INFRASTRUCTURE ENERGY EFFICIENCY

A municipality's infrastructure is a major consumer of energy. The infrastructure of local government buildings, commercial and industrial facilities, transport and telecommunications, water and energy supply, and waste disposal systems are significant energy users. Consequently, these users also present opportunities for energy efficiency and conservation when properly planned for, operated, retrofitted, or regulated.

Energy efficiency in the infrastructure sector can help cut costs and stimulate the local economy thereby producing more revenues that can be used to deliver essential services. The environmental rationales for energy efficiency improvements are also important. To the degree that the community infrastructure depends on fossil fuels (coal, oil, and natural gas) for its energy supply, their negative impacts on air quality and human health, as well as energy security, can be reduced through conservation and energy efficiency.

APPLICABLE NEW JERSEY GOALS AND TARGETS

Reduce projected energy use by 20% by 2020 and meet 20% of the state's electricity needs with Class I[1] renewable energy sources by 2020 (NJ Energy Master Plan).

Stabilize GHG emissions at 1990 levels by 2020/ Reduce emissions to 80% below 2006 levels by 2050 (E.O. 54; NJ Global Warming Response Act, P.L.2007, c.112).

SUGGESTED ACTIONS AND STRATEGIES

Several strategies are available to local governments aiming to promote energy-saving programs, including the following: technical assistance, public education, and requirements by ordinance. However, to avoid duplication of effort, relevant activities by the utilities serving their areas should first be determined.

Audit and retrofit local government facilities - Considerable energy and costs savings can be realized by retrofitting buildings and facilities. Retrofit projects can serve as models for the community. Project examples include weatherization and heating-ventilation-air conditioning (HVAC) improvements (boilers, chillers, and high efficiency rooftop units), building controls, landscaping changes, thermal cool storage retrofits, and outdoor lighting upgrades. Prior to undertaking a retrofitting project, there is need to assess: current facility conditions, what needs or opportunities exist, options to address needs and opportunities, how much they will cost, and what the savings will be. This process is commonly referred to as an energy audit.

Streetlight retrofits - Many communities are replacing their lamp systems (including traffic signals) with the higher efficiency alternatives now available, realizing cost and energy savings in the process. Conventional mercury vapor streetlights consume about twice as much energy as newer high-pressure sodium (HPS), low-pressure sodium (LPS), and metal halide lamps. LED (light emitting diode) technology lighting is also available offering significant cost-saving opportunities (especially for traffic signals where LEDS use 82-93% less energy than incandescent bulbs).

[1] Class I renewable energy is defined as electricity derived from solar energy, wind energy, wave or tidal action, geothermal energy, landfill gas, anaerobic digestion, fuel cells using renewable fuels, and — with written permission of the New Jersey Department of Environmental Protection (DEP) — certain other forms of sustainable biomass.

Consider Cogeneration or Combined Heat and Power (CHP) in new public infrastructure projects - Cogeneration is simply the production of electricity in plants that can capture what would otherwise be waste heat lost in generating the electricity. This capability makes cogeneration facilities about twice as efficient as conventional electricity generating plants (depending on productive use of waste heat captured). As there are varying views on cogeneration[2], local governments should evaluate for themselves the technical and economic feasibility of such facilities, and should include such an evaluation during the planning stages of all major redevelopment and civic building projects. Such policy ensures that cost-effective opportunities for cogeneration are not overlooked.

Adopt an energy efficiency/conservation[3] retrofit ordinance for industrial/commercial buildings - In communities where the industrial and commercial sector is a major local energy user, a retrofit ordinance can have significant positive impacts on energy use, jobs, and the local economy. An energy efficiency/conservation retrofit ordinance requires that a commercial/industrial building be retrofitted with simple energy efficiency and conservation measures at time of sale (and possibly at time of a major renovation).

Encourage energy conservation and efficiency measures in public housing rehabilitation projects - A policy should be adopted to encourage installation of energy conservation and efficiency improvements beyond those required by state and federal minimums.

Consider use of Thermal Storage - Thermal energy storage is primarily a load (or demand) management option (in contrast to a load reduction option) and, as such, is a technology that can be employed to reduce on-peak electric demand (thus delaying or eliminating construction of peak-capacity generating plants by the local utilties). Thermal energy storage systems are installed in buildings in order to collect and “store” heat or cold, which can be used at a later time to heat or cool the building.

Implement energy efficiency/conservation improvements for water and wastewater systems - Complement water conservation with energy efficiency and conservation in the supply, storage, and distribution of water using appropriate energy-saving technologies and devices (e.g., high efficiency pumps). When appropriate and cost-effective, use renewable energy technologies (e.g., PV) in water supply and treatment systems. Conversely, explore the potential of using the groundwater system and wastewater treatment plant for district heating and cooling. Ground water, along with the surrounding soil mass, could act as either a heat source or sink in a closed loop geothermal heating or cooling system. On the other hand, sludge digesters in waste water treatment plants produce gas that is typically 65 to 80% methane. It may be financially feasible to burn this by-product gas for heat or electricity at the treatment plant itself, for nearby buildings, or even for use as a vehicle fuel.

Promote energy efficiency through land-use regulation - Promote land-use patterns that increase energy efficiency in buildings and transportation systems by making energy efficiency a critical element when developing new zoning regulations and modifying old regulations, e.g., higher density development, solar orientation requirements, site design.

[2] Cogeneration (CG) systems are complex undertakings and require expertise to construct and maintain properly. It has been observed that smaller CGs (<5 megawatts) have lower capacity factors (60%) compared to larger ones and maybe prone to service interruptions. There may also be stiff technical standards imposed by utilities for interconnection.

[3] Energy efficiency refers to using less energy to perform a function (e.g., use of more efficient lighting), while energy conservation refers to the elimination of unnecessary energy consumption (e.g., turning off unneeded lights).

Encourage energy-efficient transportation - Create opportunities for non-auto transportation including bikeways and walkways. An alternative fuels program can also be pursued for the vehicle fleet of local government as well as school buses to reduce gasoline and diesel use.

Enhance energy efficiency in telecommunications - Whenever applicable, renewable energy should be used to power telecommunication facilities. When appropriate, workers should be given opportunities for off-site work and telecommuting.

Pursue waste reduction and recycling - These activities are also energy saving and should be pursued to optimize benefits (see Source Reduction, and Recycling fact sheets in this series).

STATE TECHNICAL/FINANCIAL ASSISTANCE

New Jersey Municipal Audit Program - provides funding to subsidize energy audits for municipalities. Program details are being developed by NJ Board of Public Utilities.

New Jersey SmartStart Buildings Program - provides technical assistance and incentives for new and retrofit efficiency upgrades including high efficiency lighting, heating, and cooling equipment for schools, commercial buildings, industrial buildings and processes, and government.

Combined Heat and Power (CHP) Program - offers incentives to purchase and install various types of CHP units to qualifying customers.

For further details on these and other incentives programs, visit www.njcleanenergy.com.

FURTHER INFORMATION

American Council for an Energy Efficient Economy - www.aceee.org
Alliance to Save Energy - www.ase.org
NJ Adopts Energy Conservation Standards for Building Construction - www.state.nj.us/dca/news/2007/pr022607.shtml
NJ Energy Code - www2.iccsafe.org/states/newjersey/NJ_Energy/Energy_Frameset.htm
Rocky Mountain Institute - www.rmi.org
U.S. Department of Energy (energy efficiency and renewable energy) - www.eere.energy.gov/

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