Best Practices in Municipal Energy Management and Efficiency

South Bend Green Ribbon Commission
Energy Group

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Executive Summary

Across the nation, American municipalities are taking numerous measures to improve the ecological friendliness, economic soundness, and health and wellness of their communities and citizens. They have identified and executed dozens of initiatives to reduce environmental impact and save tax payer dollars.

In this paper, we identify 10 best practices in municipal energy efficiency and management that could be used here in South Bend to realize similar savings. We also provide links and references, and examples for each. The municipal energy efficiency projects implemented by the 23 cities examined for this report already have resulted in an ongoing net savings of $3,180,375 per year.

The data for this paper was collected from comprehensive plans and annual reports of municipalities in Indiana, the Midwest, and beyond, EPA reports, and reports from the U.S. Department of Energy. In each section the data is presented geographically, beginning with Indiana, followed by contiguous states and beyond.

Best practices in municipal energy efficiency and management from currently in place with documented results and savings include:

1. Energy Audits and Baseline Analyses
2. Clearly Established and Ambitious Metrics for Energy Savings
3. Summer and Winter Temperature Set Points across Municipal Facilities
4. Energy-Efficient Procurement Policies
5. Dedicated Energy Savings Reinvestment Plans
6. Municipal Building Upgrades and Retrofits
7. Municipal Fleet Fuel Efficiency
8. Upgrade and Retrofit of Waste Water Treatment Facilities
9. Municipal Waste to Energy Programs
10. Renewable Energy Projects

Best Practice in Municipal Energy Management

Municipal governments are typically elected on a platform of improving the quality of life of their citizens within the limitations of budget constraints. In this paper we have identified initiatives have that other mid-sized cities have undertaken to save tax payer dollars and reduce their environmental impact. The 10 best practices in municipal energy efficiency outlined in this paper have demonstrated a favorable return on investment and could be implemented in South Bend with similar results.

1. Energy Audits and Baseline Analyses

For a municipality to implement a comprehensive energy efficiency and management plan, the first step is to conduct an energy audit to establish usage and cost baselines. The Local Government Operation Protocol and the Clean Air and Climate Protection Software is commonly used to inventory energy use and costs. Each year's inventory enables the city to make comparisons, measure success, and make new recommendations. This analysis creates a valuable feedback loop for fine-tuning the estimated impact of existing policies and programs on energy reductions and savings.

For example, Bloomington IN, purchased an energy dashboard that enables it to monitor its energy usage on an hourly basis and make use and cost comparisons by day, month, or years. Using information from the dashboard, Bloomington was able to reduce electrical usage early in the morning and on weekends.[1] This helped them to reduce their energy usage by 13% in 2013,[2]saving more than $200,000 in energy expenses per year going forward.

In 2006 Boulder CO, started documenting energy usage in city buildings. By using this data to implement targeted efficiency upgrades they saved $529,000.[3]

In 2010 Holland MI established a baseline based on an inventory of all city buildings. Demonstrated energy savings afterwards averaged 34% for the 25 retrofitted buildings with average annual savings of $28,000.

2. Clearly Established and Ambitious Metrics for Energy Savings

Like commercial businesses, cities understand the need to reduce their energy costs through effective energy management practices that involve establishing baseline energy performance, setting energy-savings goals, and regularly evaluating progress. Energy use should be tracked at the granular level and normalized overtime to account for energy price fluctuation. Energy efficiency upgrades need to be monitored to ensure the expected savings are realized.[4] Many cities have begun to use building dashboards to provide immediate feedback on building energy use.

Fayetteville, AK committed to becoming a sustainable city in 2007. Their energy efficiency investments since then are saving more than $400,000 a year.

In 2008, the mayor of Louisville KY launched GO Green Louisville in order to decrease energy use in the city 25% (based on a 2010 baseline) by 2025. Energy efficiency upgrades were implemented in 24 city-owned buildings. In 2013, a report verified that the city had achieved a 7% reduction in electricity use, saving more than $750,000 in energy bills compared to 2010.[5]

In 2000 Berkeley CA adopted a sustainable energy plan. Commercial electricity consumption decreased 7% between 2000 and 2013. As of 2013, cumulative annual savings on energy bills across all Berkeley businesses served by Smart Lights exceeded $1.3 million. Upgrades to municipal building systems, lighting and HVAC controls resulted in approximately $380,000 savings per year.[6]

Lafayette CO adopted three approaches for energy savings in 2013. The Building Permit education program generates in $100,000 annual savings and a 2.5 year return on investment (ROI). The Energy Efficiency Drive and Contractor Training program produces $280,000 in annual savings with a 2.1 year ROI. The Green Business Award Program has led to $135,000 annual savings and with a 0.5 year ROI.[7]

Additional cities that have achieved similar energy and cost savings through their comprehensive energy plans and metrics include Boulder City CO, [8] Burlington VT, and Eugene OR.

3. Summer and Winter Temperature Set Points across Municipal Facilities

The recommended temperatures for municipal buildings, as established by American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 55-2013 Thermal Environmental Conditions for Human Occupancy are 75-78° F in the summer and 68-72° F in the winter.[9] For summer cooling the California Energy Commission estimates savings of 1-3% for each degree the thermostat is set above 72° F in the summer.[10] Implementing temperature set points is a cost-free way to save energy. The added benefit is increased occupant satisfaction by reducing the overcooling of indoor air in the summer.

Minneapolis MN,[11] Cecil County MD,[12] Indiana University-Purdue University Indianapolis Campus)[13] and Lawton OK[14] have all established Indoor Temperature Set Point Policies.

4. Energy-Efficient Procurement Policy

Purchasing energy-efficient products can reduce facility energy costs by 5-10%, and also lower maintenance costs. Municipal governments typically implement these policies at no added cost by using replacement schedules already in place. The EPA includes an Energy-Efficient Product Procurement Guide in its series of publications on Local Government Climate and Energy Strategy. Municipal Governments can use the free savings calculators

of the Energy Star program to quantify the financial benefits of energy efficient products.[15] Changing one light to a more energy efficient model saves $4 a year in energy costs. Replacing an old computer monitor with an Energy Star-rated monitor saves $58 a year in energy costs.[16]

In 2003, Santa Rosa CA converted city buildings to energy efficient lighting and saved $122,000 per year in energy costs. The ROI was less than 3 years based on installation costs of $300,000. To do this, Santa Rosa established a central purchasing office in order to benefit from volume purchase savings by combining all departments' purchases. Davenport IA also has a central purchasing office for all City departments. It competitively purchases the equipment, supplies and services required by City departments for their operations. Davenport was a Finalist for the Siemens Sustainable Community Award in 2010.[17]

Santa Monica CA,[18] Richmond VA[19] and Lansing MI[20] each have an Energy-Efficient Product Procurement Policy.

5. Dedicated Energy Savings Reinvestment Plans

Lack of funding is the main roadblock to achieving municipal improvements. Establishing an Energy Savings Reinvestment Plan allows future projects to be internally self-funded. These plans are set up so that up to 80% of a project's savings goes to the energy fund to pay for future energy efficiency projects, while the remaining amount is returned to the city's general fund.

The Michigan Suburbs Alliance serves as a fiduciary entity for the Southeast Michigan Regional Energy Office which oversees efficiency and renewable-energy projects for interested municipalities. Ann Arbor MI set up an energy fund that captures a portion of energy savings and has generated tens of thousands of dollars over the years to reinvest in efficiency projects. Eighty percent of a project's savings goes to the energy fund, while the remaining 20% is returned to the city's general fund.

Meridan Township MI has used the 80/20 model over the last 8 years. They have focused their energy efficient upgrades on lighting, controls, insulation and HVAC systems. The township has saved approximately $20,000 a year for the past three years.[21]

Battle Creek MI and Phoenix AZ[22] also have Energy Conservation Savings Reinvestment Plans.

6. Municipal Building Upgrades and Retrofits

Commercial and residential buildings account for 40% of total U.S. Energy use which is comprised of 72% of U.S. electricity use and 36% of U.S. natural gas use. Technological improvements, including light fixtures, windows, building controls and appliance efficiency,

can reduce the energy consumption of standard building services.[23] Outlined below are five building and municipal upgrade that have shown good return on investment.

6.1 Upgrade and retrofit municipal buildings using high efficiency, heating and air conditioning systems

The EPA reports that 30% of energy in commercial buildings is used inefficiently or unnecessarily.[24] EPA Energy Star-qualified light commercial HVAC equipment uses 7-10% less energy than un-qualified new equipment.[25] For a quicker and more affordable solution that reduces a building's energy use, the General Service Administration (GSA) recommends the replacement of HVAC filters on a regular schedule and the installation of high performance filters. Replacing the manufacturer-recommended filters with high performance filters can reduce HVAC cost by up to 10%, and improve occupant satisfaction because of improved indoor air quality.[26] The National Renewable Energy Laboratory reports that 39.3% of local governments surveyed had upgraded and/or retrofitted facilities to a higher energy efficient HVAC system.[27]

6.2 Upgrade and retrofit windows

A study conducted by the Preservation Green Lab found that upgrading existing windows can generate as much as 30% in savings, especially in cold climates. [28]

In 2008, Temple NH started to audit municipal buildings' energy use and costs. They discovered that the municipal building and the library were the most expensive energy users. The city decided to increase the insulation factor of the windows in the municipal building, reducing energy consumption by 50% with $50,000 in annual savings.[29] La Jolla CA retrofitted windows of The Aventine Building which resulted in an energy use reduction of 63%. Portland OR replaced the single paned windows in its City Hall with double paned windows at a cost $105,000, and now saves the city an estimated $15,000 per year resulting in a 7 year ROI.[30]

6.3 Upgrade and retrofit lighting in municipal buildings

Lighting costs account for an average of 15%of the annual energy budget for municipal government buildings. Each LED bulb reduces energy usage by 80-90% compared to an incandescent bulb. A 288-City Survey shows that mayors choose energy-efficient lighting as the "most promising" technology receiving top priority in their cities.[31] The National Renewable Energy Laboratory noted that 55.9% of reporting local governments upgraded or retrofitted facilities to higher energy office lighting. [32]

The South Bend Municipal Energy Office has retrofitted city buildings with more energy efficient lighting options to save energy and reduce costs. The Martin Luther King Center obtained a 20% reduction in energy use, which equates to $200 savings per month. The Charles Black Center benefited from a 37% reduction, a savings of $76 per month. Fire

Station #6 has had a reduction of 36% in overall energy use and over the next 20 years the station projects approximately $108,000 in energy cost savings. The Park Maintenance facility saw an approximately 32% reduction in energy use, which amounts to a projected cost savings $126,000 over 20 years.[33]

Barnstable County MA retrofitted the lighting systems in 10 buildings in 2003. The retrofit has produced annual energy savings of $19,000.[34]

6.4 Install occupancy sensors

Properly installed occupancy sensors can reduce energy costs associated with lighting and HVAC by up to 80%. Depending on the type of occupancy sensors, the ROI can range from 0.5 to 5 years.

Mesa AZ installed sensors and timers on lights in the parking lot outside their library, resulting in a savings of more than $40,000 per year with a 4 year ROI. In 2006, Tucson AZ installed occupancy sensors in the city's municipal buildings at a cost of $3,000, and an annual savings are $375. Santee, CA installed occupancy sensors in City Hall offices. Along with lighting upgrades, the resulting annual cost savings were 25% or $19,000.[35]

6.5 Upgrade and retrofit traffic lights and street lighting

LED traffic lights use 80 to 90 percent less energy and last five to 10 times longer than incandescent lights, reducing both energy use and maintenance costs. Converting 100 traffic lights to LEDs can save approximately $3,000 a year.[36] The LED lights are also brighter contributing to increased visibility and safety. Cities can further reduce energy use by replacing traffic signals with traffic circles.

In 2012 it cost South Bend Indiana $18,750 a month to light its cities streets at night. Starting with a grant from Wells Fargo the city began the Light Up South Bend Program with the goal of replacing 13,000 street lights and cutting the energy bill in half.[37]

Until 2000, Ann Arbor MI spent almost 25% of its energy budget on traffic signals and street lighting (8% and 92% respectively). Then it installed LED fixtures in traffic lights and cross-walk signals and began saving $49,000 annually in energy costs.

Since 1999, nearly 7000 LED traffic signal units have been installed in more than 80% of the traffic signals in Madison WI. Annual savings from this replacement are $240,000.[38] The retrofitting of 380 traffic signals in Clackamas County OR has produced annual energy savings of $10,000 with a 4 year ROI.[39]

7. Municipal Fleet Fuel Efficiency

Vehicles which can run on compressed natural gas (CNG) are smart choices for high-mileage, centrally fueled fleets that operate within a limited area. A CNG truck reduces

greenhouse gas emissions by 20-30%.[40] Natural gas powers approximately 150,000 vehicles in the United States and 15.2 million vehicles worldwide. CNG is listed as an alternative fuel under the Energy Policy Act of 1992.

On Earth Day, April 2013, the city of South Bend's Solid Waste Division announced the arrival of four CNG refuse trucks. These trucks are the first phase of a new solid waste transportation plan. Acquired in part from an Indiana Department of Environmental Management (IDEM) grant – applied to the purchase of two of the four trucks – the city stands to save $50,000 per year in fuel costs alone.[41]

In Dublin OH, 44 vehicles were converted to CNG - one Ford Transit, two Ford Fusions, one Ford F-350, 23 F-250s and 17 F-150s. The conversion kits were all EPA-certified. The initial phase is projected to save $30,000 per year in fuel costs.[42]

There are many heavy-duty CNGs, as well as a growing number of light-duty Natural Gas Vehicles available from original equipment manufacturers. It is important to purchase vehicles only from Qualified System Retrofitters (QSRs) who will economically, safely, and reliably convert many vehicles to natural gas operations.[43] At this time only gasoline to CNG conversions are certified by the Environmental Protection Agency (EPA). Conversion costs range from $8,000 to $16,000 per vehicle and vary based on their size and manufacturer.

In addition to CNG some cities are making their vehicle fleets more fuel efficient by purchasing hybrid and/or electric vehicles. The National Renewable Energy Laboratory noted that 44.4% of reporting local governments had increased the purchase of fuel efficient vehicles. Twenty-three point seven percent of reporting local governments had purchased hybrid electric vehicles.[44]

Columbus, OH has joined Dublin in making their municipal vehicle fleet more fuel efficient through a program called Green Fleet Action Plan.[45]

8. Upgrade and Retrofit Waste Water Treatment Facilities

A significant amount of municipal energy use occurs at water and wastewater treatment facilities. Pumps, motors and other equipment usually operate 24 hours a day, seven days a week. Operational modifications such as installing Supervisory Control and Data Acquisition (SCADA) software can result in a significant reduction in energy usage and avoid the need for capital investment. Replacing older pumps and motors with efficient, appropriately sized pumps and motors with variable speed drives will also provide additional energy savings.[46]

Sheboygan WI replaced an old, inefficient anaerobic digester system that was unable to use all the methane produced by the wastewater facility that they then had to use a flare to

burn off the excess. [47] After the wastewater treatment facility installed the new 300kW system at a cost of $300,000, they recouped $78,000 in annual energy savings with a ROI of less than 4 years. Sheboygan won the Wege Small Cities Sustainability Best Practice Award in 2011.[48]

The National Renewable Energy Laboratory noted that 23% of reporting local governments upgraded or retrofitted facilities to higher energy efficient pumps in water and sewer systems. Seven percent of reporting local governments generated electricity through municipal operations such as wastewater treatment.[49]

Albert Lea MN [50] and Wooster OH [51] are additional cities that have installed CHP anaerobic digesters.

9. Municipal Waste to Energy Programs

Nationally, the goal of zero waste continues to be pursued. While many companies have worked to achieve "landfill free" status at their various facilities, municipalities and individual states have only begun to debate and implement zero waste initiatives. Americans each produce 4.4 pounds of trash a day. The EPA reports that the recycling rate has leveled out at 34%.[52] Austin TX aims to reach a 50% diversion rate this year and zero waste by 2040[53]

The State of Indiana has signed into law a goal of reducing solid waste collection 50% by 2019. The Indianapolis Resource Recovery Facility can process 2,175 tons of solid waste per day of solid waste to produce no less than 4,500 pounds of steam. Citizens Thermal Energy (CTE) purchases the steam to power the downtown heating loop.[54] The rates for solid waste disposal at a landfill is approximately $0.11 per pound and the rate for disposal at the incinerator is approximately $0.06 per pound

Kent County MI, home to Grand Rapids, MI incinerates 625 tons of municipal solid waste daily, which represents 25% of the volume of solid waste generated in the County. This "trash" is burned to produce electricity and steam. The Waste-To-Energy facility generates up to 16 megawatts of electricity.[55]

Ames IA [56] and Detroit MI[57] also have established Waste-To-Energy Facilities.

10. Renewable Energy Projects

Outline below are examples of mid-size cities that have installed solar, wind, geothermal and hydroelectric renewable energy projects. The cities that have implemented these projects benefit fr**om more than just reduced energy bills; they are preparing** their cities for the future.

10.1 Solar Panel Installation

Glastonbury CT partnered with SolarCity to assess their energy consumption and install solar arrays in strategic locations. They started with three locations: Town Hall, the high school, and the maintenance yard. Later, four more locations were added, including two elementary schools, a parks and recreation facility and the bus yard. A twenty year solar power purchase agreement (PPA) with SolarCity is projected to save the taxpayers of Glastonbury more than $100,000 each year. Together the projects total one megawatt of solar generation capacity, enough to produce 1.27 million kWh of electricity for the town each year. [58]

10.2 Wind

Indiana is the state with the fastest-growing number of wind energy installations. Union City IN has installed two 1 MW Nordic wind turbines that supply power to city schools and municipal buildings. Each turbine is estimated to generate over 2,000 MWh of electricity annually, equivalent to powering 250 homes per year. These turbines are expected to generate a profit of $3 million for the city and school over the next 25 years.[59]

In Milwaukee WI, the Office of Environment and the Port of Milwaukee partnered to install a Northern Power Systems wind turbine at the Port's administration building along the shore of Lake Michigan. The turbine provides100% of the electricity needs of the administration building. Since the installation in 2012, the wind turbine has generated over 480,000 kWh of clean power and saved more than $62,000 in energy costs.[60]

10.3 Geothermal – Retrofit Existing Buildings

Hastings School in Westborough MA replaced an all-electric heating system with a geothermal heat pump system and saved $75,000 of utility costs per year.[61] A Kentucky Study of Annual Energy Cost per Square Foot showed that schools that replaced older gas boiler-based HVAC systems with a geothermal heat pump system saved 61% in energy costs. The benefits of geothermal installation include reduced noise, lower utility bills, lower maintenance costs, and elimination of toxic chemicals from the work environment. A geothermal system also has less exposed outdoor equipment which reduces the risk of vandalism.[62]

10.4 Low Impact Hydro

Since only three percent of the nation's 80,000 dams currently generate electricity,[63] states and cities are looking into retrofitting existing dams to generate power. In 2007 Brookfield Renewable Power started a retrofit project on the Mississippi River in Minnesota. The project added 10 megawatts of power capacity to an existing Army Corps of Engineers dam.[64]

The U.S. Department of Energy has developed an interactive map showing U.S. Hydropower potential from existing non-powered dams capable of producing at least 1 MW of power. The Ball Band (In-Channel) Dam in Mishawaka is listed as capable of producing 2.3 MW of energy.[65]

Next Steps: Engage Citizens toward Energy Efficiency

Municipalities are making improvements in energy efficiency in various ways, and when citizens are "nudged" in that direction, it has a huge additional positive effect on energy savings.

The citizens of Madison WI produced annual savings of more than $1,689,000 because 20% of citizens are actively participating in energy efficiency programs. The city began the Mpower Challenge program in 2009, through which more than 75 local businesses, organizations and citizens agreed to make energy reductions. [66] In 2007, Madison started the MadiSUN program, which educates citizens about solar energy. [67]

Loveland CO has been able to decrease utility bills for selected customers by $418,000 since 2011.[68] Loveland is participating in the COpower program, which randomly selects 15,000 homes and provides Home Energy Reports for each of the selected homes to educate the homeowners on energy efficiency opportunities. Loveland has also developed school curricula using the city Energy Education Assistance Program to educate students about energy efficiency and renewable energy. Student projects are developed, promoted and supported by the Energy Education Assistance Program. The city provides the funding for this program as well as a $5,000 award to the school that produces the best project. [69]

Elmwood IL residents are saving $50,000 per year through a municipal program that educates citizens and engages them in their energy plan through the use of Smart Grid, which enables residents to monitor and adjust their energy use through smart meters. [70]

Cuyahoga Falls, OH is also nudging its residents toward energy efficiency.

Conclusion

Implementing the measures discussed in this paper will improve the economic soundness, reduce the environmental footprint and improve the health and wellness of South Bend and its citizens. Some of these best practices are easy to implement and require minimal financial commitment such as establishing temperature set points in municipal buildings but others require a significant capital investment such as upgrading a wastewater treatment facility or the replacing windows in a municipal building. The city of South Bend has started to implement some of these recommended best practices and the annual savings resulting from such project as purchasing CNG refuse trucks and upgrading to LED street lights can provide further benefits by being reinvested in future energy efficiency projects.

As shown in this paper energy efficiency projects can help a city realize hundreds of thousands of dollars in annual savings. These best practices and the annual energy and financial savings will help South Bend increase its prosperity and the welling of its citizens now and in the future.

Appendix A

Table 1. Energy Actions (within the city government)[71]

Which of the following actions has your government taken to decrease its use of energy?

Action	Local Government Has Taken Action (% reporting)
Conducted energy audits of government buildings	62.9
Upgraded or retrofitted facilities to higher energy efficiency office lighting	55.9
Installed energy management systems to control heating and cooling in buildings	46.4
Increased the purchase of fuel efficient vehicles	44.4
Upgraded or retrofitted facilities to higher energy efficiency heating and air conditioning systems	39.3
Upgraded or retrofitted traffic signals to improve efficiency	37.1
Upgraded or retrofitted streetlights and/or other exterior lighting to improve efficiency	30.5
Purchased hybrid electric vehicles	23.7
Upgraded or retrofitted facilities to higher energy efficiency pumps in the water or sewer systems	23.4
Established policy to only purchase ENERGY STAR equipment when available	17.4
Utilized dark sky compliant outdoor light fixtures	15.1
Installed solar panels on a government facility	13.1
Established a fuel efficiency target for the government fleet of vehicles	12.5
Purchased vehicles that operate on compressed natural gas (CNG)	8.5
Generated electricity through municipal operations such as refuse disposal, wastewater treatment, or landfill	7.4
Installed a geo-thermal system	6.6
Installed charging stations for electric vehicles	5.3

Appendix B

Energy Efficiency Funding, Grants, Contracts and Loans

Indiana Office of Energy Development, http://www.in.gov/oed/

Grants

1. 2015 Fall Community Conservation Challenge Grant Program. Applications due Oct 30, 2015. $600,000 in grant awards will be issued in amounts ranging from $25,000 to $100,000. The projects must "demonstrate measurable improvements in energy efficient or the use of renewable energy, result in a reduction in energy demand or fuel consumption, or involve the implementation of an energy recycling process."[72] The winning recipients must provide 25 percent cost share for the project.

2. 2015 Indiana Wastewater Treatment Plant Grant Program. Applications due Oct 23, 2015. $500,000 in grant awards. The maximum award per grant will be $100,000. The "grant is intended to help reduce energy demand and energy costs at wastewater treatment plants through investments in energy efficiency, combined heat and power, and/or waste heat recovery."[73]The winning recipients must provide 50 percent cost share for the project.

3. 2015 Indiana Propane School Bus Grant Program. Applications due Oct 16, 2015. $300,000 in grant awards. The grant is dedicated to propane school buses. "The winning recipient will receive between 50 to 100 percent of the incremental cost difference between a new propane-powered school bus and a diesel or gasoline-powered school bus. " [74] Two buses must be purchased.

Contracts

4. Guaranteed Energy Savings Contract (GESC). A Guaranteed Energy Savings Contract (GESC) is an agreement between a qualified provider and a building owner to reduce the energy and operating costs of a building, or a group of buildings, by a specified amount." The main advantage of these agreements is that the building owner can participate in the project without a large upfront investment of capital. The savings are used to pay for the investment over a period not to exceed the lesser of 20 years or the payback period of the project. If the guaranteed savings are not achieved, the provider must

reimburse the building owner for the difference between the guaranteed and cost savings."[75]

Loans

5. Indiana's Wastewater State Revolving Loan Fund (SRF), "provides low-interest loans for treatment improvements and upgrades. The SRF loan program offers the Green Project Reserve (GPR) Sustainability Incentive Program, which encourage SRF loan program participants to reduce resource consumption, such as energy and water" [76], and may be eligible for an interest rate reduction of up to 0.5% of its SRF loan.

Appendix C

United States EPA Local Government Energy Strategy Series

"The Local Government Climate and Energy Strategy Series gives a straightforward overview of greenhouse gas (GHG) emissions reduction strategies that local governments can use to achieve economic, environmental, social, and human health benefits. The series covers energy efficiency, … and renewable energy." [77]

Energy Efficiency

Energy Efficiency in Local Government Operations (PDF), October 2011,
http://www3.epa.gov/statelocalclimate/documents/pdf/ee_municipal_operations.pdf

Energy Efficiency in K-12 Schools (PDF), May 2011,
http://www3.epa.gov/statelocalclimate/documents/pdf/k-12_guide.pdf

Energy Efficiency in Affordable Housing (PDF), May 2011,
http://www3.epa.gov/statelocalclimate/documents/pdf/affordable_housing.pdf

Energy-Efficient Product Procurement (PDF), September 2011,
http://www3.epa.gov/statelocalclimate/documents/pdf/energyefficientpurchasing.pdf

Combined Heat and Power (PDF), February 2014,
http://www3.epa.gov/statelocalclimate/documents/pdf/CHPguide508.pdf

Energy Efficiency in Water and Wastewater Facilities (PDF), May 2013,
http://www3.epa.gov/statelocalclimate/documents/pdf/wastewater-guide.pdf

Renewable Energy

On-Site Renewable Energy Generation (PDF), April 2014,
http://www3.epa.gov/statelocalclimate/documents/pdf/OnSiteRenewables508.pdf

Landfill Gas Energy (PDF), March 2012,
http://www3.epa.gov/statelocalclimate/documents/pdf/landfill_methane_utilization.pdf

Green Power Procurement (PDF), April 2014,
http://www3.epa.gov/statelocalclimate/documents/pdf/greenpowerprocurement508final.pdf

Appendix D

City Energy Efficiency Projects

City/State	Population	Project Description	Annual Savings
Bloomington IN	80,405	Energy Dashboard	$200,000
Holland, MI	33,051	Energy Baseline	$28,000
Fayetteville, AK	78,960	Building Energy Efficient Retrofits	$400,000
Louisville, KY	253,128	Building Energy Efficient Retrofits	$750,000
Berkeley, CA	116,768	Building Energy Efficient Retrofits	$380,000
Lafayette, CO	26,784	Building Permit Education Program	$100,000
Lafayette, CO	26,784	Contractor Training Program	$280,000
Lafayette, CO	26,784	Green Business Award Program	$135,000
Meridan Township, MI	40,000	Energy Conservation Savings Reinvestment Plan	$20,000
Santa Rosa, CA	171,990	Energy Efficient Lighting Retrofit	$122,000
Temple, NH	1,366	Energy Efficient Window Retrofit	$50,000
Portland. OR,	609,456	Energy Efficient Window Retrofit	$15,000
Barnstable County, MA	214,990	Energy Efficient Lighting Retrofit	$19,000
Mesa, AZ	457,587	Installed Occupancy Sensors	$40,000
Tucson AZ	526,116	Installed Occupancy Sensors	$375
Santee, CA	56,105	Installed Occupancy Sensors and Lighting Upgrades	$19,000
Ann Arbor, MI	117,025	Installed LED traffic Lights	$49,000
Madison, WI	243,344	Installed LED traffic Lights	$240,000
South Bend, IN	100,886	Purchased CNG Trash Trucks	$50,000
Dublin, OH	43,607	Convert Vehicle Fleet to CNG	$30,000
Glastonbury, CT	34,427	Solar Panel on Municipal Buildings	$100,000
Sheboygan, WI	49,288	Installed new CHP system	$78,000
Westborough, MA	18,272	Retro Fit School with Geothermal System	$75,000

Endnotes

[1]City of Bloomington, Department of Economic & Sustainable Development, Local Government Operations, Energy Use and Emissions Inventory, 2010, https://bloomington.in.gov/media/media/application/pdf/11987.pdf

[2]Bloomington Energy Dashboard, https://bloomington.in.gov/energydashboard

[3]Boulder Energy Community Greenhouse Gas Inventory Results, 2012, https://bouldercolorado.gov/links/fetch/26051

[4]Benchmarking to Save Energy, Protect our Environment through Energy Efficiency, Energy Star, https://www.energystar.gov/ia/business/healthcare/Benchmarking_to_Save_Energy.pdf

[5]Louisville Metro Sustainable Plan, March 2013, https://louisvilleky.gov/file/sustainlouisvillepdf

[6]Office of Energy and Sustainable Development, City of Berkeley Climate Action Plan Goals & Metrics for Building Energy Use, http://www.ci.berkeley.ca.us/Planning_and_Development/Energy_and_Sustainable_Development/Climate_Action_Plan_Building_Energy_Use.aspx

[7]City of Lafayette Community Energy Efficiency Plan, December 2013, http://www.cityoflafayette.com/DocumentCenter/View/4664

[8]Commission for Environmental Cooperation, Best energy management practices in 13 North American municipalities, http://www.cec.org/municipalenergy/home.asp?varlan=en

[9]ANSI/ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy https://www.ashrae.org/resources--publications/bookstore/standard-55

[10]GSA Public Building Service, Energy Savings and Performance Gains in GSA Buildings, Seven Cost-Effective Strategies. March 2009, http://www.gsa.gov/graphics/pbs/GSA_SevenStrategies_090327screen.pdf

[11]Minneapolis City of Lakes Policy on Indoor Space Temperature, http://www.ci.minneapolis.mn.us/www/groups/public/@citycoordinator/documents/webcontent/convert_258024.pdf

[12]Indoor Space Temperature Guidelines, Cecil County Government, http://www.ccgov.org/uploads/HR/INDOOR%20SPACE%20TEMP%20GUIDELINES.pdf

[13]Indiana University-Purdue University Indianapolis, Campus Facility Services, http://www.cfs.iupui.edu/departments/energy-management/indoor-air-temperature-set-points.asp

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