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FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

Partners for Climate Protection

National Measures Report 2018

How Canadian cities and communities are taking action on climate change

The Partners for Climate Protection (PCP) program is a network of over 350 Canadian municipalities committed to taking action on climate change. The program helps local governments reduce greenhouse gas emissions and make a difference in protecting our climate.

PCP is a partnership between the Federation of Canadian Municipalities (FCM) and ICLEI—Local Governments for Sustainability. The program receives financial support from the Government of Canada and ICLEI Canada.

Canada

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Written and prepared by ICLEI—Local Governments for Sustainability and the Federation of Canadian Municipalities.

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Contents

Over 350 member municipalities committed to local action on climate change, representing over 65 per cent of the Canadian population.

This year:

43 municipalities reported

164 climate actions reported

721,510 tonnes CO_2e[1] of GHG emissions reduced per year

This is equivalent to:[2]

Recycling over **35,000** garbage trucks of waste instead of it being dumped into the landfill

The amount of carbon stored in over **340,000 hectares** of forest in one year

Taking over **150,000** passenger vehicles off the road for one year

Climate actions to reduce emissions from

MUNICIPALLY OWNED BUILDINGS | STREETLIGHTS | MUNICIPALLY OWNED VEHICLES

generated **$2.88 million** in annual savings

Community-wide climate actions

made up **41%** of all reported measures

but were responsible for **95%** of total GHG reductions

1 There are a variety of greenhouse gases (GHGs) that contribute to climate change. The primary GHGs measured by PCP member municipalities are carbon dioxide (CO_2), methane and nitrous oxide. The term "CO_2e" expresses the impact of each different GHG in terms of the amount of CO_2 that would have the same impact on the climate.

2 Estimated using the Greenhouse Gas Equivalencies Calculator on the U.S. Environmental Protection Agency website: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Overview

Municipal governments have control or influence over approximately half of all greenhouse gases (GHGs) in Canada. Consequently, Canadian municipal governments have an important role to play in mitigating the effects of climate change. This *National Measures Report* provides a summary of the actions and strategies cities and communities across the country are taking to reduce GHG emissions. It describes the cumulative contributions that members of the ICLEI—Local Governments for Sustainability and the Federation of Canadian Municipalities' Partners for Climate Protection (PCP) program are making to reduce emissions, and it serves as a resource for other local governments, large and small, who want to reduce emissions in their communities.

The PCP program is a capacity-building program that supports Canadian municipalities that have committed to reduce their GHG emissions and take action on climate change. Launched in 1994 and jointly delivered by the Federation of Canadian Municipalities (FCM) and ICLEI Canada the PCP program is now a network of over 350 municipal governments. PCP member municipalities follow a Five Milestone Framework to measure and manage local GHG emissions, including developing emission inventories, setting reduction targets, developing and implementing local climate change action plans, and monitoring progress and reporting on results.

The measures discussed here are not an exhaustive list of all actions occurring in Canada. Rather, this report presents a snapshot of municipal climate action in 2018. It also describes what is driving climate action, explores what types of actions are having the greatest impact and suggests ways municipalities can continue to show leadership and scale up action on climate.

Methodology

This *National Measures Report 2018* collates information on projects completed within the past 12 years that aim to reduce GHG emissions at the local level, both in municipal operations and in the way Canadians use energy in their homes, in businesses and on the move. ICLEI Canada and FCM collected data primarily through an online survey conducted between October 2017 and January 2018. The PCP member municipalities across Canada submitted one or more projects to the survey using a standard template to record key metrics for each project, including estimated GHG reductions, energy savings, cost savings and other qualitative details, where available. The program secretariat also extracted data from member reports submitted to the PCP program and from publicly available reports. Only those measures with quantifiable emissions reductions were collected.

The reductions were calculated, and are presented, as annual reductions based on the difference in energy use or emissions between the project baseline and the project outcome. In some cases, the project baseline involves actual performance metrics, such as energy consumed by a building prior to an energy retrofit project. In other cases, the project baseline is modelled using a theoretical business-as-usual scenario that estimates what would have occurred had the project not been implemented, such as a district energy system in a newly built development. Emission reductions were calculated using province-specific emission factors from the *National Inventory Report*,[3] provincial government or utility methodologies and, in one case, the United Nations Framework Convention on Climate Change guidelines. The PCP secretariat also provided support to municipalities in calculating annual emissions and energy reductions.

Monitoring and reporting emission and cost reductions at the project level is a challenge for many local governments. Some municipalities have well-established systems for collecting and reporting project-level data, while others do not have the resources or expertise to monitor impacts for each implemented measure. For this reason, the reported measures vary in completeness: some projects have accurate information on all key fields, including costs and energy savings, while others cover only the GHG reductions. The PCP secretariat has undertaken due diligence where possible to ensure members used reasonable methodologies and assumptions to estimate emissions reductions. Furthermore, due to the challenges of quantifying project-level GHG reductions, many projects that have been implemented at the local level are not captured in this report. The PCP program and its partners will continue to provide capacity-building support to members over the coming years to strengthen municipal GHG measurement and reporting.

3 Environment and Climate Change Canada. 2015. *National Inventory Report 1990–2015: Greenhouse Gas Sources and Sinks in Canada.*

Participating municipalities

BRITISH COLUMBIA
City of Campbell River
City of Coquitlam
Cowichan Valley Regional District
City of Dawson Creek
District of Hudson's Hope
City of Kamloops
City of Kelowna
Township of Langley
City of North Vancouver
City of Richmond
District of Saanich
City of Surrey
City of Vancouver

ALBERTA
City of Edmonton
City of Leduc
City of Lethbridge
City of Spruce Grove

SASKATCHEWAN
City of Saskatoon

MANITOBA
City of Brandon
Town of Morris
Rural Municipality of Sainte-Anne

ONTARIO
Town of Ajax
Township of Asphodel Norwood
Town of Caledon
Township of Cavan Monaghan
Township of Douro Dummer
Township of Havelock-Belmont-Methuen
City of Kingston
Township of Otonabee-South Monaghan
City of Peterborough
County of Peterborough
City of Pickering
Township of Selwyn
City of Greater Sudbury
City of Toronto
Municipality of Trent Lakes

QUEBEC
Town of Bromont
Town of Nicolet

NEW BRUNSWICK
City of Dieppe
Town of Sackville

PRINCE EDWARD ISLAND
City of Charlottetown

NOVA SCOTIA
Municipality of the District of Digby
Halifax Regional Municipality

Who reported?

Across Canada, 43 member municipalities reported 164 local climate actions representing 721,510 tonnes of GHG reductions annually. Participating municipalities include communities of all sizes, from those with fewer than 5,000 residents to big cities with over 300,000 residents (Figure 1). The population of the reporting member municipalities represents 21 per cent of the total Canadian population.

Figure 1: Number of reporting municipalities by population

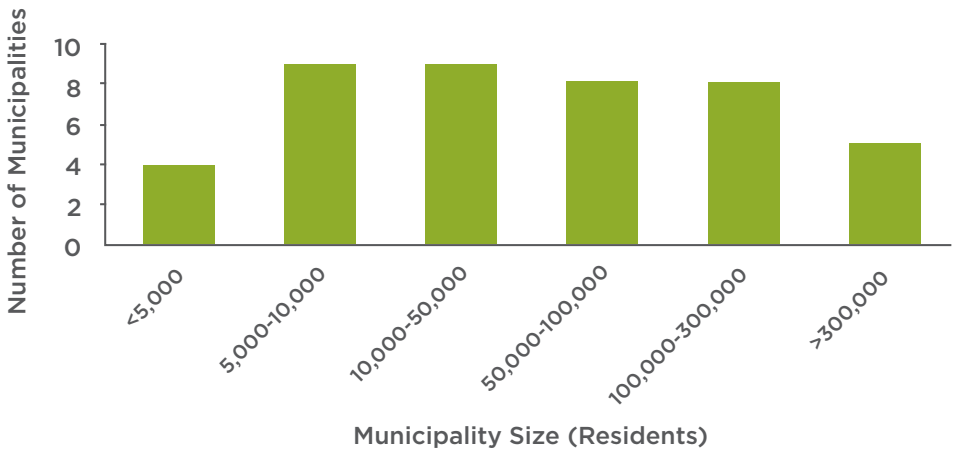
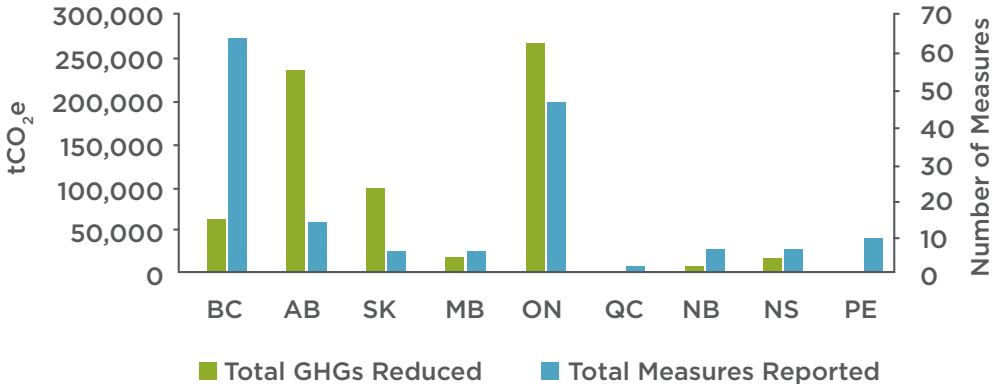


Figure 2 shows the distribution of reported measures by province as well as the associated emission reductions. (There is no data for Newfoundland and Labrador and the three territories.)

Figure 2: GHG reductions and reported measures by province



Note: tCO_2e = metric tonnes of CO_2 equivalents

As is made clear in Figure 2, having a high number of measures reported does not always correlate to the amount of GHGs reduced. For instance, British Columbia reported roughly three times as many measures as Alberta yet experienced a relatively small decline in emissions. This is because Alberta's electricity grid is partially powered by coal, which offers a greater potential for reductions compared to provinces like BC that depend more on hydro power.

What types of measures were reported?

A variety of measures were reported, ranging from small projects such as lighting upgrades at municipal buildings to large-scale, community-wide projects such as installing district energy systems or changing policies to divert more waste from the landfill. Of the 164 measures reported, 59 per cent focused on municipal operations (corporate measures) and 41 per cent targeted community-wide emissions. Figures 3 and 4 illustrate the types of measures taken, by percentages.

Figure 3: Reported corporate measures by type (%)

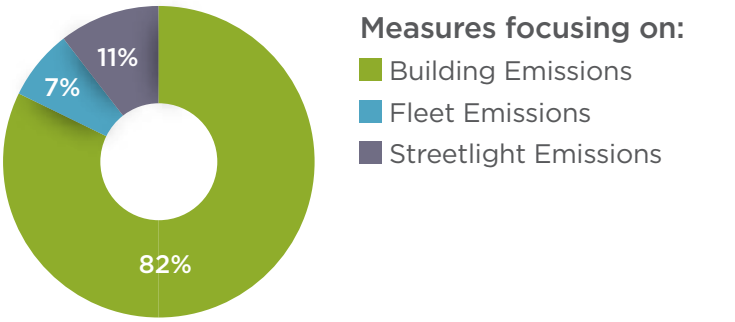
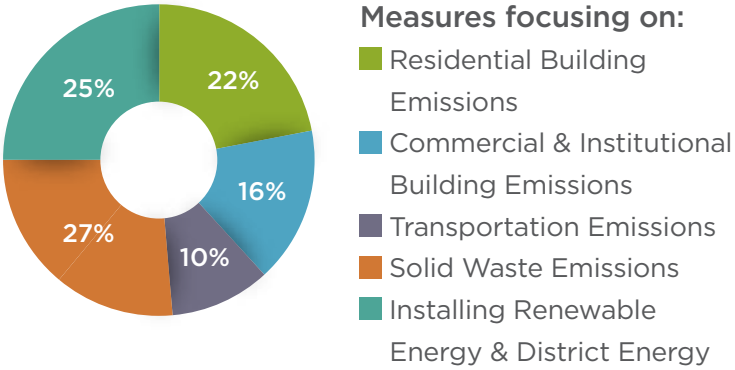


Figure 4: Reported community measures by type (%)



A **measure** is an action, initiative, program or project implemented by a municipal government or any community organization, business or institution that helps reduce GHG emissions within a municipality.

Corporate measures target emissions from municipal operations and services such as road maintenance, drinking water delivery, wastewater treatment, waste collection,[4] and parks and recreation.

Community measures target emissions from the community at large, including private and public transportation; heating, cooling and lighting for homes, businesses, and institutions; and the waste generated by residents and businesses.

GHG emissions from municipal operations are considered a subset of community-wide emissions, and typically represent a small portion of community emissions.

4 According to the PCP Protocol, emissions from the disposal of waste at a landfill owned and operated by the municipality are covered under corporate emissions, while emissions from landfills *not* owned or operated by the municipality are covered under the community sector. However, this report includes all emissions associated with the disposal of waste under community sources of emissions, regardless of landfill ownership. This better aligns with the GPC Protocol, which is considered the current best practice for accounting and reporting community sources of emissions and is being adopted by the PCP program for community-sources of emissions. See World Resources Institute. 2014. *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories: An Accounting and Reporting Standard for Cities*. http://www.ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

Corporate measures

More than half of all reported initiatives in 2018 were aimed at reducing GHG emissions in municipal operations, referred to as "corporate measures." Municipal governments have much more control over their own operations than they do in the broader community, and therefore they tend to focus most heavily on implementing corporate measures. For example, municipalities can work with their facility managers and finance departments to monitor energy and cost savings from capital investments and operational improvements.

The benefits of corporate measures aimed at reducing GHGs include reduced utility costs, improved delivery of municipal services, and demonstrated leadership to residents and businesses. These corporate measures accounted for 5 per cent of total reported emission reductions. The actions focusing on corporate sources of emissions reported by PCP members were responsible for reducing 33,499 tonnes of emissions per year, and for saving $2.88 million in costs per year for municipalities.

Corporate emission reductions

Emission reductions	Examples of local actions
Municipal buildings, including arenas, community centres, schools and other public facilities *24% of corporate annual GHG reductions, 7,892 tonnes of GHGs reduced annually*	• Energy-efficiency upgrades to buildings (e.g., LED light conversions, upgraded boiler systems, heat pumps and combined heat and power units, improved insulation, building automation systems) • Installation of renewable power, such as solar panels or geothermal heating systems
Streetlights and traffic signals *59% of corporate annual GHG reductions, 19,858 tonnes of GHGs reduced annually*	• Conversion of less-efficient lightbulbs to LED lights
Municipal vehicles and trucks *17% of corporate annual GHG reductions, 5,749 tonnes of GHGs reduced annually*	• Addition of plug-in hybrid, bio-diesel or electric vehicles to municipal fleets • Policies and strategies to reduce idling time and staff commute trips

The potential for reducing emissions through electricity-saving measures largely depends on the region's electricity grid. For instance, half of the LED conversion projects occurred in Alberta and Nova Scotia, which both have a large share of coal-fired electricity in their electricity grid. This explains why streetlight LED conversion projects contributed nearly 60 per cent of emission reductions but made up only 10 per cent of reported corporate measures.

The average cost savings for energy-efficiency projects in municipal buildings and streetlights was approximately $45,000 per year, with an average payback period of 6.5 years. Cost-savings data was also provided for some rooftop solar photovoltaic installations. The average cost savings for these renewable energy projects was approximately $46,000 per project, with generation capacity ranging from 24kW to 1.14MW. The cost savings and payback period for energy-efficiency measures and renewable energy projects depend largely on provincial or regional energy prices as well as local policy (e.g., feed-in-tariffs for renewable energy).

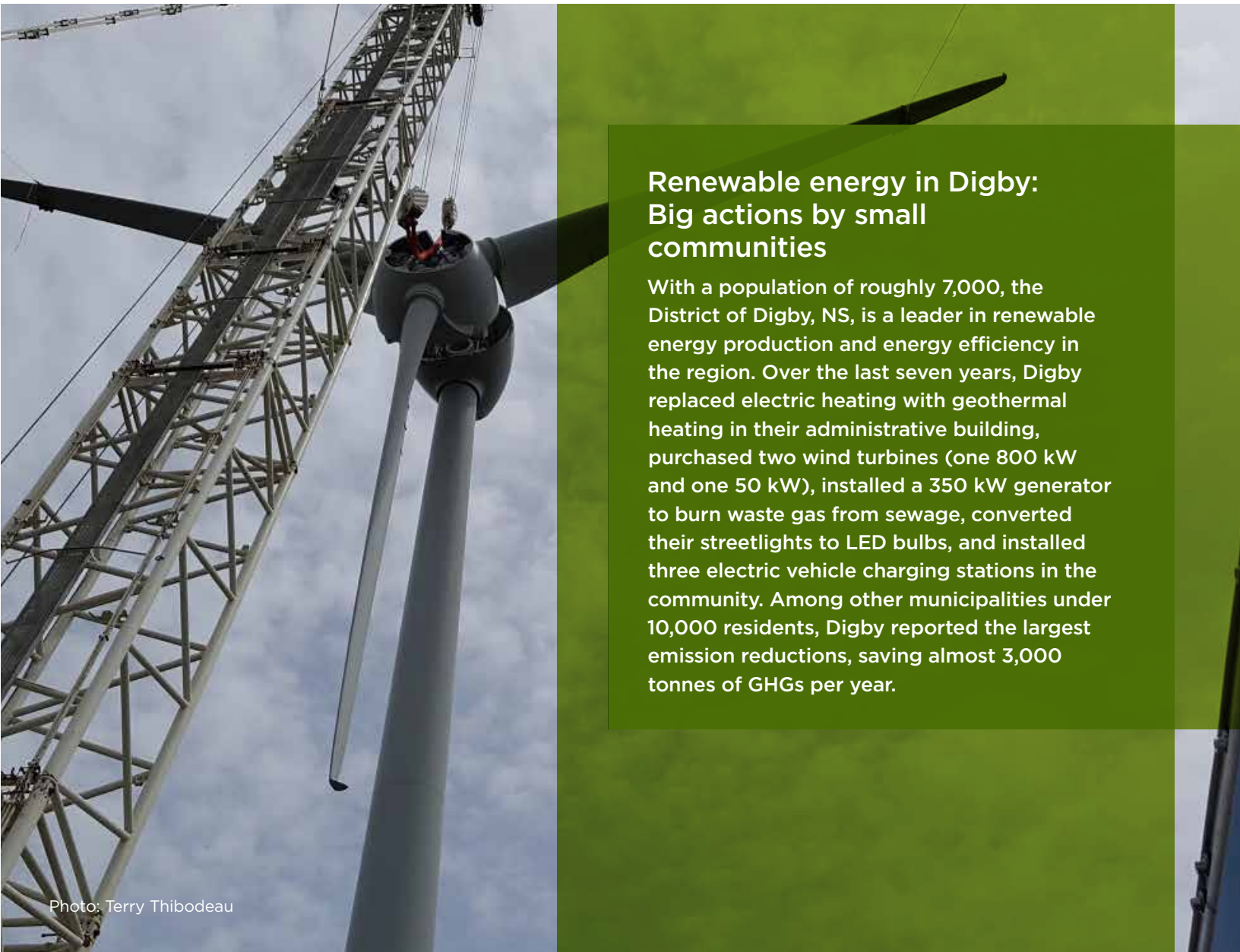


Photo: Terry Thibodeau

Renewable energy in Digby: Big actions by small communities

With a population of roughly 7,000, the District of Digby, NS, is a leader in renewable energy production and energy efficiency in the region. Over the last seven years, Digby replaced electric heating with geothermal heating in their administrative building, purchased two wind turbines (one 800 kW and one 50 kW), installed a 350 kW generator to burn waste gas from sewage, converted their streetlights to LED bulbs, and installed three electric vehicle charging stations in the community. Among other municipalities under 10,000 residents, Digby reported the largest emission reductions, saving almost 3,000 tonnes of GHGs per year.

Community measures

Community-wide actions made up 41 per cent of all reported measures, but accounted for 95 per cent of all reported GHG reductions, or 687,840 tonnes of GHG emissions. Engaging the community in local climate action offers municipalities the potential to achieve much larger emission reductions compared with measures focused on corporate emissions.

Community emission reductions

Emission reductions	Examples of local actions
Residential buildings *7% of community annual GHG reductions, 48,660 tonnes of GHGs reduced annually*	**Energy-efficiency programs** • Incentive programs, loans, or rebates, for: · Appliance exchanges (wood stoves, oil tanks, showerheads, etc.) · Energy-efficiency retrofits in homes and apartment buildings • Delivered by municipalities directly or by local utilities (e.g., Enbridge Gas, BC Hydro) **Neighbourhood-level energy planning** • Density bonusing (i.e., permitting developers to increase density or height beyond what regular zoning allows in exchange for affordable housing, green space, and other community benefits) **Building standards** • Performance standards for new buildings to promote sustainable building design
Commercial and institutional buildings *18% of community annual GHG reductions, 120,879 tonnes of GHGs reduced annually*	**Energy-efficiency programs** • Energy-efficiency retrofits in businesses, warehouses, offices, hotels, etc. • Appliance exchanges for restaurants **Building standards** • Performance standards for new buildings to promote sustainable building design

Transportation *Less than 1% of community annual GHG reductions, 2,269 tonnes of GHGs reduced annually*	**EV charging stations** • Installation of EV (electric vehicle) charging stations for community vehicles **Public transportation** • Public transport network extensions **Active transportation** • Bike networks
Solid waste *70% of community annual GHG reductions, 483,380 tonnes of GHGs reduced annually*	**Waste diversion** • Curbside collection of household organics and yard waste • Curbside collection of recyclables **Landfill gas capture system** • Installed at landfills to capture methane; common among both small and large municipalities • Sometimes linked to waste-to-energy systems
Renewable and district energy *5% of community annual GHG reductions, 32,822 tonnes of GHGs reduced annually*	**Renewable energy** • Roof and ground-mounted solar panels **District energy** • Heating and cooling system serving residential buildings, commercial outlets, institutional facilities and other buildings using geothermal energy or waste heat from water or wastewater treatment plants

More than one-third of reported community measures targeted improving energy efficiency in existing residential, commercial and institutional buildings, and set higher performance standards for new buildings. These measures accounted for one-quarter of reported community emissions reductions.

For this report, there was insufficient data available to draw clear conclusions on cost savings for community measures. However, the example of Toronto's Better Buildings Partnership program demonstrates the potential for significant savings for building owners, operators and tenants from actions directed at the energy performance of buildings (see inset on next page). This program also demonstrates the wide range of community stakeholders that need to be mobilized to help deliver on community climate action.

Toronto's Better Buildings Partnership program: Large community cost savings

The Better Buildings Partnership provides building owners, managers and developers in the City of Toronto, ON, with expertise, resources and financial assistance to maximize the outcomes of a wide range of energy-efficiency projects. Low-interest loans are available to community organizations and not-for-profits for energy retrofit projects. The program also provides incentives for business owners, architects, engineers and consultants to offset the cost of making buildings more energy efficient and building beyond the Ontario Building Code. Incentives can cover modelling costs and provide dollars per kilowatt of verified savings. With 52 projects completed, totalling 14 million square feet and generating 15,000 person-years of employment, the Better Buildings Partnership program is responsible for avoiding 4,038 tonnes of GHGs and saving over $4.3 million per year.

Electric vehicle (EV) charging stations made up the bulk of reported transportation projects. While there is a significant potential to reduce emissions from transportation by switching to low-emissions electricity and other fuel sources, the impact of EV charging networks will only be felt once a larger share of electric vehicles are in use in Canada. Furthermore, the lack of a clear methodology for quantifying GHG emissions from active and public transportation initiatives may have limited the number of reported transportation measures. Given that transportation emissions make up a quarter of Canadian GHGs, there is a significant opportunity for municipalities to promote low-carbon transportation alternatives through both regional planning and collaboration with other orders of government.

Waste projects were the most commonly reported community action in 2018 and were responsible for 70 per cent of the total annual GHG reductions from community measures. Measures aimed both at diverting waste from landfill and capturing landfill gas prevent the release of methane—a potent greenhouse gas that has approximately 25 times the global warming potential as carbon dioxide. In addition, many of the landfill gas–capture systems are linked to waste-to-energy systems, where captured waste gas is used to generate electricity.

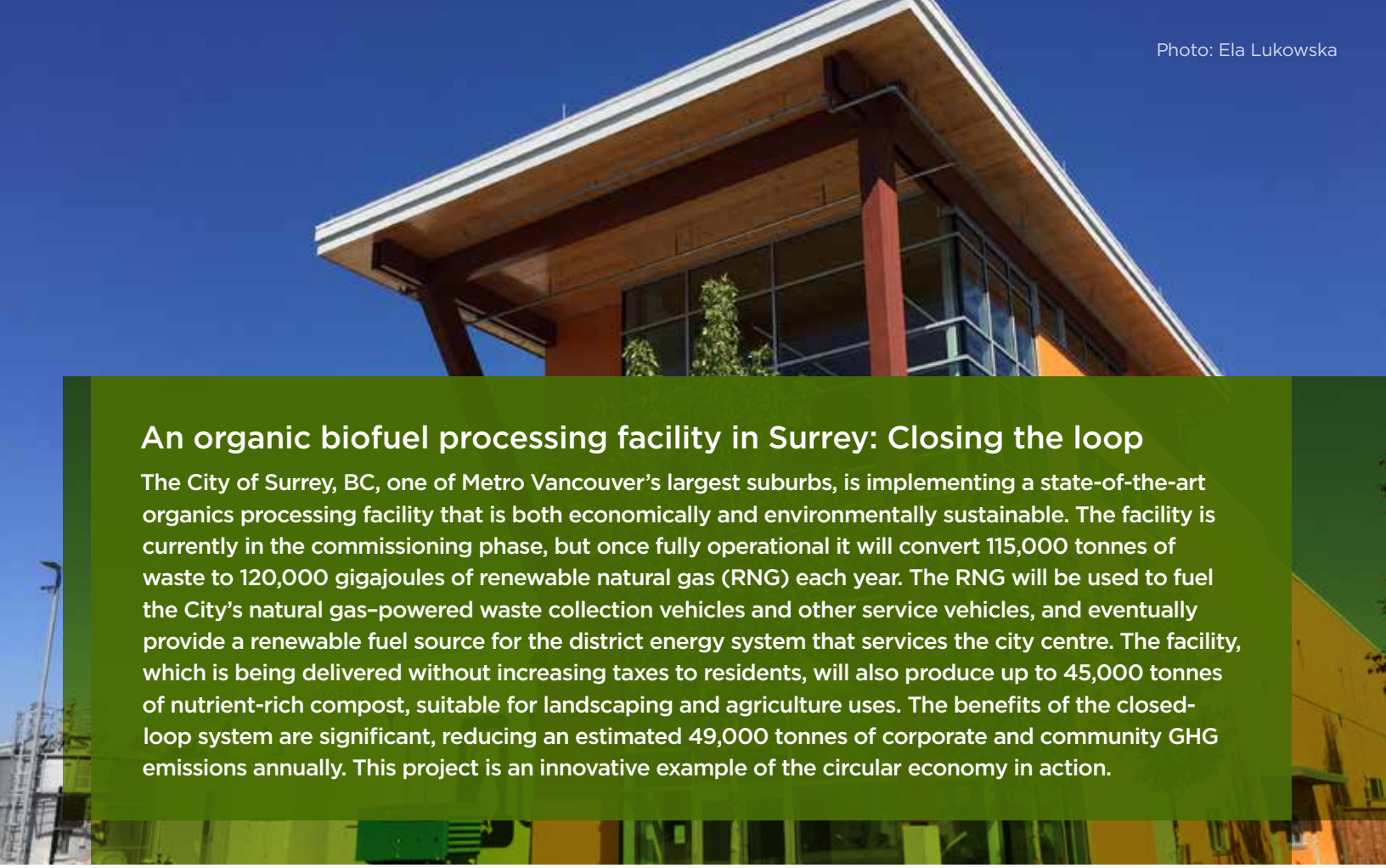


Photo: Ela Lukowska

An organic biofuel processing facility in Surrey: Closing the loop

The City of Surrey, BC, one of Metro Vancouver's largest suburbs, is implementing a state-of-the-art organics processing facility that is both economically and environmentally sustainable. The facility is currently in the commissioning phase, but once fully operational it will convert 115,000 tonnes of waste to 120,000 gigajoules of renewable natural gas (RNG) each year. The RNG will be used to fuel the City's natural gas–powered waste collection vehicles and other service vehicles, and eventually provide a renewable fuel source for the district energy system that services the city centre. The facility, which is being delivered without increasing taxes to residents, will also produce up to 45,000 tonnes of nutrient-rich compost, suitable for landscaping and agriculture uses. The benefits of the closed-loop system are significant, reducing an estimated 49,000 tonnes of corporate and community GHG emissions annually. This project is an innovative example of the circular economy in action.

Renewable energy and district energy projects were almost as popular as solid waste measures, representing a quarter of reported community measures. These projects, which demonstrate the emerging integrated community energy systems where energy needs are matched to the most efficient energy source, have the potential to achieve deep and broad emission reductions.

Member municipalities are also undertaking **transformative, system-wide initiatives** that will shape the way new buildings and neighbourhoods consume energy and generate waste. Two current examples:

- Toronto's Green Building Standard, which reduces GHGs by 115,205 tonnes per year and will result in reductions of 30.6 megatonnes by 2050.
- Surrey's project to build a high-density neighbourhood that will pilot innovative ideas to reduce energy consumption and reduce GHGs by 2,600 tonnes per year.

Another example looks to the future (and therefore is not included in the total of this report). Vancouver's Zero Emissions Building Plan has the potential to avoid significant emissions from the building sector in the years ahead (see inset on next page).

Transformative, system-wide initiatives like these can have significant environmental benefits and are becoming increasingly important for growing communities. These municipalities have demonstrated that transformative measures are not only possible but are feasible and can be implemented now.

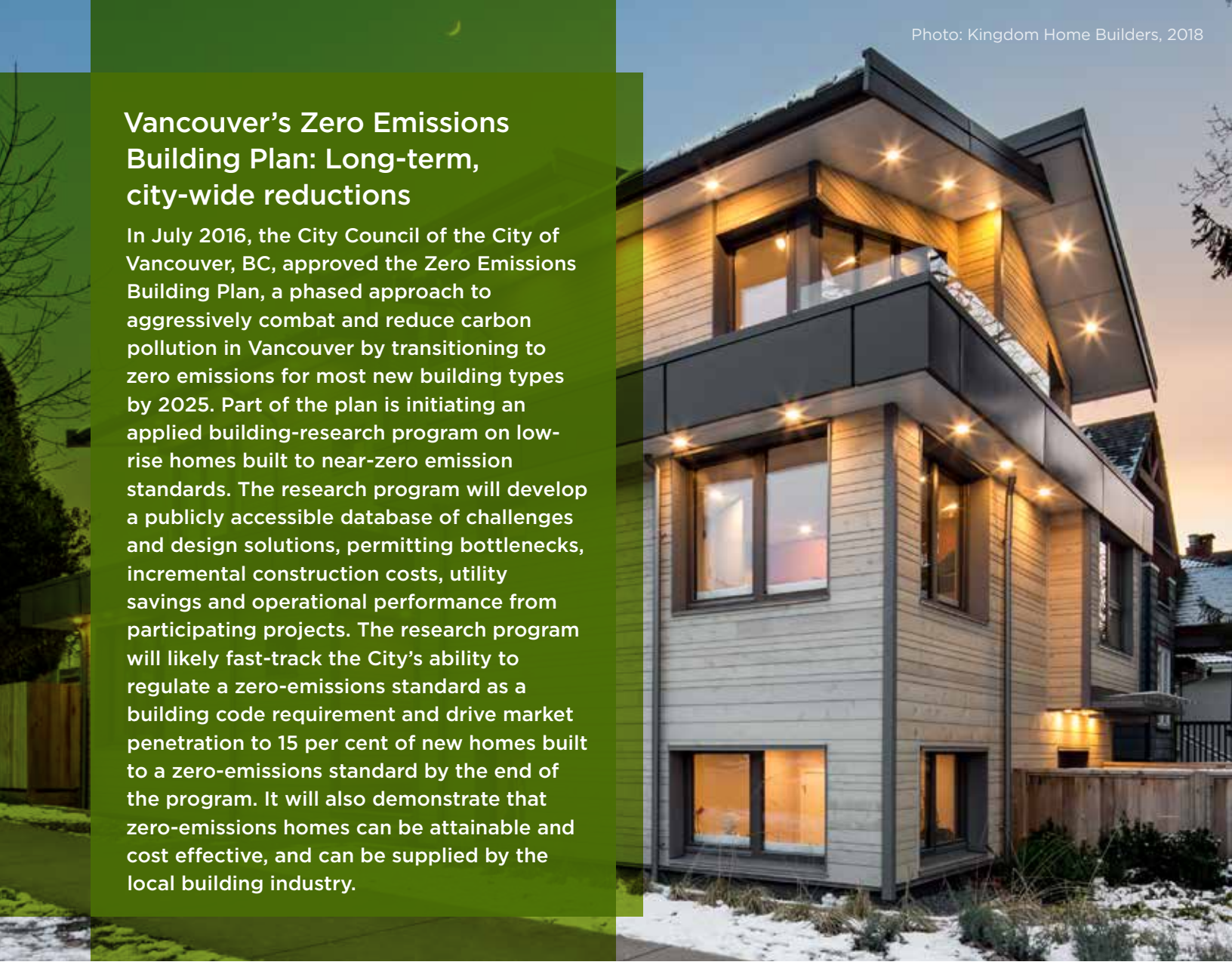


Photo: Kingdom Home Builders, 2018

Vancouver's Zero Emissions Building Plan: Long-term, city-wide reductions

In July 2016, the City Council of the City of Vancouver, BC, approved the Zero Emissions Building Plan, a phased approach to aggressively combat and reduce carbon pollution in Vancouver by transitioning to zero emissions for most new building types by 2025. Part of the plan is initiating an applied building-research program on low-rise homes built to near-zero emission standards. The research program will develop a publicly accessible database of challenges and design solutions, permitting bottlenecks, incremental construction costs, utility savings and operational performance from participating projects. The research program will likely fast-track the City's ability to regulate a zero-emissions standard as a building code requirement and drive market penetration to 15 per cent of new homes built to a zero-emissions standard by the end of the program. It will also demonstrate that zero-emissions homes can be attainable and cost effective, and can be supplied by the local building industry.

Incentives for action

Participating municipalities named the following as the most common motivations for initiating the measures included in this report:

1. Financial benefits
   - Cost savings from reduced electricity and natural gas consumption through energy-saving measures
   - Avoiding the cost of replacing or expanding landfills
2. Environmental concerns
   - Reducing emissions and meeting the goals of climate action plans
3. The opportunity to demonstrate leadership through the adoption of clean technologies and practices
4. Compliance with legislation imposed by other orders of government
   - Nova Scotia requires municipalities to replace high-pressure sodium streetlights with more efficient technology by the end of 2022
   - Manitoba requires that all major landfills capture and destruct landfill gas

Sources of funding

Funding for the reported measures came from the municipalities themselves, provincial and federal governments, local utilities and other sources. Utilities were the most commonly cited funding sources, especially for energy-efficiency or renewable energy incentive programs or rebates. Other common sources of funding were the provincial governments, either directly or through provincial agencies like Alberta's Climate Change and Emissions Management Corporation. The federal government funded many projects as well, through the federal gas tax, Natural Resources Canada and FCM's Green Municipal Fund. Municipal reserves also funded some projects.

Photo: Randy Eros

Sainte-Anne's solar panel carport: Taking advantage of multiple funding streams

The Rural Municipality of Sainte-Anne, MB, just a few kilometres east of Winnipeg, installed a 33 kWh solar array carport in 2017, which generates roughly 90 per cent of the municipal office's electricity needs. In future, the solar power will also be used to charge electric vehicles with the installation of charging stations at the carport. Currently, the project is responsible for reducing 35 tonnes of GHGs per year, displacing annual grid electricity by 1,051 gigajoules and saving over $8,500 per year. Sainte-Anne took advantage of the province's Hydro Solar Energy Program and received a rebate of $28,000. The contractor also provided a discount, due to the innovation and novelty of the project. Lastly, some money came from Manitoba Hydro Bipole III funding, which over the last few years has been funnelled into a municipal reserve account. Through these funding pathways, the implementation cost of $125,700 was covered without using any taxpayer dollars.

Conclusions

Canadian municipalities are making great strides in climate action, as demonstrated in this report in the snapshots of projects and initiatives that communities across Canada, both large and small, are undertaking to save energy and reduce emissions. Along with reducing the impacts of climate change, they are also saving money and generating other community benefits.

Within the corporate sector, Canadian municipalities are showing leadership through a variety of wide-ranging actions in municipal facilities, fleets and streetlighting. The majority of these projects have measurable cost savings and can help increase a municipality's resilience to changes in energy prices, while demonstrating municipal leadership on climate change.

Within the community sector, Canadian municipalities of all sizes have made significant gains in reducing emissions through incentive programs to increase energy efficiency in buildings, by diverting and managing solid waste more sustainably and by implementing renewable energy projects, and district energy and waste-to-energy systems. Climate mitigation activities focusing on sources of emissions from the community at large have the greatest potential for reduction, and local governments of all sizes should continue to show leadership at the community level and scale up action on climate change mitigation.

There have been many other projects implemented by municipal members that are not reported here, due to the challenges of quantifying project-level GHG reductions. To improve reporting, municipalities should consider incorporating monitoring considerations into project design and implementation, such as identifying baseline conditions and key performance indicators. Such reporting will better inform council members and constituents, potential funders and other provincial and national entities. Consistent and thorough project-level monitoring and reporting can also increase the exchange of ideas and knowledge between other municipalities and accelerate local climate action both in Canada and abroad.

Is your municipality a PCP member? Join the conversation on the PCP Hub and connect with your regional climate advisor to help advance your community's local climate change work.

Not a PCP member? Learn about the benefits of membership and how to join a**t fcm.ca/joinPCP**

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