depend on the expertise developed within state energy office personnel and the contacts developed within this office. This expertise comes from an understanding of transportation processes, rules, issues, and safety issues. Managers report that without the availability of SEP and PVE funds, most of the existing transportation (and other) programs in Arkansas would not exist. Managers note that it was the state's SEP funds that provided the critical leverage to get programs up and moving and demonstrating the value and need of increased funding. Managers indicated that prior to SEP Arkansas did not have any of these initiatives, programs, or emergency plans for energy. It was SEP funding that jump started many of the energy efficiency transportation programs.

Summary of Readiness for the Future

Interviewed managers report that SEP funding has elevated the skills and expertise of Arkansas' state energy office. The SEP-funded programs have allowed the office to establish allies and partnerships, and work with other stakeholders. The energy office has formed a joint committee on energy-related issues that will be working with the legislature to develop state initiatives related to energy issues. According to SEP managers, these SEP-supported efforts have already built the state energy office's expertise, and the office now has the platform to move forward into higher levels of energy efficiency. Without SEP Arkansas would not now have the expertise, the capability or even the state's energy office.

DELAWARE: TRANSPORTATION

Historic Development of State Capacity

Managers report that Delaware's SEP transportation initiatives have primarily focused on alternative fuels, although they have also worked with organizations that promote rideshare and van pools to improve air quality. Delaware was designated as a clean state in 1993. SEP and Clean Cities has supported the development and growth of Delaware's alternative fuels program.

These two programs have each provided about half the support in this area. SEP has provided both programmatic and staffing support.

The activity level of Delaware's alternative fuels program has fluctuated over the years as SEP support has fluctuated, and is currently in a down phase to match the recent cuts in SEP funds. One limitation to private industry support is that Delaware does not have niche markets (e.g., taxi fleets, airports) for alternative fuels.

Delaware tried to develop public access compressed natural gas stations, but that did not work well. Part of the problem was that auto manufacturers changed direction in what they were going to produce in the market. Delaware also developed a public access E-85 station that has been operational for over two years, however, at this time it does not get much use with the lower costs of gasoline. Two key reasons are that the location is not ideal, and the price of this fuel is tied heavily to the price of gasoline (i.e., it is more appealing when gasoline prices are over $2.70).

Summary of SEP Effects on Current Capacity

Managers report that Delaware's current capacity in this programmatic area probably would not exist without SEP support, or at best would be severely curtailed. Clean Cities support without SEP would not have been enough to maintain the full-time staff person needed for this program, nor provide sufficient programmatic support. Ongoing SEP support over the years has enabled Delaware to maintain some level of continuity over the years, although the fluctuating levels of SEP support have affected the rates of progress during that time.

Summary of Readiness for the Future

Delaware's future progress is heavily dependent on the future levels of SEP and other support. The state's programs in this area are reactionary, that is they develop the expertise and capacity to match the available funding sources. As these move up and down over the years, the state's capacity in these areas also move up and down. Managers report that they are ready for the future and that SEP has built that readiness, however funding availability will determine future efforts.

MAINE: TRANSPORTATION

Historic Development of State Capacity

Interviewed experts report that SEP support has been critical to Maine's initiatives in the transportation area. Maine has used both federal highway and federal transit support to fund a portion of a staff person's time, supplemented by SEP funding to help support projects.

SEP has had a particular impact on the state's outreach and educational efforts to fleets and fuel providers. More generally, SEP has helped Maine build its knowledge levels in this area. Its primary transportation initiative has been its Clean Cities effort. Maine's Clean Cities initiative has included a targeted focus on natural gas buses and fueling infrastructure, although it has also had initiatives to develop other fuels (e.g., propane and biodiesel). However, since this is a state-level program priority that is not driven by a federal mandate, it is difficult for Maine to compete

for federal financial support. Managers report that Maine's status as a rural state places them in a competitive disadvantage when it has to compete for federal funds. Nonetheless, a small amount of SEP support has been essential to enabling Maine to have some continuity of progress regarding energy efficient transportation initiatives.

Summary of SEP Effects on Current Capacity
Managers report that while Maine's energy efficiency and renewable energy transportation initiatives are small, Maine would not have developed any capacity in this area without SEP or other federal support. Interviewees indicated that absent such financial support, Maine has generally not paid much attention to transportation, alternative fuels, or petroleum reduction (even though it is heavily dependent on petroleum for heat), primarily because this has not been a priority of the state legislature, and because SEP funding levels specifically for transportation are low.

Managers indicate that even though Maine's level of SEP support is relatively small, what has been received has been valuable for helping to bring others to the discussion table as a coalition (e.g., fleets, fuel providers, and other key decision makers). This coalition approach has stimulated cooperation and project development among Maine coalition participants.

Summary of Readiness for the Future
SEP support is critical to the continued existence of transportation energy efficiency initiatives in Maine. This state did not receive or allocate any ARRA stimulus support for such initiatives. Maine's future progress in this programmatic area is dependent on the level of SEP support that can be directed to it.

NEW YORK: TRANSPORTATION

Historic Development of State Capacity
Managers in New York indicated that for a great many years the only resource available for developing and implementing transportation and transportation-associated alternative fuels projects in New York was SEP funding. While small amounts of other funding was available to help support these efforts, managers noted that the restrictions on the use of these funds made them particularly difficult to use in a way that provided the most value to the state across the initiatives that were most needed. It was noted that the SEP funds and the flexibility of how the funds could be spent provided substantial value to the people of the state. Managers noted that it was the SEP funding that allowed the state of New York to establish alternative fuel filling stations across the state. It was these stations that allowed people to acquire and use alternative fueled vehicles because it gave them a place to obtain the fuel. Managers noted that it was the SEP alternative fuel stations that made up a substantial part of the state's Clean Cities Initiatives and allowed the state to acquire additional Clean Cities funding to expand their Clean Cities efforts. The SEP-funded stations became the focal point for being able to expand the Clean Cities efforts. Managers noted that the flexibility in the use of SEP fund allowed the state to identify a need for a transportation program, and implement that program. Managers noted that the state was able to develop vehicle and fleet infrastructure and develop and launch alternative

fuel and transportation educational and information efforts. This infrastructure allowed fleets to acquire and use alternative fuels in their alternative fueled vehicles. Managers noted that it was the joint SEP initiatives of infrastructure development linked to an aggressive educational effort that allowed for the seeding and expansion of alternative fueled fleet operations in the state. Managers noted that because of SEP, New York was able to development of 30 different alternative fueled fleet projects across all areas of the state in 8 years.

Managers noted that the DOE alternative fuel development objectives and the SEP spending priorities match well with the state's objectives for the development of an alternative fueled transportation infrastructure. This SEP funding and spending flexibility has allowed New York to have an integrated and coordinated transportation approach that focuses on alternative fueled vehicles, biofuel development and deployment, development of natural gas engines and transportation-related fuel cell projects. Managers also note that the SEP program has allowed their managers to serve on multiple state committees and panels and be used as technical experts not only for SEP projects but for other projects across multiple organizations, state agencies and departments. Managers note that the SEP funds have allowed them to build high levels of expertise and share that expertise within the state as well as across multiple states. Managers also report that some transportation and renewable fuel efforts do not have the full support from the energy industries and that there are risks to pushing these efforts forward. However, they also report that it is the knowledge that is acquired via the SEP funds that allow state managers to be experts in the transportation field and be able to move projects forward and overcome lack of support to progress in these areas.

Summary of SEP Effects on Current Capacity

Managers noted that their transportation initiatives stem from a direct cause-and-effect relationship to the SEP funding source. According to the managers interviewed, SEP provided the seed money as well as the program development and implementation funding which allowed New York to have a transportation program. Managers noted that New York's SEP funding allowed the state to fill in service and infrastructure gaps and made the transportation projects not only possible, but successful. The SEP funding was used to hire and acquire expert managers who became the center of the SEP programmatic push and were able to also grow the non-SEP transportation initiatives in the state as a result of their SEP derived expertise. They noted the multiplier effect of having experts for SEP initiatives that could also be used to feed decision about non-SEP transportation initiatives. According to those interviewed, the SEP managers were developed into experts using SEP dollars and this level of expertise allowed the New York efforts to be successfully approved and implemented. These same individuals then went on to become some of the experts that supported other non-SEP initiatives not only within, but beyond the state, allowing other states to have access to these experts and their knowledge. Managers report that without the SEP funds, there would not have been the New York transportation initiatives describe here and they would not have had the flexibility to support other transportation initiatives.

Summary of Readiness for the Future

New York managers report that SEP has positioned the state to be ready to take on the ARRA challenge and other related initiatives and that it is because of SEP that they are now prepared. They report that the expertise has been and is continuing to be acquired and that New York

knows what to do and how to do it as a direct result of SEP. SEP established the state's planning capabilities. They report that SEP has allowed them to have a respected market presence and a skilled level of knowledge on which planning efforts must be grounded. They noted that they are now accepted in New York as the industry's experts and they report that because of SEP they now have the partnerships, knowledge, skill, people, and market savvy to be even more effective in the future. They report that they are now already moving into climate change initiatives and other policy arenas with a base of knowledge that is guiding New York's future initiatives and that this capability is there because of SEP.

UTAH: TRANSPORTATION

Historic Development of State Capacity

Interviewed managers report that the state of Utah made an early decision to concentrate its transportation initiatives in the area of alternative fuels, especially natural gas. Utah also decided to support the development of the Clean Cities program through a grant program to the Clean Cities Coalition.

Managers note that without the availability of SEP funds, Utah could not have kept its Clean Cities initiative active. The promotion of alternative fuels was especially difficult when gasoline prices were low and alternative fuels did not have much support.

When funds were reduced, SEP funding provided for the continuity of expertise in the Utah Energy Office. SEP funds also provided for the leveraging of additional resources such as Salt Lake City that provided office space, office equipment and supplies for a person devoted to energy related issues.

Managers report that without the availability of SEP funds, Utah would have lost partners for the Utah Clean Cities Coalition and it would have ceased to exist. Without the availability of PVE funds, there would not have been the robust grant program for the promotion of alternative fuels. The awareness and interest level in alternative fuels would have decline without the grant program. SEP funds bridged the gap to maintain interest in alternative fuels when gasoline prices were low until the spike in prices rebuilt the interest and awareness in alternative fuels.

According to the interviewed managers, the major success was the establishment of the Clean Cities Coalition. The existence of the Coalition helped maintain the structures that were developed for the promotion of alternative fuels. The partners became the guardians of the tax credit program when it came up for reauthorization.

The major difficulty was limiting programs to alternative fuels at the expense of promoting other forms of alternative fuels. Managers report that it would have been better to have broadened the available programs to include other fuels. Funding limitations over 10 years, from 1995 to 2005, reduced the achievable impacts from renewable energy initiatives.

Summary of SEP Effects on Current Capacity

Managers report that SEP funding has provided the core staff and infrastructure for the development and implementation of current programs. They note that without SEP funds these efforts would not be supported with state funds.

Summary of Readiness for the Future

The impact of SEP funding has been to allow Utah to maintain a presence in many program areas and to continue to provide incentive programs. This continuity of infrastructure and maintenance of expertise has provided Utah the opportunity to bridge the lean years until the current change in culture and the availability of ARRA funding have provide the ability to filed new program initiatives. Managers report that they are ready now because of SEP but have had to focus maintaining capability in the areas supported by SEP funding.

VIRGINIA: TRANSPORTATION

Historic Development of State Capacity

Managers report that Virginia has utilized SEP support to develop an extensive array of energy programs. They also have an SEP supported statewide energy management plan that is currently being updated.

Interviewed managers report that Virginia has a robust alternative fuels program for vehicles, supporting fueling infrastructure and providing technical assistance on retrofit approaches. This program includes support focused on hydrogen fuel cell, fuel to electric hybrids, biodiesel and ethanol fuels, and blends for these fuels. These efforts also include education for the general consumer, fleet targeted information, and technical support, as well as workshops on physical, engineering or reliability issues. Virginia also provides website tools for decision makers considering alternative fuels in fleets. They offer one-on-one visits to fleets to implement alternative fuel strategies.

Data collection from fleets that use alternative fuels is utilized by Virginia to understand issues and explore solutions. The state energy office tracks alternative fuel vehicle penetration and the number of stations with alternative fuels. They also focus on specific data collection via their grant programs. Clean diesel grant programs via the Clean Cities program and the associated grants are managed and coordinated by the SEP program. Virginia pays for project management with SEP funds. In the past the program has collected data on mechanical problems and breakdowns, and other maintenance issues, resulting from the use of alternative fuels. This provided good information on how to use these fuels safely and reliably and to avoid maintenance issues.

Virginia's SEP efforts also supports industry development via workshops on manufacturing and refining and fleet use of alternative fuels. These are fleet educational efforts aimed to increase adoption. They also provide support on biodiesel manufacturing and refining so that the fuel can be used in vehicles in the winter when fuel chemistry is critical to reliable operations. Virginia

also supports ethanol distribution systems in the state at the industrial level. This is done via educational and financial support for fuel distributors to add E-85 to existing stations.

Most of the hydrogen fuel cell support has been aimed at government decision makers. Virginia focused on education of decision markers promoting that state's development as an early adopter of fuel cell technologies. SEP supported hydrogen fuel cell workshops and video materials to educate government and elected officials, as well as operational staff. This showed these decision makers what it was, how it could be used, and what it meant to their operations.

SEP support also helped demonstrate fuel cell vehicles via working with GM and Honda to use their vehicles in the state energy office's workshops. Additionally, Virginia used SEP funds to demonstrate small scale propane fuel cells to strip off hydrogen atoms to generate electricity.

Managers report that Virginia is also looking at building more biomass and renewable energy resources, including municipal solid waste to energy programs. They are highly confident that these will work because of their past SEP-built expertise in this field and the results of previous efforts, however, lack funding has slowed these efforts.

Summary of SEP Effects on Current Capacity

Managers report that SEP has had an enormous impact in Virginia. One state expert summarized it this way: "SEP is the bedrock for most everything we do, what we have learned, and the expertise and capacity we have acquired." According to the interviewed managers, Virginia's progress on all of its various initiatives is directly traceable to SEP, and would not have been possible without SEP.

Their program support budget is heavily driven by SEP and SEP associated funding. . Managers report that without SEP, Virginia would not have hired any staff for the functions of the state energy office and would not have acquired energy efficiency or related engineering and other support skills. A non-exhaustive list of the skills acquired as a result of SEP includes engineering, alternative energy, certified energy manager and other management, energy-related financial analysis, policy analysis and policy assessment, project management and tracking, training and education, website design, and networking across multiple stakeholders.

Summary of Readiness for the Future

Managers report that SEP and related funding from DOE enabled Virginia to lay the foundation for all of its energy efficiency and renewable energy initiatives. All of its current programs, and all those projected in its future plans, are grounded in its SEP and the program's infrastructure. This infrastructure is essential for the state's readiness to effectively and efficiently respond to ARRA investments. The SEP infrastructure and continuity of expertise has profoundly affected Virginia's progress and provides its foundation for the future.

WISCONSIN: TRANSPORTATION

Historic Development of State Capacity

According to Wisconsin SEP managers, energy efficient transportation projects were developed and implemented as a direct result of SEP funding. SEP funding provided for the training and development of experts in transportation energy efficiency and the development of networks for the distribution of information and program resulting. The funding of demonstration projects was a particularly important aspect of the promotion of energy efficiency in the transportation sector.

Wisconsin state government initiated SEP-funded demonstration projects in the Wisconsin transportation sector. SEP mandated the implementation of the Right Turn On Red program. This program was 100% funded through Wisconsin SEP efforts.

An innovative program funded through SEP funds was a software development project that allowed for the synchronization of traffic lights. There were no software packages available for purchase available through the market place. Funds were provided to a contractor for the development of such a system and computer algorithms were written to monitor traffic flow and reduce start and stop driving. Wisconsin was one of the first to states to develop, install and implement such a traffic light synchronization program. Traffic light synchronization programs are now common across the country, many of which have been based on the Wisconsin SEP-funded software.

Another area of expertise that was developed by Wisconsin's energy office was in the area of bicycle transportation. The energy office facilitated the installation of bike racks in Madison around state government buildings. This effort was followed by Bike To Work days. The positive public relations led to legislative initiatives that resulted in Bike To Work Week. Milwaukee adopted many biking measures and other cities adopted similar measures. Madison has developed one of the most extensive systems of bike paths in the country and has been voted one of the most bicycle friendly cities in the US. The result has been an improvement in transportation energy efficiency because of the extensive use of biking to work. As a result of the heightened awareness of bicycling, the State of Wisconsin has established an extensive network of bicycle trails in Wisconsin. These trails have provided centers of economic development as tourists come to Wisconsin to enjoy the bike trails and scenic areas. The professionals who established these capabilities were SEP-funded managers.

The agricultural base of the Wisconsin economy has provided the opportunity to develop an extensive effort for the production of ethanol. SEP was the source of early efforts to develop reliable programs for the conversion of various agricultural products into ethanol. These research and development efforts resulted in the extensive ethanol industry currently in place in Wisconsin.

The energy office promoted the use of ethanol in the state car fleet. Gasoline pumps at state facilities were modified to pump ethanol. Gasoline tanks were installed at state facilities to hold E-85 ethanol gasoline. The E-85 promotional effort was funded through SEP funds.

An electric car educational and promotion program was developed and monitored through he use of SEP funds. This program provided training in the servicing and maintenance of electric vehicles. The program was designed to develop the infrastructure necessary for a successful

introduction of electric vehicles into the economy. The program provided training related to batteries, electronics, controllers and other skills necessary for the successful operation of electric vehicles.

Another successful program was the promotion and adoption of LED traffic signals. The Energy Office studied the potential benefits of LED traffic signals. The Wisconsin Department of Transportation provided sufficient funds for the wholesales purchase and installation of LED traffic signals. Wisconsin was one of the first states with a large-scale LED traffic signal installation program. This program went ahead before the before the completion of the federal standards for LED traffic signals. The effect was to push the market and complete the development and implementation of standards. The mass adoption of LEDs for traffic signals was to push down the price and provide for the rapid adoption of energy efficient LED traffic signals nationwide.

Not all programs were successful. Many of the waste products used for the generation of ethanol did not prove successful. There were attempts to generate ethanol from potato peelings, rice hulls and cheese whey. From these early failures, Wisconsin learned to concentrate on corn.

Summary of SEP Effects on Current Capacity

SEP funding has provided the core staff and infrastructure for the development and implementation of current programs. An extremely active program in the promotion of ethanol is currently operating. This program is working to expand the fleet of vehicles using E-85 and the installation of facilities to provide E-85 fuel in convenient and highly utilized locations. Bicycle paths continue to be installed and routes connected so that the presence of bike paths can be used as in promotional efforts to attract meetings and conferences to Wisconsin cities. The availability of extensive biking opportunities was used by the City of Chicago in its efforts to bring the summer Olympics to Chicago.

Summary of Readiness for the Future

According to Wisconsin SEP managers, the current staff and programs developed under SEP funding will continue to provide for the initiation and ramping up of new programs such as expansion of ethanol production or other alternative fuels funded by new funds, such as projects funded through ARRA monies.

Future activities will include the distribution of educational material currently developed and the incorporation into ongoing and new programs of additional material to be developed though new program activities. Future activities will build on the expertise and experience developed through the LED traffic signal program for the design, development and implementation of additional traffic lighting energy efficiency programs.

APPENDIX B: GLOSSARY OF TERMS

AC – Air Conditioning – A phrase commonly used to denote equipment used to provide cooled air. This equipment is also used to improve air quality through changes in humidity and filtering.

Anemometer – A device used to measure wind speeds to determine if there is enough wind speed at a particular location to be able to generate electricity from a Wind Turbine.

ARRA – American Recovery and Reinvestment Act - The American Recovery and Reinvestment Act of 2009 is an economic stimulus package for the US economy to create or save jobs and address future challenges. ARRA provides funding for many energy efficiency programs including research, development, and the deployment of technologies related to energy efficiency and renewable energy.

ASHRAE 90.1 2004 – American Society of Heating, Refrigeration and Air-Conditioning Engineers. 90.1 2004 is the 2004 document with energy efficiency design guidelines for buildings. This document serves as the basis for model energy efficiency codes. This guideline is updated approximately every two years.

Biodiesel – A renewable energy form of diesel fuel used in cars and trucks. Biodiesel is often made from waste fats, cooking oils and oils used in deep fat fryers. It can be made directly of soy beans and some other crops with high oil content.

Biomass – Energy resources derived from organic matter. These include wood, agricultural waste and other living-cell material that can be burned to produce heat energy. They also include algae, sewage and other organic substances that may be used to make energy through chemical processes.

BOCT – Building Operator Certification Program – A program designed to train building operators, maintenance personnel and managers in the proper operations of building equipment and energy efficient operating procedures. Upon completion of training the student receives a certificate that certifies them as trained in the energy efficient operation of their building.

Climate Change – A phrase used to describe changes in local or global climate. Climate Change is often used as an alternative to Global Warming to represent local climate changes that are more general such as increases in the frequency of extreme local weather events, local cooling or other unusual climate conditions.

CNG – Compressed Natural Gas – Natural gas compressed under high pressure and stored in steel cylinders so that it can be used as a fuel for vehicles such as car and trucks.

While CNG is not a renewable fuel, it serves as an Alternative Fuel to reduce dependence on imported petroleum.

Compressed Air Challenge – An Industrial energy efficiency program funded through DOE efforts. The program provides information on how to avoid waste in the used of compressed air through detection and fixing of leaks, proper sizing of air compressors, and sizing of compressed air distribution systems and purchased of efficient air compressors and proper use of compressed air.

Cooperative Extension Service – A cooperative provision of educational services provided through state land grant colleges. These services are "extended" throughout the state and often provided through County Extension Agents. Cooperative Extension will often provide training on new equipment, building codes, or to obtain credits required to obtain or maintain accreditation as a licensed engineer.

DOE - The United States Department of Energy.

E85 – a mixture of ethanol and gasoline that is 85% ethanol and 15% gasoline. The ethanol is a renewable energy source made from biological materials or other waste products such as cheese whey.

EERE - Office of Energy Efficiency and Renewable Energy within the Department of Energy, which is devoted to programs that research and develop energy efficiency and renewable energy.

Energy Star – A program provided through the combined efforts of DOE and EPA to identify and label energy efficient products such as appliances and other energy using equipment. Energy Star has a goal to identify and label the top 20% most energy efficient products such as refrigerators, freezers, dish washers, clothes washers, many commercial food service equipment products, lighting equipment and many other products. Energy Star also promotes improved energy efficiency of total building energy use through bench marking or the rating of energy usage for many specific types of buildings.

ESPC – Energy Service Performance Contract – Energy services provided by firms that determine opportunities for reducing wasteful energy use, installing more energy-efficient equipment, and improving operations and maintenance of buildings. These services are often paid for through the dollar savings resulting from reduced energy use and lower utility expenses.

EXXON Funds – One of many Petroleum Violation Escrow funds resulting from the settlement of petroleum overcharge violation in federal court proceedings. EXXON funds result from a separate court settle against the EXXON Oil Company.

Hazard Mitigation – A phrase used to describe the reduction or elimination of a hazard such as exposure to lead paint, asbestos or radon gas. The mitigation can consist of removing hazardous materials or taking other measures to prevent exposure.

HERS – Home Energy Rating System – A HER rating is a measure of a home's energy efficiency. The rating is used by the US government for verification of building energy performance for such programs as federal tax incentives, the US Environmental Protection Agency's Energy Star program and the US Department of Energy's Building America Program. A rating of 150 is a typical existing home, 100 is a Standard New Home (2006), 85 is an EPA Energy Star New Home and 0 is a Net Zero Energy Home (ZEH).

HVAC – Heating, Ventilation, and Air Conditioning – The general term applied to equipment used for heating a residential or commercial building and for providing ventilation and air conditioning to the occupied space.

ICP – Institutional Conservation Program – The ICP is a voluntary grant program designed to help non-profit institutions like schools, hospitals, local governments, and public care facilities save energy and reduce energy-related costs.

K-12 A phrase used to describe school programs for children in grades Kindergarten through 12^{th} grade. Used to identify comprehensive programs for pre college level students.

LED – Light Emitting Diode – A light source ten times more efficient than incandescent light bulbs often used in flashlights and traffic signals. New applications include: street lighting, parking lot lighting, highway billboards, and the replacement of incandescent lights.

LEED – Leadership in Environment and Energy Design – A program to promote the design, building and retrofit of buildings to be more energy efficiency, compatible with the environment and consistent with a sustainable environment.

LNG – Liquefied Natural Gas – Propane – A hydrocarbon molecule found in natural gas that becomes a liquid at room temperature under modest pressures. Used as a fuel for vehicles such as cars, light trucks and buses. Also used as an energy source for outdoor grills.

Motor Master – A database listing electric motors, their type, horsepower, speed and energy efficiency. This database is used to promote the sale and distribution of energy efficient electric motors.

NEED – National Energy Education Development Project – NEED works with energy companies, agencies and organizations to bring balanced energy programs to the nation's schools with a focus on strong teacher professional development, timely and balanced curriculum materials, and signature program capabilities.

ORNL – Oak Ridge National Laboratory – A federally-owned national laboratory managed by UT-BATTELLE. ORNL manages many federal energy related programs and was one of the original laboratories associated with the Manhattan Project.

OWIP – Office of Weatherization and Intergovernmental Program – The OWIP is an office within the Office of Energy Efficiency of Renewable Energy (EERE) in DOE. The activities of OWIP include the Weatherization Assistance and State Energy Programs.

PR – Public Relations – Public relations is the provision of information through various media such as print, radio, or TV utilizing press releases, fact sheets, interviews, testimonials or other forms of communication.

Public Benefits Program – A program to provide energy efficiency information, education, incentives, and equipment to utility customers funded through a separate charge on customers' utility bills. These programs are often run by utilities or nonprofit organizations established by statute or through competitive bidding.

Public Goods Charge Program – A charge on a utility customer bill to fund public purpose programs including energy efficiency, low-income, and research and development programs.

PV – Photovoltaic – A solid state electronic device that absorbs solar energy and generates electricity. A photovoltaic system can provide electrical energy for a residence or building or provide energy directly into the electric grid.

PVE – Petroleum Violation Escrow funds – These are funds make available to state energy offices for energy efficiency improvements as a result of law suits and court settlements against oil companies for overcharges in violation of limits on prices allowed for petroleum products.

Rebuild America – A program to promote energy efficiency in existing building within the commercial, government and multifamily sectors. The program's focus is to provide assistance to projects that lead to the best available building technologies and practices, resulting in improved energy efficiency, reduced pollution, and a more modern infrastructure. This program works through state and local governments.

Renewable Energy – A form of energy that can be used to replace non renewable energy such as fossil fuels. Renewable energy resources constantly renew themselves or are considered inexhaustible, such as heat or geothermal energy from the earth or energy from the sun. Examples include: wind energy for electric generation, geothermal for the generation of electricity or for space heating such as geothermal heat pumps, solar energy for the generation of electricity through photovoltaics, the production of hot water through solar collectors or space heating through solar heating of air, biofuel such as

ethanol, biodiesel, wood, hydro generated electricity and other forms such as tides and wave action.

RPS - Renewable Portfolio Standards – A requirement that utilities include or reach a predetermined goal of electric generation or generating capacity from the use of renewable energy. This is their portfolio of generation capacity. An example would be 20% by 2020. This means that 20% of the electricity generated by an electric utility would come from renewable energy by 2020. This generation could be hydro power, wind power, burning bio mass for steam generation, solar photovoltaic or some other renewable energy.

Right-Turn-On-Red – A program to allow vehicle drivers to turn right at an intersection even if the traffic signal is red. The program is designed to reduce waiting times at intersections and as a result save gasoline.

Schools and Hospitals Program – The Schools and Hospital Program was funded through the National Energy Conservation Policy Act. The program concentrated on providing audits, technical assistance and energy efficiency improvements in schools and hospitals.

SEP – State Energy Program – The SEP was established in 1996 by merging the State Energy Conservation Program (SECP) with the Institutional Conservation Program (ICP), both of which had been in existence since 1976. The SEP provides financial assistance for a wide variety of energy efficiency and renewable energy activities undertaken by the states and territories. SEP provides money to each state and territory according to a formula that accounts for population and energy use. In addition to these "Formula Grants," SEP "Special Project" funds are made available on a competitive basis to carry out specific types of energy efficiency and renewable energy activities. The resources provided by DOE typically are augmented by money and in-kind assistance from a number of sources, including other federal agencies, state and local governments, and the private sector.

Specifiers – Professionals who specify the building design and equipment incorporated into new construction or retrofits of existing buildings.

Stripper Funds – One of several Petroleum Violation Escrow (PVE) funds. Stripper funds result from a settlement of lawsuits related to overcharges of petroleum from "Stripper Wells" or petroleum obtained from older oil wells where smaller amounts of petroleum are pumped out of older oil fields.

Universal Charge Program – A universal charge is similar to a public benefits charge except that for a public benefits charge program often there is a provision that some customers that do their own energy efficiency improvements can be excused or opt out of the public benefits charge. A universal charge program requires that every customer pay into the program. This is often used in the regulated telephone industry as a universal charge to assist low income customers.

USDOE – The United States Department of Energy.

Web – A phrase used to denote the Internet or the World Wide Web (WWW). This is the interconnection of computers or information exchange in a vast web like structure connecting distant users with each other.

Wind Turbine – A large wind mill used to generate electricity where the energy of wind turns the blades of an electric generator much like a coal fired electric generating plant uses steam to turn the blades of a steam turbine.