

Green Guide for Local Governments

Strategy: Energy

Reduce Energy Use in New and Existing Governmental Buildings

Fast Facts-

- In the United States buildings account for: □
 - 72% of electricity consumption,□
 - 39% of energy use,□
 - 38% of all carbon dioxide (CO₂) emissions,□
 - 40% of raw materials use,□
 - 30% of waste output (136 million tons annually), and□
 - 14% of potable water consumption (USGBC, 2008; WBDG, 2009).
- Building “green” could cut CO₂ emissions by 35% in North America (CEC, 2008).
- Fewer than 4% of new buildings meet LEED standards (CEC, 2008).
- Heating, cooling, lighting and operating of commercial buildings account for about 1/3 of energy use from existing local power plants (OEQ, 2008).
- Worldwide, better insulation of buildings would save 1.6 gigatonnes of CO₂ emissions annually (Enkvist et al., 2007).
- Payback for insulating hot water pipes may take up to a year, but saves 150 pounds of CO₂ emissions and \$15 annually (Energy Saving Trust, 2009).
- Inefficient windows and doors in U.S. buildings waste \$40 billion each year, the amount of energy provided by the Alaska pipeline (Common Fire Foundation, 2009).
- White roofs can cut a building’s energy use by 20%; the average house would cut CO₂ emissions by 10 metric tons per year (San Francisco Business Times, 2008).

Actions for Local Governments:
Give recognition, awards, or incentives for energy efficient design in commercial building construction.
Adhere to LEED standards in construction of new buildings.
Employ energy modeling programs early in the design process.
Think smaller; make building sizes appropriate to use.
Build for the site.
Orient buildings to take advantage of natural sunlight and breezes.
Utilize natural daylight by installing skylights and windows appropriately.
Plant trees to shade buildings in summer (see Strategy – Landscaping in land use and development section).
Install skylights and utilize natural daylight to reduce energy usage.
Consider building underground to take advantage of thermal benefits; a root cellar can store local farmers’ market produce and basements reduce heating and cooling costs.
Use alternative energy sources for central heating, cooling and heating water (see Strategy – Use alternative energy sources).
Use roofing materials that provide maximum energy efficiency, such as “green” or “white” roofs.
Use only Energy Star appliances.
Install energy efficient windows and doors.
Use maximum insulation in walls (R-30), roofs (R-50), and floors and around hot water pipes.
Install water efficient fixtures.
Buy construction products locally.
Buy used and salvage materials when possible to reduce energy needed for new production.
For retrofitting existing buildings:
Install storm windows over existing windows.
Plug all leaks; install caulking or other draught-proofing around windows, doors and floors.

Energy: Manage Heating and Cooling Systems

Fast Facts

- About 86% of U.S. annual energy use is created by the combustion of fossil fuels (Energy Star 1, 2008).
- Total U.S. residential energy consumption is projected to increase 17% from 1995 – 2015 (Solar Energy International, 2008).
- The U.S. uses about 15 times more energy per person than the typical developing country uses (Solar Energy International, 2008).
- The average household spends 45% of its energy dollars (~\$1,000) on heating and cooling (DOE, 2008).
- Heating and cooling systems in the United States emit 150 million tons of carbon dioxide into the atmosphere each year (DOE, 2008).
- Geothermal systems use 50% less energy to heat homes and 25% less to cool them (Common Fire Foundation, 2008).
- For every degree you lower your thermostat in winter or raise it in summer, you cut 3% of your energy use (Consumer Reports, 2008).
- Proper use of programmable thermostats will save the average homeowner \$180 per year and eliminate 1.5 tons of CO₂ emissions (Energy Star 2, 2008; Consumer Reports, 2008).

Actions for Local Governments:

Use combined heating and cooling systems, rather than window air conditioners.

Use Energy Star certified heating and cooling systems.

Improve air conditioner efficiency of buildings to federally mandated standards of 30%.

Regularly maintain air conditioners, heat pumps and chillers.

Inspect all heat/air ductwork, piping, coils and fittings to ensure there are no leaks. Repair or replace if necessary.

Clean or replace air filters on heating/cooling systems monthly.

Install programmable thermostats on heat/ air units.

In winter, set thermostats between 66^o and 68^o F and lower at night. In summer, set thermostats between 76^o and 78^oF.

Reduce Energy by Equipment / Appliances

Fast Facts

- Appliances account for about 20% of a household's energy consumption, with refrigerators, clothes washers, and clothes dryers at the top of the consumption list (DOE, 2008).
- Since their inception, Energy Efficiency Ratio (EER) standards have saved consumers over \$200 billion, about \$2,000 per household, while cutting electricity use 5% (NRDC, 2004).
- Energy Star appliances use 10-50% less energy than a standard appliance, saving almost \$80 a year (Common Fire Foundation, 2008).
- If just 1 in 10 homes used Energy Star appliances, the change would be like planting 1.7 million new acres of trees (Common Fire Foundation, 2008).
- If all computers sold in the United States meet the ENERGY STAR requirements, the savings in energy costs will grow to about \$2 billion each year and greenhouse gas emissions will be reduced by the equivalent of those from 2 million cars (Energy Star, 2009).
- A typical laptop uses 15 watts of energy, while a typical desktop uses 130 watts (Lance, 2007).

Actions for Local Governments:

Upgrade to Energy Star appliances.

When comparing similar units, buy the one with the higher EER rating.

Unplug appliances and equipment when not in use.
Adjust computer sleep modes to turn on more quickly; screen savers use as much energy as word processing.
Use laptops instead of desktop computers when possible; they save 80-90% in energy.
If window air conditioners must be used, use the appropriate size.
Demand Energy Star vending machines at your place of employment.
Encourage staff to turn off PCs, monitors, printers, copiers and lights every night and weekends. If the entire computer systems cannot be turned off, turn off monitors and printers.

Resources:

Energy Star for Local Government.

http://www.energystar.gov/index.cfm?c=government.bus_government_local

Energy Star Guidelines for energy management

http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index

Energy: Electricity/Lighting

“The economic benefits for municipalities to invest in LEDs are clear – they save energy, reduce environmental impact and improve the quality of light.”

(Charles Meeker, Raleigh mayor; The Energy Blog)

Fast Facts

- Lighting accounts for 20-25% of the electricity used in the US (Flex your power, 2009).
- Ohioans spend about 10% of their household energy budget on lighting (Alliance to Save Energy).
- If Ohio households replace the four most-used bulbs with CFLs, they will save \$120 over the life of the bulbs (Alliance to Save Energy).
- LED holiday lights save 10 to 100 Killowatt hours of energy and \$1 to \$10 per strand Consumer Reports, 2007).
- If everyone in the U.S. switched inside and outside holiday lights to LEDs, the savings would be \$250 million per year (Britt, 2008).
- Vancouver’s replacement of mercury vapor street lights with high pressure sodium ones saves the city \$600,000 per year (Rocky Mt. Institute).
- Denver’s replacement of incandescent pedestrian and traffic signals with LED lights saves the city \$360,000 per year and allowed it to earn \$500,000 in rebates from the local utility company (Southwest Energy Efficiency Project).

Actions for Local Governments:
Replace incandescent traffic signals with LED lights.
Replace mercury vapor street lights with high pressure sodium lights.
Reduce or replace inefficient lighting in buildings, and exit signs in parking lots.
Replace T8 ballasts with T12 ballasts in fluorescent tubes.
Replace incandescent exit signs with LED exit signs.
Install timers or occupancy sensors to turn off lights when rooms are unoccupied.
Replace incandescent bulbs with more efficient bulbs such as compact fluorescent lighting (CFLs) or LEDs.
Install lighting sensors to turn off outdoor lights.
Take advantage of natural daylight when possible to reduce lighting cost

For government-

Energy efficient street lights http://www.energyfinder.org/images/other/CEOF_CityLighting.pdf

Energy efficient traffic lights <http://www.swenergy.org/casestudies/colorado/trafficlight.htm>

Energy Efficiency: Management for Energy Efficiency

“The most cost effective means of meeting our energy needs whilst tackling climate change is by using energy more efficiently and utilizing renewable energy.” (Towards Sustainability, 2009)

Fast Facts

- Government agencies spend more than \$10 billion a year on energy to provide public services and meet constituent needs (ENERGYSTAR, 2009).
- Retail companies spend nearly \$20 billion on energy each year (Energy Star, 2009).
- Operations and management programs targeting energy efficiency can save 5% to 20% on energy bills without significant capital investment (DOE, 2007).
- Save Energy Now energy assessments have helped manufacturing plants save over \$2 million, equal to 8% of their energy costs (DOE, 2008).
- Ford Motor Company has saved over \$75 million through effective energy management (Energy Star).
- Tax incentives could reduce energy bills by \$27 billion

Actions for Local Governments:
Join the ENERGY STAR Challenge - a national call-to-action by USEPA to improve the energy efficiency of America’s commercial and industrial buildings by 10 percent or more.
Join the National Action Plan for Energy Efficiency – a private-public initiative towards energy efficiency through the collaborative efforts of gas and electric utilities, utility regulators, and other partner organizations.
Track energy usage and costs for all department and sectors.
Develop and implement codes and development strategies for building and renovation.
Work in partnership with agencies responsible for advising local businesses about how to increase their energy and resource efficiency.
Promote energy efficient building upgrades in public facilities.
Provide energy efficiency information to local community.
Provide energy advice to households to help in choosing most appropriate renewable and low carbon energy technologies for their homes.
Develop an energy management plan.
Take advantage of federal and state incentives for energy efficiency upgrades for building structure, central heating and cooling systems and weatherization programs.
Pursue and apply for grants for investing in renewable sources of energy.
Train local authority staff to be energy-aware.
Encourage staff to turn off PCs, monitors, printers, copiers, and lights every night and every weekend. If the whole computer can't turn off, turn off the monitor and the printer.
Form a local 'save energy' partnership.
Provide incentives for energy saving innovation.
Create a 'wall of pledges' for individuals to commit to conserve energy.
Energy Star for Local Government. http://www.energystar.gov/index.cfm?c=government.bus_government_local