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LEARN MORE ABOUT MUNICIPAL ENERGY EFFICIENCY IN NORTH AMERICA

- Detailed case studies for each of the initiatives highlighted in this brochure are available online at: www.cec.org/municipalenergy

Explore other resources from the CEC:

Guide to Developing a Community Renewable Energy Project in North America

This detailed “how-to” guide is designed to help towns and indigenous communities develop small-scale renewable energy projects. It includes valuable information on assessing technologies and resources available, financing projects and getting them operation.

Renewable Energy Training Resources

This new online database provides a portal to training courses available across North America. Ranging from technical training workshops to university certificates, these courses cover energy sectors including photovoltaic systems, wind power and biofuels.

- Find out about the CEC’s municipal energy partners in each country:

- Asociación Mexicana de Municipios de México, A.C. – www.municipiosmexico.org.mx

- National League of Cities – www.nlc.org

- Federation of Canadian Municipalities – www.fcm.ca

BEST ENERGY MANAGEMENT PRACTICES

IN 13 NORTH AMERICAN MUNICIPALITIES



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Commission for Environmental Cooperation

INTRODUCTION

Municipalities have a major impact on energy use in North America. Besides the energy used in municipal buildings, public transportation, street lighting, and other operations, local governments exert influence over transportation and land use patterns, the energy efficiency of private buildings, and in some cases, local energy supply. Taken together, municipal governments can be said to have direct or indirect control over more than half the energy used in a community.

This brochure provides a snapshot of a CEC-sponsored study on best practices in energy use and supply in North American municipalities. The research began with a detailed scan of municipal energy initiatives in Canada, Mexico, and the United States, covering renewable energy generation, energy efficiency and energy-related procurement.

Thirteen municipalities, chosen for their innovative management and use of energy, the diversity of their actions, and the results they produced, were selected from across the three countries. Through this sharing of experiences and lessons learned in the region, the CEC seeks to promote action at the local level. Thus the case studies go beyond describing the programs and actions taken, but provide a wider policy and economic context as well as performance indicators. The map inside this brochure shows the location of the thirteen municipalities studied and provides a sample of their initiatives and accomplishments. The complete case studies are available online at www.cec.org/municipalenergy.

ENERGY MANAGEMENT TOOLS

Several municipalities have recently begun using sophisticated energy management software that allows administrators to monitor energy by department, by building, or even by individual system within a building. The data obtained helps municipalities evaluate their energy-efficiency initiatives and identify new opportunities for saving energy. For example, York Region developed its own energy management software package, called the Energy & Environmental Management System (EEMS), which it licenses to other municipalities.

RENEWABLE ENERGY

Many municipalities have already undertaken initiatives to increase the use of renewable energy resources. Some municipalities are committed to purchasing a portion of their electricity supply from clean, renewable sources, thereby offsetting some of their GHG emissions. Eugene, for instance, purchases 25% of its electricity from wind power generators. Others have developed renewable energy generating capacity of their own, such as solar thermal water heating and solar photovoltaic electricity generation on municipal buildings. The City of Burlington, for example, has installed solar photovoltaic panels on several schools, generating electricity and helping to acquaint students with renewable energy and sustainability. York Region is considering installing a wind turbine at one of its water treatment facilities. Several initiatives found at landfill and wastewater treatment facilities involve the capture of biogases to power small electric generators. Both Aguascalientes and Monterrey have recently implemented biogas generator projects at their municipal landfills.

COMMON INITIATIVES

GREENING EXISTING BUILDINGS

Most of the studied municipalities have undertaken initiatives to reduce energy consumption in the buildings they own or occupy. These initiatives typically include upgrades and retrofits to existing buildings or the construction of new buildings according to recognized energy-efficiency standards. The goal of these initiatives is not only to save energy, reduce costs, and mitigate greenhouse gas emissions, but also to lead by example, i.e., to inspire local, private building owners to undertake similar initiatives.

Before greening existing buildings, municipalities usually perform energy audits in order to identify the main opportunities for energy savings. Audits allow the strategic implementation of targeted upgrades and retrofits to maximize energy savings while minimizing investment. Generally, upgrades include replacement of lighting, climate control, and other energy-consuming equipment with newer, more efficient versions. In Boulder, Eugene, and Saint John, for example, major retrofits are being implemented, such as the installation of new windows, insulation, and solar or geothermal heating systems.

NEW GREEN BUILDINGS

In addition to greening existing buildings, a few of the municipalities studied also have policies requiring that new municipal-owned buildings meet or exceed recognized energy-efficiency standards. The US and Canadian Green Building Councils' LEED certification system is the most common yardstick for measuring how green a building is. Several of the studied municipalities, such as Eugene, Saint John, Whistler, and York Region, have either built or are in the process of building LEED-compliant facilities.

GREENING BUILDING OPERATIONS

In addition to savings obtained from physical upgrades, some municipalities save energy by improving the efficiency of building operations. Energy-consuming equipment is kept operating at maximum efficiency by adhering to a strict maintenance schedule and conducting repairs promptly. Some municipalities have undertaken initiatives to instill more energy-efficient workplace behavior. Aguascalientes, for example, has been distributing information to municipal employees to increase their awareness of their own energy use. The City has also undertaken a campaign of placing stickers on light switches, computers, and other equipment to remind staff to switch them off after use.

INFRASTRUCTURE AND OTHER CAPITAL INITIATIVES

Beyond upgrading public buildings, infrastructure and capital initiatives recur in several case studies. For example, Aguascalientes, Mexico City, Monterrey, and Municipio de Centro have ongoing street and other outdoor lighting upgrade programs. A few municipalities have been replacing all incandescent traffic lights with much more efficient LEDs, while, as a non-infrastructure initiative example, Montreal has upgraded its municipal vehicle fleet by replacing vehicles at the end of their service life with models meeting strict fuel efficiency criteria.

OUTCOMES

The greening of municipal buildings is an area where municipalities are making documented progress. Through a cocktail of auditing, targeted upgrades and retrofits, improved maintenance procedures, and employee behavioral modifications, significant energy savings are being attained. For example, the City of Eugene reduced average energy consumption per unit of floor area in its buildings by 26%. As another example, York Region reduced electricity consumption by 14% and natural gas consumption by 40% at its main administrative complex. The cost savings resulting from reduced energy consumption are expected to pay for the cost of the upgrades within a decade.

Large-scale upgrades to outdoor lighting have yielded very significant energy savings. For example, in the nine years since Aguascalientes initiated its outdoor lighting program, the City has saved an estimated 55 million kWh of electricity—over 16% of the municipal corporation's total energy consumption over that period. In Mexico City, ongoing lighting upgrades are also yielding significant savings. It is believed that, by 2012, annual energy savings will have reached 11 million kWh and that over 65,000 tonnes of CO₂ emissions will have been avoided since 2005.

CONDITIONS OF SUCCESS

Positive Factors

Municipalities that have made the most progress on energy efficiency and GHG reduction appear to have been helped by the following factors:

- a high level of public awareness of environmental issues and substantial public support
- a supportive municipal policy environment, with strong climate change and sustainability policies that address energy use
- financial support from senior governments and other national or international agencies
- collaboration with local institutions, especially universities
- politicians or municipal administrators championing the cause
- an employee or even a whole department overseeing energy management

Barriers and Challenges

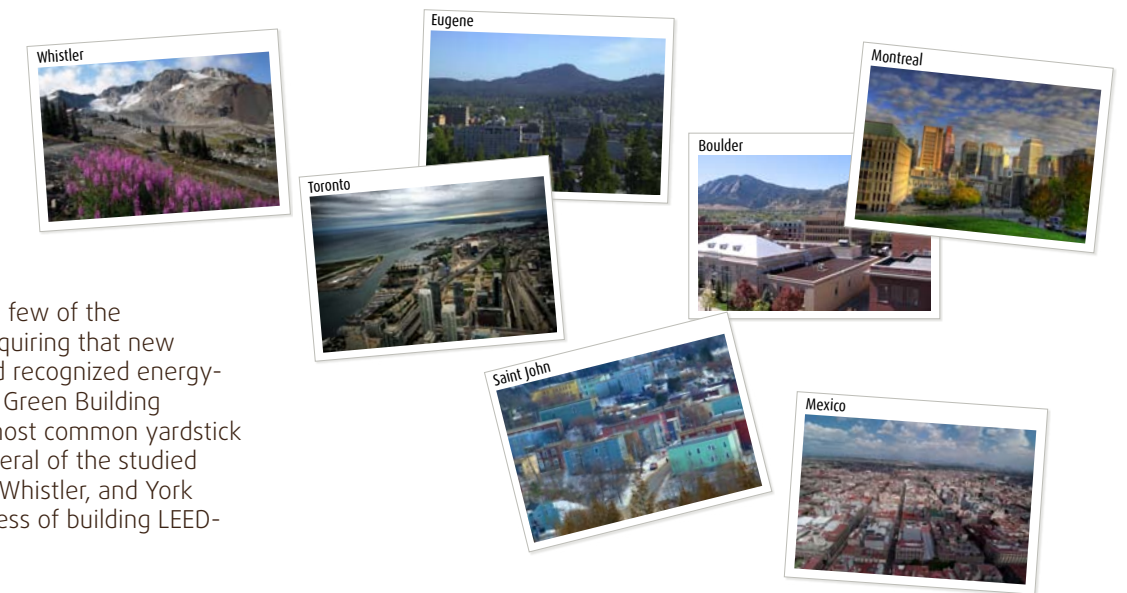
Municipal officials across the continent report similar barriers and challenges that prevent their communities from making progress on energy efficiency and GHG reduction. Those mentioned most frequently include:

- lack of interest and support from municipal politicians
- lack of funding
- lack of enforcement and accountability for meeting energy management targets
- balkanization of municipal administration and lack of horizontal coordination among municipal departments
- resistance to changes in workplace behavior that would improve energy efficiency



PROCUREMENT POLICIES

A few municipalities have adopted energy-efficient procurement policies, requiring that any materials or equipment purchased by the municipal administration meet certain energy-use criteria and other environmental standards. Mexico City has a particularly broad procurement policy, covering everything from plumbing equipment to office equipment and supplies.



WHISTLER, British Columbia
 pop. 9,700 residents | average daily population (residents + visitors) 24,000



WHISTLER IS A VERY POPULAR RESORT COMMUNITY WITH AN ECONOMY OVERWHELMINGLY ORIENTED TOWARD TOURISM.

Among the studied municipalities, Whistler had the most comprehensive energy management plan. Its Integrated Energy Plan (IEP) is the only such plan to specify a rigorous set of performance measures. These measures are to be used on a continuous basis for monitoring progress in implementing the plan and achieving its energy use and emissions targets. As part of the IEP, the municipality made an energy use and emissions inventory for the year 2000, which will be used as the baseline for evaluating future progress.

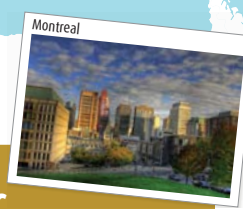


MONTREAL, Quebec
 pop. 1.6 M city | 3.6 M metro



MONTREAL HAS A HIGHLY DIVERSIFIED ECONOMY, BEFITTING ITS STATUS AS A MAJOR MANUFACTURING CENTER AND SHIPPING HUB.

Its Energy Fund finances energy-efficiency projects within the municipal corporation.



SAINT JOHN, New Brunswick
 pop. 68,000 city | 120,000 metro



SAINT JOHN'S ECONOMY IS CENTERED ON SHIPPING AND INDUSTRY.

The City of Saint-John intends to set up a district heating and cooling system in its downtown core that will use water from the nearby Bay of Fundy to provide heating in the winter and cooling in the summer. The system will link several municipal buildings and some neighboring private buildings.



YORK REGION, Ontario
 pop. 900,000 city | 5.6 M metro



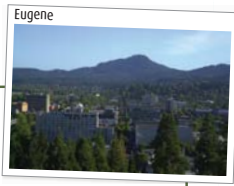
GREATER TORONTO HAS DIVERSIFIED ECONOMIC SECTOR, INCLUDING MANUFACTURING, HIGH-TECH, AND AGRICULTURE.

Targeted upgrades to an administrative complex resulted in a 14% (1 million KWh per year) overall reduction in electricity use and a 41% (211,098 m3 per year) reduction in natural gas consumption.



MAIN ECONOMIC SECTORS ARE EDUCATION AND MANUFACTURING.

Over 50 energy efficiency upgrade projects in municipal buildings have yielded a 20% decrease in energy use (108 kBtu or 31.7 kWh per square foot down to 80 kBtu or 23.4 kWh per square foot).



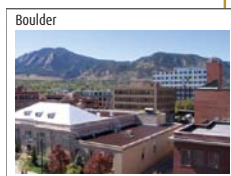
EUGENE, Oregon

pop. 150,000 city | 340,000 metro



THE AREA POSSESSES A VIBRANT HIGH-TECH SECTOR, INCLUDING A NUMBER OF FEDERAL LABORATORIES AND FIRMS SPECIALIZING IN RENEWABLE ENERGY TECHNOLOGY.

The City of Boulder is the only municipality in North America to have adopted a local carbon tax. The tax is collected from residential, commercial, and institutional customers of Xcel Energy, the local gas and electricity utility. Only customers who chose to purchase electricity from renewable sources (at a premium price) are exempt from the carbon tax. Revenues are used to fund various energy-efficiency initiatives that are being implemented under the City's Climate Action Plan (CAP).



BOULDER, Colorado

pop. 100,000 city | 290,000 metro



METROPOLITAN MONTERREY IS THE MAIN BUSINESS AND INDUSTRIAL HUB IN NORTHEASTERN MEXICO.

The biogas electric generator at municipal landfill site has mitigated 44,300 tonnes of methane emissions, equivalent to 800,000 tonnes of CO2 in terms of greenhouse effect.

MONTERREY, Nuevo León

pop. 1.1 M city | 3.3 M metro



MUNICIPIO DE CENTRO, Tabasco

pop. 600,000



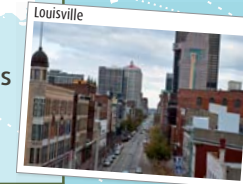
THE MUNICIPIO IS AN IMPORTANT BUSINESS CENTER FOR THE MEXICAN OIL INDUSTRY.

In collaboration with the Comisión Federal de Electricidad (Federal Electricity Commission), Municipio de Centro is piloting a energy efficient transformer program. Around 1,300 transformers are being replaced across the municipality's territory. The new transformers will reduce power loss in the electricity distribution system while improving the reliability of the electricity supply, especially in the rural parts of the municipality.



LOUISVILLE IS A MAJOR SHIPPING HUB AND A HEALTH CARE AND MEDICAL SCIENCES CENTER.

The Louisville-Jefferson County Metro Government, the University of Louisville, and the Jefferson County Public Schools District have formed an Energy Use Partnership. The partners agreed to undertake energy-efficiency audits in their buildings, develop low-cost energy-efficiency technology for implementation by the organizations, implement energy-efficiency awareness training programs for their employees, and incorporate energy-efficiency provisions into the specifications for new buildings.



LOUISVILLE, Kentucky

pop. 700,000 city | 1.2 M metro



AGUASCALIENTES, Aguascalientes

pop. 720,000



AGUASCALIENTES' PRINCIPAL ECONOMIC ACTIVITIES INCLUDE AGRICULTURE, INDUSTRY, TRADE, AND TOURISM.

A major upgrade of public outdoor lighting yielded cumulative savings of 55 million kWh of electricity, or 16.34% of the City's total consumption over a nine-year period.

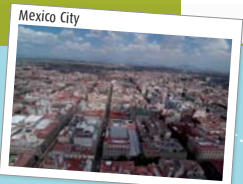


PRINCIPAL ECONOMIC ACTIVITIES IN MEXICO CITY INCLUDE TRADE, FINANCIAL SERVICES, INSURANCE, TELECOMMUNICATIONS, INFORMATION TECHNOLOGY, AND TRANSPORTATION.

According to the Norma Solar, which translates roughly as "Solar Bylaw", all new commercial and industrial buildings that employ more than 50 people are required to install solar water heaters. The heaters must have sufficient capacity to provide at least 30% of the hot water used in the given building.

MEXICO, Federal District

pop. 8.7 M city | 18.6 M metro



13 MUNICIPALITIES
 HIGHLIGHTS OF BEST ENERGY MANAGEMENT PRACTICES



GREEN BUILDINGS



INCENTIVES AND GREEN PROCUREMENT



INFRASTRUCTURE IMPROVEMENTS



ENERGY MANAGEMENT AND USE