EPA State Climate and Energy Program Technical Forum

Lead-By-Example (LBE) Programs

Background and Resources

March 19, 2009

State governments are demonstrating the benefits of clean energy through "Lead by Example" (LBE) programs. LBE involves implementing clean energy policies and programs in buildings, facilities, operations, and fleets under their control (U.S. EPA 2006a). EPA and other organizations recognize LBE programs as a key policy option for states seeking to achieve their clean energy goals. For example, the National Action Plan for Energy Efficiency "Vision for 2025" report identifies LBE as a critical component for achieving the long-term goal of all cost-effective energy efficiency by 2025. LBE opportunities have increased importance as states evaluate the best use of clean energy funding in the American Recovery and Reinvestment Act of 2009.

The Value of Clean Energy LBE Programs

States can adopt a number of activities and strategies to capture significant energy, environmental, economic, and other benefits. These benefits include:

- *Demonstrating leadership*. Through good energy management, state governments can proactively address the nation's energy challenge while also being fiscally 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.

- *Reducing 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 2007b). 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.

- *Reducing 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.

- *Fostering markets for energy-efficient products and encouraging 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 those jobs (U.S. DOE 2004, ASES 2007).

- *Offer improved energy supply reliability.* Many LBE activities can reduce energy demand (in kilowatts, 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 gas prices sensitive to sales volume 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 2004a, 2006a).

- *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 (Huang et al. 1990, 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, and reduced maintenance costs in energy-efficient buildings.

LBE Goals and Activities

To achieve their clean energy goals, states are implementing LBE activities that generally fall into one of six categories. These activities and a selection of state examples are listed in the table below:

Table 1: Six Key LBE Activities and Selected State Examples			
Activity	**Summary of Activity**	**Selected Examples**	**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 2007b). 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.	• CA: Benchmarking State Facilities • CO: Energy Management and Integrated Energy-Efficient Design in K–12 Schools • MI: State Facilities Energy Savings Plan • MT: 20 x 10 Initiative • NC: Sustainable Energy Efficient Buildings Program • NH: ENERGY STAR Challenge Participant • OR: Building Commissioning Program • VA: Energy Efficiency Policy and Advisory Council • WA: Building Commissioning Program • WI: Wisconsin Energy Initiative	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 whole-building retrofits to 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.	• AZ: Green Building Policy for Public Buildings • DC: Washington, D.C. Green Building Policy • HI: Lead by Example Initiative • MA: LEED-Plus Standard • MN: State Sustainable Building Guidelines • NM: Lead by Example Initiative • NY: "Green and Clean" State Buildings • OR: Portland Green Building Policy • PA: High Performance Green Building Program • PA: Cambria State Office Building • WI: Sustainable Facilities Guidelines/Standards • WI: Department of Natural Resources Buildings	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).
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 fiscal year (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).

Table 1: Six Key LBE Activities and Selected State Examples			
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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 their reliance on fossil fuel-based energy (U.S. EPA 2004a, 2007d), reduce vulnerability to conventional energy price volatility, and improve energy supply reliability.	• CT: Green Power Purchases • MD: Montgomery County Wind Power Purchase • ME: Aggregating Green Power Purchases • NJ: Aggregated Green Power Purchase • PA: Green Power Purchase Commitment	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 2008).
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 • CA: Solar Technology at State Facilities • CA: Solar Power at a University • IL: State Agency CHP Activities • MA: Renewable Energy Initiatives • MN: CHP at a Wastewater Treatment Facility • NJ: Solar Power in Public School District • OH: CHP at Ohio University • OR: Solar State Buildings • TX: CHP at the University of Texas • UT: Solar Power Demonstration • VA: Solar Power at New State Facilities • WI: CHP at the University of Wisconsin	Arizona developed a solar farm to supplement its energy use at the Army Aviation Training Site. The $196,000 PV 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	DR programs and environmental activities such as recycling, water efficiency, and sustainable landscaping strategies can also result in significant energy cost savings.	• CO: Water Conservation in State Agencies • CT: Demand Response Program • MA: State Sustainability Program • MA: Water Consumption Reduction Goal	The Connecticut Office of Policy and Management (OPM) administers a DR program that coordinates DR activities among 11 state agencies. OPM works with these agencies to reduce peak electrical loads during periods of high demand by transferring loads to DG 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 $430,000 quarterly, through third-party contractors. This payment is allocated to the participating agencies for reinvestment in clean energy projects (Connecticut OPM 2007).
a. January 1, 1997 is the accepted date marking the beginning of the voluntary green power market.			

Establishing an LBE Program

Establishing an LBE program framework typically includes selecting an 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. LBE activities and measures are usually then screened, a comprehensive LBE program is developed, and the program's progress is tracked, measured, and reported. In addition, elements that contribute to the establishment of a successful program are outlined in the table below.

Table 2: 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, and 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, and 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 ongoing 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.

LBE Guide Tools and Resources

Based on input from a number of states, EPA developed a "*State Clean Energy Lead by Example Guide*" (*LBE Guide*) to provide states with information on initiating and expanding LBE programs that focus on the building sector. It is currently under peer review and will be available to the public in spring 2009. Tools and resources referenced in the *LBE Guide* include:

- *Preliminary assessment tools.* An important task when developing an LBE program is to screen potential LBE activities and measures to determine which options to pursue. The tools described in Table 3 below can provide information about how proposed options affect building energy performance, GHG and air pollution emissions, and energy and financial savings.

- *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 *LBE Guide*, and are summarized in Table 4 below.

Table 3: 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=intensive_calc.mgr
Life-Cycle Cost Programs (National Institute of Standards and 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 emissions reductions and forecasts emissions from proposed reduction measures. • Develops government baseline inventory.	http://www.cacpsoftware.org/
Greenhouse Gas Equivalencies Calculator (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 (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 (EPA; under development)	• Enables states to develop GHG emissions inventories.	http://www.epa.gov/climatechange/wycd/stateandlocalgov/analyticaltools.html
Emissions Forecasting Tool (EPA; under development)	• Enables states to forecast business-as-usual emissions through 2020.	http://www.epa.gov/climatechange/wycd/stateandlocalgov/analyticaltools.html

Table 3: Preliminary Assessment Tools		
Tools/Organization	**Description**	**URL/Source**
Energy Saving Tool		
Community Energy Opportunity Finder 2.0 (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 4: Key Resources for Developing an LBE Program	
***LBE Guide* Chapter 2: Lead by Example Activities and Measures**	
Databases	
Database of State Incentives for Renewables & Efficiency	http://www.dsireusa.org/
DOE State Energy Program	http://apps1.eere.energy.gov/state_energy_program/
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 State Climate & Energy 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: Environment, Energy & Natural Resources	http://www.nga.org/portal/site/nga/menuitem.8274ad9c70a7bd616adcbeeb501010a0/?vgnextoid=75b4d9b834420010VgnVCM1000001a01010aRCRD
***LBE Guide* Chapter 3: Establishing the LBE Program Framework**	
Examples of State Plans and Guidance for Implementing LBE Programs	
Connecticut *Leading by Example Report*	http://www.ctclimatechange.com/rbf_rept.html
Connecticut Climate Change Action Plan	http://ctclimatechange.com/StateActionPlan.html
Maine Clean Government Web Site	http://www.maine.gov/cleangovt/
Massachusetts *State Agency Sustainability Planning and Implementation Guide*	http://www.ncprojectgreen.com/Documents/AgencySusGuide.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=92ebc7

Table 4: Key Resources for Developing an LBE Program	
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***LBE Guide* Chapter 4: Screening LBE Activities and Measures**	
California *Local Energy Efficiency Program Workbook*	http://www.caleep.com/workbook/workbook.htm
Colorado *Greening of State Government: Detailed Implementation*	http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobheadername1=Content-Disposition&blobheadername2=MDT-Type&blobheadervalue1=inline%3B+filename%3D662%2F842%2FD+012+07.pdf&blobheadervalue2=abinary%3B+charset%3DUTF-8&blobkey=id&blobtable=MungoBlobs&blobwhere=1224913548736&ssbinary=true
New York *Executive Order No. 111 "Green and Clean" State Buildings and Vehicles Guidelines*	http://www.nyserda.org/programs/State_Government/exorder111guidelines.pdf
***LBE Guide* Chapter 5: Developing a Comprehensive LBE Program**	
Innovative Financing Solutions: Finding Money for Your Energy Efficiency Projects	http://www.energystar.gov/ia/business/COO-CFO_Paper_final.pdf
"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/energy/greening/index.asp
***LBE Guide* Chapter 6: Tracking, Evaluating, and Reporting LBE Program Progress**	
Model Energy Efficiency Program Impact Evaluation Guide	http://www.epa.gov/cleanenergy/documents/evaluation_guide.pdf
Measurement and Verification Documents	http://ateam.lbl.gov/mv/
Technical, Methodological, and Reporting Requirements for Evaluation Professionals	http://www.calmac.org/publications/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.pdf
Impact Evaluation Framework for Technology Deployment Programs	http://www1.eere.energy.gov/ba/pba/pdfs/impact_framework_tech_deploy_2007_main.pdf
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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