Executive Summary

State governments can achieve substantial energy cost savings across their facilities, operations, and fleets through clean energy Lead by Example (LBE) programs.

They can also demonstrate energy and environmental leadership, raise public awareness of the benefits of clean energy technologies, improve air quality, reduce greenhouse gas (GHG) emissions, improve energy supply and reliability, and foster markets for environmentally preferable products. The LBE Guide provides information to assist state governments as they develop and implement effective LBE programs to achieve their clean energy goals. It presents strategies, resources, and tools state decision makers can use throughout the process.

EPA and other organizations recognize leading by example as a key policy option for states seeking to achieve their clean energy goals. For example, the importance of LBE programs is documented in the the National Action Plan for Energy Efficiency "Vision for 2025" report. The Vision identifies LBE as a critical component of achieving the long-term goal of all cost-effective energy efficiency by 2025. Goal Six of the Vision's ten implementation goals is to develop state policies such as LBE for pursuing robust energy efficiency practices.

BACKGROUND

State governments across the country are achieving significant energy, environmental, public health, and

DOCUMENT MAP

financial benefits through a variety of clean energy policies and programs (U.S. EPA, 2006). One of these clean energy strategies is "leading by example," which involves implementing clean energy policies and programs in buildings, facilities, operations, and fleets under their control (U.S. EPA, 2006). State governments are finding that such Lead by Example (LBE) programs produce substantial energy savings while offering a range of other benefits, including: demonstrating leadership and the economic competitiveness of clean energy; reducing emissions of greenhouse gases (GHGs) and air pollutants; increasing fuel diversity; improving energy system reliability; fostering markets for clean energy products, services, and technologies; and promoting sustainable alternatives to conventional practices.

To help states achieve these benefits, EPA has developed the *LBE Guide.* States can use the *LBE Guide* to initiate or expand an LBE program with the objective of establishing a comprehensive LBE program across their buildings, facilities, operations, and fleets. A comprehensive program typically (1) offers greater benefits due to its broader scope, (2) increases the cost-effectiveness of LBE activities, due to economies of scale from bundling individual activities, (3) garners political support by appealing to a variety of constituencies, and (4) increases the visibility of LBE activities.

The *LBE Guide* is an important next step in EPA's efforts to assist states as they develop clean energy portfolios. It extends and supports two other recent state policy assistance documents:

- EPA's *Clean Energy-Environment Guide to Action*, which describes and provides information on sixteen clean energy policies, including LBE (U.S. EPA, 2006).
- *The National Action Plan for Energy Efficiency (Action Plan)*, which is a private-public initiative designed to overcome barriers to energy efficiency. The *Action Plan*'s implementation framework – the *Vision for 2025* – defines implementation goals for achieving all cost-effective energy efficiency by 2025. This document recognizes LBE programs as an important component of this goal, and uses the presence of a strong state LBE program as an indication of progress towards achieving this goal (NAPEE, 2006, NAPEE, 2007).

The *LBE Guide* outlines:

- The value of clean energy LBE programs and activities,
- A set of LBE activities that states are successfully implementing,
- A process for developing, implementing, and tracking a comprehensive LBE program that includes one or more of these LBE activities, and
- Key strategies, resources, and tools for states to use during this process.

Throughout the *LBE Guide* more than 120 sidebars and case studies are provided. These examples describe specific instances in which state and local governments are pursuing and implementing LBE programs. Additional

WHAT IS CLEAN ENERGY?

Clean energy includes demand- and supply-side resources that are less polluting ways to meet energy demand. Clean energy resources include:

Energy efficiency – refers to using less energy to provide the same or improved level of service to the energy consumer in an economically efficient way. Energy efficiency measures include a wide variety of technologies and processes, and can be implemented across all major energy-consuming sectors.

Renewable energy – energy generated partially or entirely from non-depleting energy sources for direct end use or electricity generation. Renewable energy definitions vary by state, but usually include wind, solar, and geothermal energy. Some states also consider low-impact or small hydro, biomass, biogas, and waste-to-energy to be renewable energy sources. Renewable energy can be generated on site or at a central station.

Combined heat and power (CHP) – also known as cogeneration, CHP is a clean, efficient technology that improves the conversion efficiency of traditional energy systems by using waste heat from electricity generation to produce thermal energy for heating or cooling in commercial or industrial facilities. CHP systems typically achieve 60% to 75% fuel use efficiencies, which is a significantly higher than those of conventional power plants.

Clean distributed generation (DG) – refers to non centralized—usually small-scale—renewable energy and CHP.

For more information, visit the U.S. Environmental Protection Agency's (EPA's) Clean Energy Web site (*http://www.epa.gov/cleanenergy*) and the ENERGY STAR Web site (*http://www.energystar.gov/*).

THE LBE GUIDE AND LOCAL GOVERNMENTS

While this *Guide* is designed primarily to assist states in planning, implementing, developing, and operating comprehensive LBE programs, many of the approaches described here can also benefit local governments. Like states, municipalities are involved in developing LBE programs for clean energy, although specific program activities and issues may differ. This *Guide* provides both examples of how certain state activities are relevant to local governments and several cases in which local LBE activities can inform state activities.

state and local examples are presented throughout the text. The structure of the *LBE Guide* and a selection of some of the state and local examples highlighted in each chapter of the *Guide* are summarized in Table ES-1, and a brief summary of the key elements of the *Guide* is provided below.

THE VALUE OF CLEAN ENERGY LBE PROGRAMS

The *LBE Guide* describes a series of activities and strategies that states can adopt to capture significant energy, environmental, economic, and other benefits. An overview of these benefits is provided below, along

TABLE ES-1 LBE GUIDE: ORGANIZATION AND CONTENTS

Chapter Contents and Supporting Information	Selected State and Local Examples
Chapter 1: Introduction	
Contents: Describes the overall benefits of LBE programs and outlines the LBE process.	WI: Efficient Buys Program – VendorNet Montgomery Co., MD: Wind Power Purchases CT: Demand Response Program CT: Developing a State LBE Program
Chapter 2: LBE Activities and Measures	
Contents: Introduces important background information on benefits and implementation issues associated with six key types of LBE activities. The information and examples provided in this chapter can help inform decisions at multiple stages in the LBE program development process, described in subsequent chapters. Supporting Information: Appendix B: State and Local Clean Energy LBE Programs: Examples, Tools, and Information Resources	VA: Energy Efficiency Policy and Advisory Council CA: Benchmarking State Facilities MN: State Sustainable Building Guidelines NY: "Green and Clean" State Buildings MA: Environmentally Preferable Product Procurement CT: Green Power Purchases NJ: Aggregated Green Power Purchase IL: State Agency CHP Activities UT: Solar Power Demonstration CO: Water Conservation in State Agencies CT: Demand Response Program
Chapter 3: Establishing the LBE Program Framework	
Contents: Describes the first steps in establishing a framework for a comprehensive LBE program, including selecting an LBE team and other key participants, obtaining high level support, setting goals, and initiating the program. Supporting Information: Appendix A: State Executive Orders, Legislation, Policies, and Plans Initiating LBE Programs Appendix C: Resources for Implementing LBE Programs	Establish LBE Team and Obtain Support MA: LBE Champions GA: Gaining Support for LBE Program CT: Nonprofit Organization Participation Set Clean Energy Goals CA: Benchmarking Initiative NY: "Green and Clean" State Buildings and Vehicles Establish Mechanisms to Implement the LBE Program SC: Energy Efficiency Act WA: King County Model LBE Program

TABLE ES-1 LBE GUIDE: ORGANIZATION AND CONTENTS *(cont.)*

Chapter Contents and Supporting Information	Selected State and Local Examples
Chapter 4: Screening LBE Activities and Measures	
Contents: Provides information on assessing LBE activities and measures to create a portfolio of LBE activities and measures. Supporting Information: Appendix B: State and Local Clean Energy LBE Programs: Examples, Tools, and Information Resources	MI: Energy Reduction Strategy-Financial Criteria MA: Sustainability Program – Selection Criteria UT: Screening Energy Efficiency Options VT: State Agency Energy Plan WI: Wisconsin Energy Initiative NV: Energy Conservation Plan
Chapter 5: Developing a Comprehensive LBE Program	
Contents: Discusses key design and implementation issues for states to consider as they develop their LBE programs. Supporting Information: Appendix C: Resources for Implementing LBE Programs Appendix D: Resources for Funding LBE Programs Appendix E: Resources for Conducting Communications and Outreach for LBE Programs Appendix F: Resources on Technical and Financial Assistance to Local Governments Appendix G: State LBE Programs and Contacts	Integrate Individual Clean Energy Activities into a Program CA: Solar Schools Program Finance the LBE Program VT: Procurement Policy CO and CA: Resources about ESCOs NH: Building Energy Conservation Initiative IA: Iowa Energy Bank IA, SC, CT: States Developing Ways to Share or Retain their Energy Savings Conduct Communications and Outreach: Building and Maintaining Support for an LBE Program CO: State Employee Incentives VT: Emphasizing the Benefits of Clean Energy Provide Technical and Financial Assistance to Local Governments CA: Technical Assistance in Buildings NY: Product Procurement Assistance OR: Energy Audits and Design Reviews PA: Energy Management Plan Assistance TX: Schools and Local Government Program
Chapter 6: Tracking, Evaluating, and Reporting LBE Program Progress	
Contents: Provides information on how to track, evaluate, and report on the performance of LBE programs and activities. Supporting Information: Appendix H: State LBE Tracking Tools and Resources Appendix I: M&V Protocols and Guidance Appendix J: Resources for Reporting the Results of LBE Programs	WY: Energy Conservation Improvement Program: Measurement and Verification Plan Guidelines MA: Data Collection Approach – Energy and CO2 Intensity GA: Energy Tracking System NY: Energy Utilization Index CA and NY: State Applications of the IPMVP CA: Evaluation, Measurement, and Verification of the 2004-2005 San Diego Local Government Energy Efficiency Program

with Table ES-2 that describes the specific benefits of six key LBE activities highlighted in this *Guide*.

- *Demonstrate leadership*. Through good energy management, state governments can proactively address the nation's energy challenge while also being fiscal responsible. Through their direct actions and by sharing their approaches, state governments can help raise awareness of clean energy opportunities, help develop markets for clean energy technologies and services, make technical and financial resources available for local clean energy activities, and help develop and implement programs that directly assist constituents.

- *Reduce energy consumption and costs.* Combined, state and local governments spend more than $11 billion annually on energy costs, which can account for as much as 10% of a typical government's annual operating budget (U.S. DOE, 2007a). State governments can implement a variety of LBE activities that reduce these costs. If a state government that spends 10% of its operating budget on energy reduces its energy consumption by 20% – a goal which many states have adopted – it can reduce operating budget costs by 2% and create significant operating budget flexibility.

- *Reduce air pollutants and GHG emissions.* By implementing LBE activities, state governments can reduce emissions of GHGs and air pollutants (e.g., sulfur and nitrogen compounds) associated with conventional energy generation from fossil fuels.

- *Foster markets for energy-efficient products and encourage economic development in local and regional communities.* LBE activities can support development of in-state markets for clean energy products, manufacturers, and services. Investing in energy efficiency and clean energy can also provide an economic stimulus to the local economy. Across the nation, energy efficiency and renewable energy technologies and services are estimated to have led to the creation of 8.5 million jobs in 2006, with state government spending on energy efficiency responsible for about 64,000 of these jobs (U.S. DOE, 2004; ASES, 2007).

- *Offer improved energy supply reliability.* Many LBE activities can reduce energy demand (kW) and mitigate energy supply constraints during peak periods. Reducing peak demand makes sense from a financial perspective (i.e., due to higher peak energy demand costs and the potential for incentive payments from utility programs) and improves reliability across the transmission and distribution system. Reducing demand can also reduce energy prices, which is a special concern in areas where sales-volume-sensitive gas prices have been steadily increasing. According to one estimate, for every 1% reduction in national natural gas demand, natural gas prices decrease by 0.8% to 2% (Wiser et al., 2005).

- *Offer greater energy price certainty.* State government LBE activities can provide more reliable energy services and help governments hedge against uncertainties associated with future fossil fuel-based energy costs and availability (U.S. EPA, 2006; U.S. EPA, 2004a).

- *Promote sustainable alternatives to conventional practices.* By implementing other energy and environmental activities that complement LBE clean energy activities, states can achieve secondary energy savings benefits. For example, coordinating LBE activities with waste management, water treatment, and other state programs can lead to energy savings due to the energy implications of recycling, solid waste reduction, water conservation, and landscaping strategies (Choate et al., 2005).

- *Provide other benefits.* Clean energy LBE programs can sometimes produce additional benefits, including:
  - Improved indoor air quality and productivity in energy-efficient and green buildings.
  - Increased asset value in energy-efficient buildings.
  - Reduced maintenance costs in energy-efficient buildings.

LBE GOALS AND ACTIVITIES

Many states are pursuing clean energy across their buildings, facilities, operations, and fleets. As a result, they are reaping significant energy, environmental, and economic benefits. These activities are being implemented through executive orders, legislation, plans, and policies to establish one or more LBE goals across their facilities and/or fleets. Examples of state-specific LBE goals referenced in this *Guide* are summarized on Table ES-3. These goals can:

- Encompass all of a state's buildings and operations,
- Encompass some or all of a state's buildings,
- Address some element of a state's buildings and/or operations, such as new construction or energy-efficient product procurement, and/or
- Address state fleets and fuel use.

TABLE ES-2 POTENTIAL BENEFITS OF LBE ACTIVITIES

Activity	Potential Benefits
Improve Energy Efficiency in Government Facilities	Improved energy efficiency in government facilities can decrease energy consumption by 35% in existing buildings and 50% in new and renovated buildings, thus reducing energy costs and GHG and air pollutant emissions (U.S. EPA, 2004b; 2005a; U.S. DOE, 2007b). Reducing state government energy consumption by 20% overall (a common state goal) can reduce the average state government's annual energy bills by as much as $16 million and save nearly 1.2 trillion Btu annually in energy use (ACEEE, 2003). The potential for reducing GHG and air pollutant emissions from state facilities is substantial: energy use in commercial (including state government buildings) and industrial facilities accounts for nearly 50% of U.S. GHG emissions (U.S. EPA, 2008b). Fossil fuel combustion for electricity generation accounts for high percentages of CO2, SOx, and NOx emissions, which can be reduced through improved energy efficiency in state government facilities (U.S. EPA, 2008a). Approximately 60% of expenditures to improve energy efficiency in state facilities is for labor costs, meaning that energy efficiency activities can increase local employment opportunities (U.S. DOE. 2004). $1 spent on improved energy efficiency in a building can result in a $2 to $3 increase in the building's value (U.S. EPA 2004b).
Integrate Energy Efficiency and Renewable Energy Measures in Green Buildings	Incorporating energy efficiency into green building designs (i.e., by following ENERGY STAR guidelines) can reduce energy costs by as much as 50% compared to conventional buildings, producing annual energy savings of about $0.50 per square foot (U.S. EPA, 2008n; U.S. EPA, 2006l). Use of energy efficiency, renewable energy, and environmental measures in green buildings can: Reduce GHG emissions. Enhance biodiversity and ecosystem preservation. Reduce construction and demolition debris and other waste streams. Produce secondary energy saving benefits through water efficiency, recycling, and other activities that require significant amounts of energy.
Procure Energy-Efficient Products	State governments spend on the order of $11 billion on energy bills annually. A state energy-efficient product procurement program can save up to 10% of a state's electric utility bill (LBNL, 2002, Harris et al., 2004; U.S. EPA, Undated; U.S. DOE, 2007a). ENERGY STAR-qualified products typically use 25% to 50% less energy than conventional products and, in some cases, can offer energy cost savings of up to 90% compared to conventional products (U.S. EPA, 2007c; 2008). A typical state or local government that purchases a basket of ENERGY STAR-qualified products (including computers and monitors, vending machines, exit signs, copiers, and traffic signals) can reduce energy costs by more than $200,000 per year, equivalent to lifetime savings of $1.5 million (U.S. EPA, Undated). By procuring these ENERGY STAR products, a state can achieve annual CO2 savings of about 1,900 tons, equivalent to life-cycle savings of about 16,500 tons (U.S. EPA, Undated).
Purchase Green Power	Purchasing green power avoids use of conventional fuels, thus reducing statewide GHG emissions and other environmental impacts (U.S. EPA, 2008s). For example, purchasing 100 million kWh of green power can avoid emissions of about 78,000 metric tons of CO2, equivalent to removing 14,000 passenger vehicles from the road (U.S. EPA. 2008c). States that purchase green power from their utility reduce exposure to volatile fossil fuel prices (U.S. EPA, 2004b; NYSERDA, 2003). Generating green power can lead to local job creation for state and local governments. For example, the manufacture, construction, installation, and maintenance of 1 MW of solar photovoltaics, which is sold as green power, requires and sustains 22 jobs (Apollo Alliance, 2007).

TABLE ES-2 POTENTIAL BENEFITS OF LBE ACTIVITIES *(cont.)*

Activity	Potential Benefits
Use Clean Energy Supply Technologies	Generating clean energy can be cheaper than purchasing electricity through the grid. Generating clean energy supply can substantially reduce statewide GHG emissions and other environmental impacts (U.S. EPA, 2008s). Combined heat and power (CHP) systems are generally 40% more efficient than separate heat and power generation systems, thus requiring 40% less source energy and reducing state wide energy costs (U.S. EPA, 2007b).
Implement Other Energy-Saving Opportunities	Demand response (DR) programs aimed at lowering system peaks can reduce energy costs and produce revenues for state governments through incentive payments from utilities and electricity grid operators. Water efficiency measures preserve a valuable natural resource while potentially saving a significant amount of energy. Nationally, water supply and wastewater treatment account for nearly 1% of total electricity generation (U.S. EPA, 2008d). Improvements in water efficiency in state facilities through the installation of metering and monitoring systems can decrease annual energy consumption by 10% (Watergy, 2002). State recycling programs can result in significant energy savings – diligent recycling can conserve 70% to 90% of the energy required to produce products from virgin materials (Choate et al., 2005). Recycling 1 ton of office paper saves 10.2 million Btu and recycling 1 ton of aluminum cans conserves 206.9 million Btu (Choate et al., 2005).

Descriptions of each of these LBE activities are provided in Table ES-4, Six Key LBE Activities and Selected State Examples Included in the Guide.

To achieve these goals, states are implementing LBE activities that fall into one of six categories. These activities and a selection of the state examples provided in this *Guide* are summarized in Table ES-4. The six categories are:

- Improve energy efficiency in government facilities.
- Integrate energy efficiency and renewable energy measures in green buildings.
- Procure energy-efficient products.
- Purchase green power.
- Use clean energy supply technologies.
- Implement other energy-saving opportunities.

Beyond these six stationary-source energy efficiency and clean energy supply LBE activities, there are opportunities for states to lead by example in the transportation sector. The *LBE Guide* does not address these transportation activities. However, information about EPA's transportation programs, policies, regulations, and tools, is available in the EPA Office of Transportation and Air Quality Planning's State and Local Transportation Resources Web site (*http://www.epa.gov/otaq/stateresources/index.htm*).

ESTABLISHING A LEAD BY EXAMPLE PROGRAM

States can use the *LBE Guide* to initiate or expand an LBE program toward the objective of establishing a comprehensive LBE program across all their buildings, facilities, and operations. The steps involved in the LBE process, and specific actions states can undertake to achieve each of the steps are illustrated in Table ES-5. These steps include:

- Establish the LBE program framework, which includes selecting the LBE team, establishing the business case for the program and obtaining program support, setting LBE goals, and establishing the mechanisms required to initiate the program.
- Screen LBE activities and measures.
- Develop a comprehensive LBE program.
- Track, measure, and report on LBE program progress.

TABLE ES-3 EXAMPLES OF LBE GOALS AND TARGETS FOR STATE LBE PROGRAMS

State/Title	Goal or Target
Overall LBE Energy Savings	
Virginia **Executive Order 48**	Establishes a goal for state agencies to reduce annual energy costs by 20% by 2010. State-owned facilities over 5,000 square feet are required to be designed consistent with LEED and ENERGY STAR rating systems.
Improve Energy Efficiency in Existing and New Government Facilities	
New Hampshire **Executive Order 2005-4**	Requires the state to reduce energy consumption in state facilities by 10% in accordance with the ENERGY STAR Challenge.
Integrate Energy Efficiency and Renewable Energy Measures in Green Buildings	
Washington, D.C. **Green Building Act of 2006**	Requires all publicly-owned and publicly financed buildings to be designed to meet LEED-Silver certification standards for environmental performance and earn 75 points on the EPA energy performance rating system, using the ENERGY STAR Target Finder tool.
Procure Energy-Efficient Products	
Colorado **Executive Order 0012 07**	Requires Department of Personnel and Administration to develop policies for state agencies to purchase ENERGY STAR-qualified equipment.
Use a Clean Energy Supply	
Wisconsin **Wisconsin Act 141**	Requires the Department of Administration to set renewable energy purchase goals for six agencies with an overall goal that renewable energy account for 10% of state energy purchases by 2008 and 20% by 2012.
State Fleets and Fuel Use	
Georgia **Executive Order 2.28.06.02**	Directs state agencies to increase employee commute miles saved by 20% through compressed and alternating work schedules and teleworking.

Best practices for developing and implementing successful and cost-effective programs, which are based on state LBE experiences, are provided in Table ES-6.

LBE GUIDE TOOLS AND RESOURCES

The *LBE Guide* provides a set of tools and resources to assist states in developing and implementing their LBE programs. These include:

- *Preliminary Assessment Tools.* An important task when developing an LBE program is to screen potential LBE activities and measures to determine which ones are most likely to help meet state goals. This can involve evaluating a building's energy performance, tracking GHG and air pollution emissions, and calculating energy and financial savings. Key tools for states to use when assessing LBE options are summarized in Table ES-7. States can use these tools when:
  - Assessing building performance.
  - Developing emissions inventories.
  - Estimating potential energy savings.
  - Assessing financial costs and benefits.
- *Additional Resources*. The *LBE Guide* provides a wealth of additional resources for states to use as they develop their LBE programs. These resources are identified and described throughout the *Guide* and are summarized, by subject area in the appendices. Table ES-8 presents a summary of some of the key resources, organized by *LBE Guide* chapter.

TABLE ES-4 SIX KEY LBE ACTIVITIES AND SELECTED STATE EXAMPLES

Activity	Summary of Activity	Selected Examples Provided in Guide	One State Example
Improve Energy Efficiency in Government Facilities	State and local governments are responsible for more than 16 billion square feet of building space for a total energy cost of about $11 billion (U.S. DOE, 2007a). Energy use in state government facilities can consume operating budgets and account for as much as 90% of a state government's GHG emissions (Massachusetts, 2004). Improving energy efficiency in state government-owned and leased facilities through a comprehensive energy management approach can lead to significant energy, environmental, economic, and other benefits. States are demonstrating annual savings on the order of $1 million – $15 million dollars, depending on efficiency programs and goals.	WI: Wisconsin Energy Initiative VA: Energy Efficiency Policy and Advisory Council CA: Benchmarking State Facilities MI: State Facilities Energy Savings Plan MT: 20 x 10 Initiative NH: ENERGY STAR Challenge Participant OR: Building Commissioning Program WA: Building Commissioning Program NC: Sustainable Energy Efficient Buildings Program CO: Energy Management and Integrated Energy-Efficient Design in K-12 Schools	Wisconsin used ENERGY STAR tools and resources to systematically replace lighting fixtures in state buildings for its "Wisconsin Energy Initiative" which resulted in $7.5 million in annual energy cost savings and an emissions reduction equivalent to the emissions of 20,000 vehicles in one year. The state next pursued comprehensive whole-building retrofits in 60 million square feet of office space at a cost of $35 million which are expected to yield $11 million in annual cost savings with a payback period of less than four years. (NASEO, 2006).
Integrate Energy Efficiency and Renewable Energy Measures in Green Buildings	The planning, design, and construction process for new and renovated buildings offers opportunities to combine energy efficiency and renewable energy design features with other measures that have environmental and health benefits (e.g., selecting sustainable sites, using recycled-content materials, and landscaping to reduce water and energy use). These energy efficiency and renewable energy measures are key ways to reduce GHG emissions and decrease the carbon footprint of new and renovated state facilities.	NY: "Green and Clean" State Buildings AZ: Green Building Policy for Public Buildings HI: Lead by Example Initiative MN: State Sustainable Building Guidelines MA: LEED-Plus Standard NM: Lead by Example Initiative PA: High Performance Green Building Program PA: Cambria State Office Building OR: Portland Green Building Policy WI: Sustainable Facilities Guidelines/ Standards WI: Department of Natural Resources Buildings DC: Washington, D.C. Green Building Policy	In New York, state agencies are required by executive order to follow LEED guidelines for the construction of green buildings and to strive to meet the ENERGY STAR building criteria for energy performance. Several of New York's state agencies have partnered to develop sustainable design guidelines, including High-Performance Design Guidelines for state college and university buildings (NYSERDA, 2001; 2005).

TABLE ES-4 SIX KEY LBE ACTIVITIES AND SELECTED STATE EXAMPLES *(cont.)*

Activity	Summary of Activity	Selected Examples Provided in Guide	One State Example
Procure Energy-Efficient Products	Energy-efficient product procurement can be a cornerstone of a state or local government's energy management strategy and can be particularly helpful for fostering the development of in-state markets for clean energy products. Energy-efficient product procurement can target products as they are replaced, with many energy-efficient products having little or no cost premium. For example, many ENERGY STAR-qualified electronics and office equipment products can be purchased with no cost premium, but produce significant energy cost savings	MA: Environmentally Preferable Products Procurement NY: New York City Energy-Efficient Product Procurement	In FY 2001, Massachusetts spent $92.5 million on environmentally preferable products. The cost savings from the program surpassed $544,000, with savings from energy-efficient office equipment alone accounting for $270,000 (Massachusetts, 2003).
Purchase Green Power	Green power is electricity produced from renewable sources (e.g., wind, solar, biogas, biomass, low-impact hydro, and geothermal resources) that causes no man-made GHG emissions, has a superior environmental profile compared to conventional power generation, and was built after January 1, 1997.a By choosing to purchase green power, state governments reduce reliance on fossil fuel-based energy (U.S. EPA, 2004a; 2007d) and help reduce GHG emissions, reduce vulnerability to conventional energy price volatility, and improve energy supply reliability. The price premium for green power that covers the increased costs of adding green power to the power generation mix varies across the country. In 2006, the national average was about 2¢ per kWh (Bird et al., 2007). Techniques such as aggregated purchasing can lower this premium significantly.	ME: Aggregating Green Power Purchases PA: Green Power Purchase Commitment CT: Green Power Purchases NJ: Aggregated Green Power Purchase MD: Montgomery County Wind Power Purchase	In Maine, the governor's 2003 energy agenda established a goal for the state government to purchase at least 50% of its electricity from renewable power sources, using energy efficiency measures in state buildings to offset the cost of the renewable energy. This goal was originally met by a contract agreement committing over 800 state agency accounts under one service agreement. Maine has now increased its renewable energy purchase to 100% (DSIRE, 2007).

TABLE ES-4 SIX KEY LBE ACTIVITIES AND SELECTED STATE EXAMPLES *(cont.)*

Activity	Summary of Activity	Selected Examples Provided in Guide	One State Example
Use Clean Energy Supply Technologies	States are implementing clean energy generation –such as on-site renewable energy generation and clean DG and CHP – to provide a clean energy-supply alternative that reduces GHG and air pollutant emissions, hedges against conventional energy price volatility, improves energy supply reliability, and can sometimes reduce energy costs.	AZ: Army Aviation Training Site Solar Farm VA: Solar Power at New State Facilities UT: Solar Power Demonstration OR: Solar State Buildings CA: Solar Technology at State Facilities MA: Renewable Energy Initiatives IL: State Agency CHP Activities NJ: Solar Power in Public School District CA: Solar Power at a University OH: CHP at Ohio University TX: CHP at the University of Texas WI: CHP at the University of Wisconsin MN: CHP at a Wastewater Treatment Facility	Arizona developed a solar farm to supplement its energy use at the Army Aviation Training Site. The $196,000 photovoltaic system produces 31 kW of electricity, which has reduced grid-based electricity purchases by 113,000 kWh, or 31%, and saves the department $20,000 in annual energy costs (AZDOC, 2006; Arizona, 2007).
Implement Other Energy-Saving Opportunities	Demand response (DR) programs and environmental activities such as recycling, water efficiency, and sustainable landscaping strategies can also result in significant energy cost savings.	CT: Demand Response Program MA: State Sustainability Program CO: Water Conservation in State Agencies MA: Water Consumption Reduction Goal	As an example of a state DR program, the Connecticut Office of Policy and Management (OPM) administers a Demand Response Program that coordinates demand response activities of eleven state agencies. OPM works with these agencies to reduce peak electrical loads during period of high demand by transferring loads to distributed generation equipment and reducing non-essential electrical loads. These actions enable ISO New England, the regional grid operator, to avoid installing additional infrastructure that would otherwise be needed to meet demand. As compensation, ISO New England provides OPM approximately $300,000 quarterly, through third-party contractors. This payment is allocated to the participating agencies for reinvestment in clean energy projects (Connecticut OPM, 2008).

[a] *January 1, 1997 is the accepted date marking the beginning of the voluntary green power market.*

TABLE ES-5 SUMMARY OF THE LBE IMPLEMENTATION PROCESS

LBE Activities and Measures	Establish the LBE Program Framework			Screen LBE Activities and Measures	Develop a Comprehensive LBE Program	Track, Evaluate, and Report on LBE Program Progress
	Establish LBE Team and Obtain Support	Set Clean Energy Goals	Establish Mechanisms to Implement the LBE Program			
See Chapter 2	See Sections 3.1–3.3	See Section 3.4	See Section 3.5	See Chapter 4	See Chapter 5	See Chapter 6
POSSIBLE ACTIONS	POSSIBLE ACTIONS	POSSIBLE ACTIONS	POSSIBLE ACTIONS	POSSIBLE ACTIONS	POSSIBLE ACTIONS	POSSIBLE ACTIONS
Improve energy efficiency in buildings.	Identify lead and supporting LBE clean energy agencies.	Develop energy consumption baseline.	Governor issues an executive order.	Screen LBE activities and measures from the universe of LBE activities.	Integrate clean energy opportunities.	Develop tracking, evaluation, and reporting plan.
Integrate energy efficiency and renewable energy measures in green buildings.	Identify key personnel.	Assess state context.	State legislature enacts LBE legislation.	Develop assessment criteria.	Determine program financing.	Establish baselines.
Purchase energy-efficient products.	Identify and obtain high-level support.	Set state LBE activity goals.	State establishes LBE program through state planning process.	Estimate costs and benefits.	Conduct communications and outreach.	Conduct benchmarking.
Purchase green power.	Identify other key agencies and grvoups to help shape and implement LBE programs	Overall energy savings and GHG emission targets.	State energy office initiates LBE program.	Select and implement LBE activities and measures.	Provide technical and financial assistance to local governments.	Track energy use, emissions, and savings. Conduct impact, process, and/or market effects evaluations.
Use a clean energy supply.		Existing building targets.	Other organizations adopt programs that support or influence the state's adoption of an LBE program.		Share information and access federal, state, and local LBE resources.	Report progress.
Implement other energy-saving activities.		New building targets.				Revise program based on results.
		Energy-efficient product procurement goals.				
		Renewable energy targets.				
		Energy-efficient procurement goals.				
		State fleet and fuel use targets.				

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TABLE ES- 6 ELEMENTS OF A SUCCESSFUL LBE PROGRAM

- **Build a strong LBE team.** A successful LBE program starts with a team that is committed to identifying the mix of activities, measures, and approaches best suited to the individual state. The process of building a strong team includes identifying a state agency to lead the LBE effort and selecting team representatives, from this and other state agencies, who can offer a range of expertise and perspectives (e.g., on facility management, energy efficiency, renewable energy, sustainability, environment). Partners from outside state government can also provide valuable input to the LBE implementation process and/or serve as program champions in the community.
- **Secure high-level support.** The support of top-level leadership is critical to an LBE program's success. Approaches for building and maintaining support include involving policymakers in the early stages of the process, identifying one or more LBE team members with access to key decision-makers, and clearly articulating the value of the LBE initiative.
- **Establish goals.** Set clear, quantifiable LBE goals (through executive orders, state laws, the state planning process, or other state initiatives) to ensure that stakeholders understand the expected outcomes, provide for ease of measurement and reporting, and demonstrate the feasibility of establishing clean energy initiatives.
- **Develop an energy baseline**. To ensure that LBE goals are measurable and achievable, base them on actual past and current state energy consumption data and on projected consumption. This requires collecting state energy consumption data and information on issues that affect energy use (e.g., the number, square footage, and condition of state facilities; fleet size; and current clean energy technologies).
- **Screen LBE options based on energy savings and other criteria**. Develop screening criteria to determine the LBE activities and measures to include in the LBE program. Key criteria include expected energy savings, financial issues (e.g., payback periods and life-cycle costs), environmental benefits, economic benefits, visibility, and feasibility.
- **Implement a systematic approach to energy efficiency**. The most cost-effective approach for improving energy efficiency in state buildings is to follow the systematic process detailed in the ENERGY STAR *Guidelines for Energy Management*. Ideally, it is best applied across a portfolio of government buildings. If resources are limited, states can apply the process as a "pilot" in one or a few buildings and use the results to advocate for further energy efficiency in additional state buildings. A systematic approach to efficiency is a critical element of a comprehensive LBE program.
- **Take advantage of available financing mechanisms**. A range of financing strategies is available to states for LBE initiatives. Because these activities compete for limited financial resources with many other programs, it is helpful to use multiple financing options (e.g., municipal least-purchase agreements, revolving loan funds, aggregated purchases). In some cases, states need to modify their rules to ensure that agencies have access to a broad range of financing mechanisms (e.g., performance contracting) and accounting methods (e.g., life-cycle cost accounting).
- **Conduct communication and outreach.** States can demonstrate leadership and obtain on-going LBE support from state agency personnel, the public, and other community stakeholders by conducting communication and outreach activities that articulate the benefits of their program and encourage participation in, and support for, the program.
- **Learn from local, state, and federal sources.** Many state and municipal governments have implemented LBE programs. Staff from these agencies – as well as the LBE plans, model policies, and guidance they have developed – are key LBE resources. In addition, federal programs provide resources on designing and implementing LBE activities. For example, the ENERGY STAR program provides guidance and tools for incorporating energy efficiency in existing and new buildings.
- **Evaluate, report on, and update the LBE program.** It is important to periodically evaluate the state's LBE efforts and report on the results of these assessments. Based on evaluation results, states can expand successful (and potentially successful) activities and revise or eliminate unproductive LBE activities.

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TABLE ES-7 PRELIMINARY ASSESSMENT TOOLS

Tools/Organization	Description	URL/Source
Tools for Assessing Building Performance		
Portfolio Manager (ENERGY STAR)	▪ Enables states to rate their facilities' energy performance and identify priority opportunities. ▪ Assists states in applying for the ENERGY STAR label for facilities scoring 75 or higher.	*http://www.energystar.gov/index.cfm?c = evaluate_performance.bus_portfoliomanager*
Target Finder (ENERGY STAR)	▪ Allows states to assess the design of new buildings and compare simulations with existing buildings, based on data provided. ▪ Helps set energy performance goals and receive an energy rating for design projects.	*http://www.energystar.gov/index.cfm?c = new_bldg_design.bus_target_finder*
Small Business Calculator (ENERGY STAR)	▪ Estimates a facility's energy intensity and potential energy cost savings from upgrades.	*http://www.energystar.gov/index.cfm?c = small_business.sb_calculate*
Life-Cycle Cost Program (National Institute of Standards/ Technology)	▪ Enables states to evaluate alternative designs that may have higher initial costs, using a life-cycle costing method.	*http://www1.eere.energy.gov/femp/information/download_blcc.html*
Emission Inventory Tools		
Clean Air and Climate Protection Software (National Association of Clean Air Agencies)	▪ Tracks emission reductions and forecasts emissions from proposed reduction measures. ▪ Develops government baseline inventory.	*http://www.cacpsoftware.org/*
Greenhouse Gas Equivalencies Calculator (U.S. EPA)	▪ Translates GHG reductions into terms that are easier to conceptualize. States can also use the calculator "in reverse."	*http://www.epa.gov/cleanenergy/energy-resources/calculator.html*
e-GRID (U.S. EPA)	▪ Allows states to obtain information on power plants. ▪ Develop emissions inventories for buildings.	*http://www.epa.gov/cleanenergy/egrid/index.htm*
State Inventory Tool (U.S. EPA; under development)	▪ Enables states to develop GHG emissions inventories	*http://www.epa.gov/climatechange/wycd/stateandlocalgov/analyticaltools.html*
Emissions Forecasting Tool (U.S. EPA; under development)	▪ Enables states to forecast business-as-usual emissions through 2020	*http://www.epa.gov/climatechange/wycd/stateandlocalgov/analyticaltools.html*
Energy Saving Tool		
Community Energy Opportunity Finder (Rocky Mountain Institute)	▪ Helps identify potential community benefits resulting from energy efficiency upgrades and renewable energy opportunities.	*http://www.energyfinder.org*
Financial and Economic Analysis Tool		
Cash Flow Opportunity Calculator (ENERGY STAR)	▪ Calculates the amount of equipment that can be purchased using anticipated savings. ▪ Compares costs of financing and waiting for cash.	*http://www.energystar.gov/ia/business/cfo_calculator.xls*

TABLE ES-8 KEY RESOURCES FOR DEVELOPING AN LBE PROGRAM

Chapter 2: LBE Activities and Measures	
Databases	
Database of State Incentives for Renewable Energy	*http://www.dsireusa.org/*
DOE State Energy Program	*http://www.eere.energy.gov/state_energy_program/topic_definition_detail.cfm/topic = 115*
Best Practices Resources	
EPA *ENERGY STAR Building Upgrade Manual*	*http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual*
EPA *Clean Energy-Environment Guide to Action*	*http://www.epa.gov/cleanenergy/energy-programs/state-and-local/state-best-practices.html*
EPA Clean Energy-Environment State Partnership Program Technical Forum	*http://www.epa.gov/cleanenergy/energy-programs/state-and-local/state-forum.html*
EPA *ENERGY STAR Guidelines for Energy Management*	*http://www.energystar.gov/index.cfm?c = guidelines.guidelines_index*
National Governor's Association Center for Best Practices	*http://www.nga.org/portal/site/nga/menuitem.50aeae5ff70b817ae8ebb856a11010a0/*
Chapter 3: Establishing the LBE Program Framework	
Examples of State Plans and Guidance for Implementing LBE Programs	
Connecticut *Leading by Example Report*	*http://ctclimatechange.com/StateActionPlan.html*
Connecticut Climate Change Web site	*http://www.ctclimatechange.com/rbf_rept.html*
Maine Clean Government Web Site	*http://www.maine.gov/cleangovt/*
Massachusetts *State Agency Sustainability Planning and Implementation Guide*	*http://www.mass.gov/envir/Sustainable/pdf/ss_guide_web.pdf*
New York *"Green and Clean" State Buildings and Vehicles Guidelines* for Executive Order 111	*http://www.nyserda.org/programs/State_Government/exorder111guidelines.pdf*
State Executive Orders for Initiating LBE Programs	
Massachusetts *Executive Order 484*	*http://www.mass.gov/Agov3/docs/Executive%20Orders/Leading%20by%20Example%20EO.pdf*
Virginia *Executive Order 48*	*http://www.governor.virginia.gov/initiatives/ExecutiveOrders/pdf/EO_48.pdf*
Resources for Implementing LBE Programs	
California *Local Energy Efficiency Program Workbook*	*http://www.caleep.com/workbook/workbook.htm*
National Governors' Association *Securing A Clean Energy Future* Initiative	*http://www.nga.org/portal/site/nga/menuitem.751b186f65e10b568a278110501010a0/?vgnextoid=f080dd9ebe318110VgnVCM1000001a01010aRCRD&vgnextchannel=92ebc7df618a2010VgnVCM1000001a01010aRCRD*
Chapter 4: Screening LBE Activities and Measures	
California Local Energy Efficiency Program Workbook	*http://www.caleep.com/workbook/workbook.htm*
Massachusetts State Agency Sustainability Planning and Implementation Guide	*http://www.mass.gov/envir/Sustainable/pdf/ss_guide_web.pdf*
Colorado Greening Government Planning and Implementation Guide	*http://www.colorado.gov/greeninggovernment/guide/Guide.pdf*

TABLE ES-8 KEY RESOURCES FOR DEVELOPING AN LBE PROGRAM *(cont.)*

Chapter 5: Developing a Comprehensive LBE Program	
EPA ENERGY STAR Innovative Financing Solutions: Finding Money for Your Energy Efficiency Projects	*http://www.energystar.gov/ia/business/COO-CFO_Paper_final.pdf*
New York "Green And Clean" State Buildings and Vehicles Guidelines	*http://www.nyserda.org/programs/State_Government/exorder111guidelines.pdf*
Green California Web site	*http://www.green.ca.gov/default.htm*
Colorado Greening Government Web site	*http://www.colorado.gov/greeninggovernment/index.html*
Chapter 6: Tracking, Evaluating, and Reporting LBE Program Progress	
EPA Model Energy Efficiency Program Impact Evaluation Guide	*http://www.epa.gov/cleanenergy/documents/evaluation_guide.pdf*
LBNL Measurement and Verification Documents	*http://ateam.lbl.gov/mv/*
California Technical, Methodological, and Reporting Requirements for Evaluation Professionals	*http://www.calmac.org/publications/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.pdf*
DOE Impact Evaluation Framework for Technology Deployment Programs	*http://www.eere.energy.gov/ba/pba/km_portal/docs/pdf/2007/impact_framework_tech_deploy_2007_main.pdf*
New York Executive Order No. 111 "Green And Clean" State Buildings and Vehicles Annual Energy Report	*http://www.nyserda.org/programs/pdfs/execorder111finalreport7-03.pdf*

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