How To Guide: "Greening" of State buildings

This activity targets State buildings for energy efficiency and renewable energy improvements. It provides an integrated approach, combining technical assistance and education and outreach, for increasing energy efficiency and related economic and environmental benefits in State buildings.

The buildings sector consumes nearly one-third of the nation's primary energy and is responsible for a significant proportion of carbon dioxide, sulfur dioxide, and nitrogen oxide emissions. State and local governments own and lease millions of square feet of space. By implementing energy efficiency retrofits in existing buildings and designing new buildings to energy and resource-efficient "green" standards, State governments can create significant energy savings and reduce greenhouse gas emissions. States can use energy efficiency as a pollution prevention strategy. These results benefit the State taxpayers, building occupants, building operators, and the environment.

Desired Outcome:

Reduced energy consumption and energy costs in State buildings. Reduced greenhouse emissions. Improved indoor air and lighting quality; improved work environment and worker productivity.

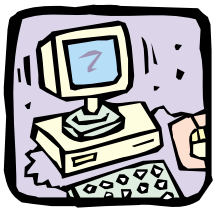
Program Design

Steps

1. Establish baseline data, including energy consumption in BTUs/square foot and monthly/annual energy costs by building type and climatic regions.
2. Conduct preliminary audit of building operations and facility equipment.
3. Compare to ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) standards.
4. Develop key energy/environment guidelines for facilities for energy, water, and materials use.
5. Review existing procurement RFP (request for proposals) or RFQ (request for qualifications) for building materials purchase for renovation or construction. If necessary, rewrite or modify RFPs/RFQs to include guidelines or goals identified in step 4. Seek necessary approvals to issue RFPs/RFQs to implement retrofits.
6. Identify funding mechanisms: ESCOs (energy service companies), energy savings performance contracts, capital improvement funds, Petroleum Violation Escrow funds, State bonds, operating budgets, utilities, etc.
7. Market program to appropriate State agencies, building engineers, and maintenance staff.
8. Select process or service provider.
9. Perform technical analyses of participating buildings and install recommended measures.
10. Develop procedure for monitoring, metering, and building commissioning by third party (or reviewed by third party) and adjust program as necessary.
11. Provide training to maintenance staff in energy-efficient operations and maintenance practices.
12. Document, publish, and market results.
13. Look for ways to institutionalize process.

Partners and Possible Incentives

- **Utility companies:** Load management, restructuring opportunities. Utilities may provide incentives for energy efficiency, low interest loan programs, and expert technical assistance.
- **State General Services Administration, Governor's Office, State budgeting office:** Energy cost savings can be channeled to other projects; emission reductions can benefit other efforts (such as emission trading systems, air quality standards); boost State image with improved environment and work conditions.
- **Building officials/operators:** Improved energy management; reduction in maintenance calls due to improved equipment and more satisfied/comfortable tenants; increased durability of building; protection from energy inflation.
- **State environmental and natural resources agencies:** Activity aligns with State and national environmental goals; provides showcase for new technologies or outreach materials.
- **Manufacturers and suppliers (technical services and green products):** Economic opportunity; high visibility project can promote green products/services.
- **ESCOs:** Economic opportunity; high visibility project can promote energy efficiency in buildings and green products/services. ESCOs guarantee a level of savings for a defined number of years.
- **Employee Unions:** Improved work environment (better air quality, stable temperature, improved lighting, etc.) will reduce absenteeism and raise productivity and satisfaction of employees.
- **American Institute of Architects:** Goals further the mission of the members.
- **State ASHRAE chapter:** Goals further the mission of the members.
- **State Building Operators and Managers Association chapter:** Benefits from increased efficiency (such as reduced costs, protection from energy inflation, and decreased maintenance) accrue to members.



Resources Available

- DOE's Center of Excellence for Sustainable Development has a "Tool-Kit of Sustainable Development Support Tools" (www.sustainable.doe.gov/toolkit/buildings.htm) which can help to determine current energy use and potential savings.
- Department of Energy programs (www.eren.doe.gov) Access to National Laboratories, Rebuild America, Building America, etc.
- Environmental Protection Agency's Energy Star Buildings Program (www.epa.gov/buildings) Offers tools to help make buildings energy efficient and reduce pollution.
- The California Energy Commission web site (www.energy.ca.gov/reports/efficiency_handbooks/index.html) Several guides available to download on a range of topics including financing, hiring an energy auditor, energy accounting, hiring an ESCO, etc.
- Green Energy Finance (www.energyfinance.org) One-stop shop of energy efficiency financing resources for homeowners, building managers, lending institutions, architects, and others.
- American Institute of Architects (www.aiaonline.com) Architects who provide environmental or energy-efficient design can be found under the service type "sustainable design."
- Green Building Resource Council (www.greendesign.net/gbrc/start/htm)
- U.S. Green Buildings Council (www.usgbc.org)
  - Sustainable Building Technical Manual: Green Building Practices for Design, Construction, and Operations – copies can be obtained through the U.S. Green Buildings Council (info@usgbc.org).
  - LEED Green Building Rating System (www.usgbc.org/programs/leed.htm) Green Building Council rating system that evaluates building performance relating to energy and sustainable design.
- Sustainable Building Industries Council (www.sbicouncil.org)
- Whole Buildings Design Guide web site (www.wbdg.org)
- National Association of ESCOs (www.naesco.org) National listing of energy service companies.

Resources Needed

- Engineering and architectural expertise to design retrofits
- Knowledge of green products and procurement practices
- Financing mechanisms
- Purchasing/contracting expertise
- Staffing resources
- Buy-in by appropriate State officials
- Examples of RFPs/RFQs
- Examples of retrofit guidelines
- Case studies of successful State retrofits

Key Conditions/ Factors

- Availability of baseline data on building energy use
- Room for improvement in energy use

Special Opportunities for Success

- Beginning of large-scale new construction or rehab program
- State revenue surplus
- Utility restructuring may spur demand for reliability of energy supply

Success Boosters

- Beginning early in the building design/retrofit process
- Collaboration with multiple State agencies
- Champion in State government
- High quality energy savings data with which to market and continue the program

Technology Transfer Plan

- Presentations to and by partner groups
- Presentations to peers at conferences, including All-States Meeting
- Recognition program for participating State officials
- Program information/results available on State web site
- Building labeling programs
- Report success story in WinSAGA

Barriers and Potential Solutions

- **Institutional inertia:** Show that department cost-savings lead to reduction in next year's operating budget. Highlight all benefits to partners and decision makers; gather information on other successes; start with a pilot project; propose energy savings returned to agency operating budgets and possibly allow for tax cuts.
- **Availability of funding:** Research ESCO possibilities.
- **Unfavorable policies/practices regarding first cost vs. life-cycle cost:** Gather information on differences between the two methods; provide for a waiver for current policy; change policy if possible.
- **Lack of authority to implement:** Seek approval from appropriate decision maker; add to program team; rely on champion to build support.
- **No continuity of building maintenance:** Emphasize the importance and benefits of energy efficiency during meetings with client building officials.

Metrics

Primary:

- BTUs/square foot (pre and post)
- Square feet of office space retrofitted or built to "green" specs
- Return on investment

Other Indicators:

- Emissions reductions
- Recycled materials included
- Water savings
- Increase in indoor air quality
- Building occupant satisfaction (Employee surveys)
- Decrease in maintenance costs
- Decrease in employee sick days
- Increase in employee productivity

Case Studies/Examples

California

In California, the Department of General Services partnered with the California Energy Commission, California Integrated Waste Management Board, Department of Health Services, and California Air Resources Board to develop the largest civic building project in the history of the State. The $392 million, 1.5 million square foot Capitol East End Complex will feature sustainable building measures and will result in estimated savings of $220 million to the State through the consolidation of 6,300 employees who are currently housed in 19 separate locations. Some of the "green" features of the five-building project include: photovoltaic panels to provide electricity from the sun to power recharging stations for electric vehicles, and to supplement office energy needs; buildings designed to be at least 30 percent more energy efficient than required by State code resulting in savings of approximately $400 thousand a year in energy costs; use of asphalt, concrete, steel, carpeting, glass, drywall, and other building materials derived from recycled sources.

Wisconsin

The State of Wisconsin's Energy Initiative relies on creative partnership to improve energy efficiency. Wisconsin worked with the State's utility companies to make basic changes to public buildings, such as installing new lighting fixtures and steam traps. The Initiative forecasts a $60 million reduction in State spending over a ten-year period. Energy-efficiency improvements funded through the Initiative have resulted in reduced emissions of carbon dioxide, sulfur dioxide, and nitrous oxides. Increased demand for energy efficiency products and services has spurred new employment opportunities in the State.

Montana

In response to a growing need to finance energy efficiency improvements in public buildings, Montana designed a State Buildings Energy Conservation Program to fund capital improvements without tapping general fund budgets. Montana sells general obligation bonds to fund energy efficiency improvements; the bonds are repaid through savings in energy costs. Once the debt is repaid, the energy savings can be used to fund new services for Montanans.