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HEALTH, EQUITY, AND OTHER NON-ENERGY BENEFITS OF COMMUNITY BUILDING RETROFITS

INTRODUCTION

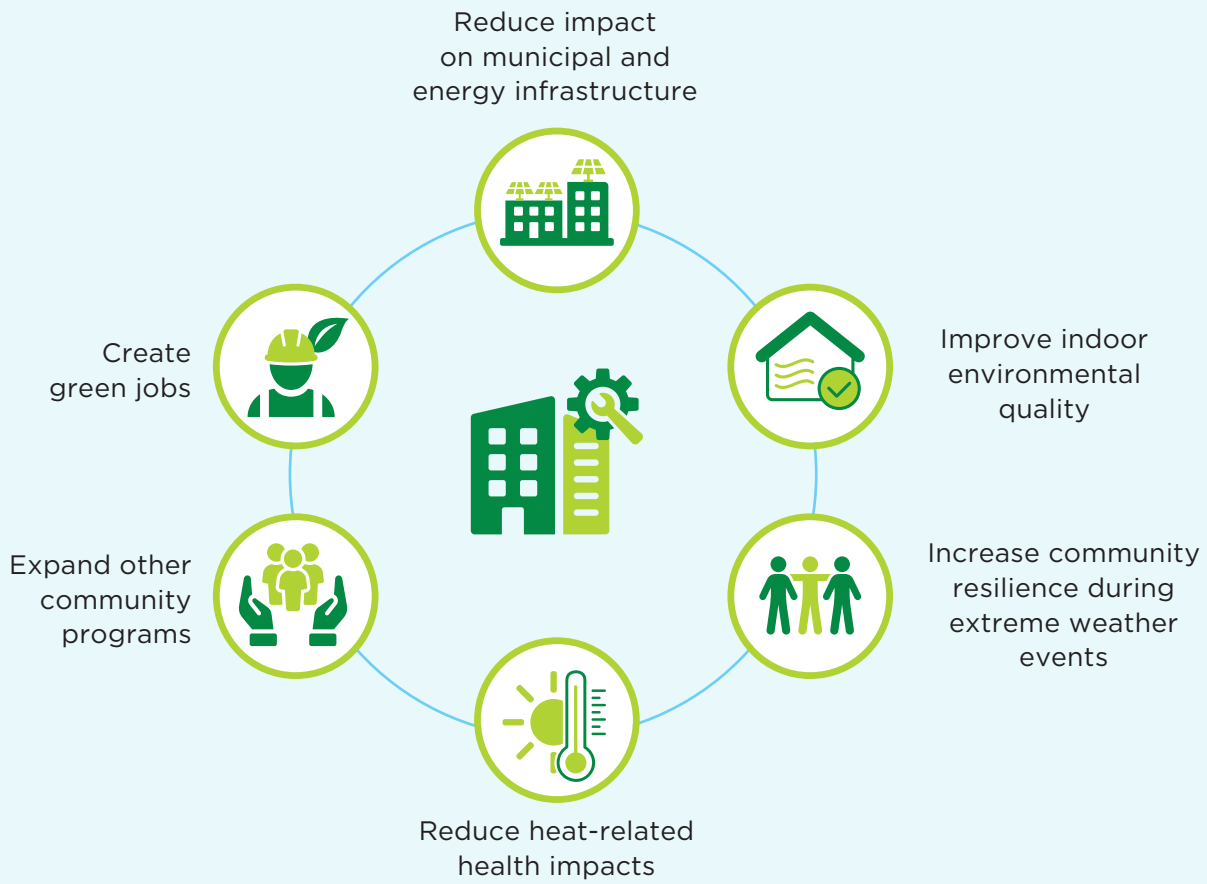
Residential, institutional and commercial buildings are the third-largest source of greenhouse gas (GHG) emissions in Canada, contributing 13% of total emissions. This figure increases to 18% when electricity-related emissions are included[1].

Community buildings are often one of the largest sources of municipal corporate GHG emissions. These important and welcoming facilities serve as social hubs, providing a space for people to build relationships, reduce social isolation and foster a sense of community and belonging. However, many of these well-loved buildings are older and inefficient, with dated mechanical systems and poor insulation.

Municipalities across the country are setting ambitious targets to reduce building emissions and achieve net-zero by 2050. Community building retrofits offer a significant opportunity to reduce both municipal GHG emissions and building operations costs. These retrofits can benefit communities and residents in many additional ways[2].

NON-ENERGY BENEFITS OF COMMUNITY BUILDING RETROFITS

Municipalities often undertake community building retrofits with the primary goal of reducing energy use (and thereby GHG emissions) and operational costs. But these retrofits have benefits far beyond simple energy savings, both for individual occupants and for the community at large.



Some common non-energy benefits of community building retrofits include:

+ **Better air quality**—Retrofit measures such as improved insulation, energy-efficient windows, modern heating and cooling systems and better ventilation can significantly reduce mould, cold drafts and dampness. Switching from fossil fuels to electricity reduces air pollutants and GHGs. When planned and implemented properly, community building retrofits can improve a building's indoor environmental quality while also boosting occupant satisfaction, health and comfort.

Common indoor air pollutants include[3]:

- Carbon dioxide released from the combustion of gas and oil in furnaces and heaters.
- Carbon monoxide from improperly vented gas-fired infrared radiant heaters and gas-fired water heaters as well as from vehicle exhaust brought into the building by air intakes.
- Dust, fibreglass, asbestos and gases including formaldehyde from building materials.
- Vapours and volatile organic compounds (VOCs) from materials such as carpets, furnishings, cleaning products, solvents, pesticides, disinfectants, glues, caulking and paints.
- Microbial contaminants, fungi, moulds and bacteria from damp areas, wet or damp materials, stagnant water and condensate drain pans.

+ **Increased community resilience**—Due to the effects of climate change, Canadian communities are facing floods, wildfires, hurricanes, ice storms and heat waves that are more frequent and intense than in the past. These events have exposed millions of people to extremely high levels of toxic wildfire smoke, forced hundreds of thousands to evacuate their homes and left communities without power for extended periods of time.

When planned with resilience in mind, community building retrofits can help create spaces that support residents during extreme climate change–related events, offering protection to community members who lack access to private climate-controlled spaces and might otherwise be exposed to hazards. When retrofitted with measures such as high-quality air filtration systems and on-site precipitation mitigation, community buildings can act as shelter from flooding or wildfire smoke. The return on investment of retrofitting community buildings increases as they are used to serve various purposes.

+ **Improved access to cooling**—Prolonged extremely high temperatures such as those observed during the 2021 B.C. heat dome can result in heat exhaustion, heat stroke and premature deaths, especially among older Canadians. Data from Statistics Canada shows that only 64% of Canadian households had access to some type of air conditioning in 2021. Not only do low-income populations often have limited access to cooling systems, but they may be hesitant to operate them due to potentially high electricity costs during times of peak energy demand.

  Retrofitted community buildings with upgraded cooling and ventilation systems can act as designated cooling centres to support vulnerable community members during periods of extreme heat. Retrofitting community buildings is a proactive step in adapting to the heat waves and heat domes predicted to become more frequent and severe due to climate change.

Cooling centres can provide respite and safety during extreme heat. They may be in community buildings such as libraries or community centres or in private businesses such as coffee shops, shopping malls or movie theatres[4].

+ **More funds for other municipal priorities**—Improved energy efficiency reduces building operational costs, freeing up resources for other community services and programs overall.

  For example, a $2.9 million retrofit of a community centre in Pictou County, Nova Scotia, is expected to reduce GHGs and energy use by 34% and save $356,000 in annual operating costs[5].

+ **Reduced impact on existing water infrastructure**—Community building retrofits can significantly reduce the demand for municipal services. By incorporating water efficiency improvements and rainwater and run-off management, these upgrades can drastically cut down on these facilities' use of water, thus reducing strain on municipal water infrastructure and costly maintenance and upgrades.

+ **Alleviate pressure on local electricity grids**—Measures to generate on-site renewable energy and improve the efficiency of heating and cooling systems can reduce energy demand during peak demand hours. When connected to the local grid, retrofitted buildings have a combination of energy-saving measures, on-site energy production, storage capabilities and smart controls that can transform them into energy hubs integrated into the electricity system. Moreover, combining on-site energy generation with on-site energy storage enhances community resilience during power outages by providing building-level backup power.

+ **Expand Canada's green jobs sector and advance green procurement**—Building retrofits spur job creation across a range of occupations and skill sets throughout the supply chain—think carpenters, HVAC technicians, plumbers, drywallers and building science experts—to build, upgrade and manage these facilities. Municipal building retrofits also unveil opportunities to train and employ Indigenous community members, newcomers, refugees and un/underemployed people to expand local skill sets and boost innovation in new efficiency technologies.

  Additionally, municipalities can support this work by adopting equitable and green procurement policies to minimize the environmental impact of the retrofit process and partner with contractors who provide opportunities for people facing barriers to employment in the construction industry to train and work on these projects.

CONCLUSION

Beyond energy and cost savings, community building retrofits offer a significant opportunity to build communities that are healthier, more equitable and more resilient.

For more information, access the Community Buildings Retrofit Initiative for resources, events and training opportunities. The **Resource Library** offers practical resources to support local facility upgrades. You can also connect with energy management experts through the **Advisory Service** to discuss community building retrofit projects and funding opportunities available to support project implementation.

Definitions:

- **Non-energy benefits (NEBs)** are the many and diverse benefits produced by energy efficiency in addition to energy and demand savings[6].
- **Indoor environmental quality (IEQ)** encompasses the conditions inside a building—air quality, lighting, thermal conditions, ergonomics—and their effects on occupants or residents[7].
- **Climate resilience** is the ability to anticipate, prepare for and respond to hazardous events, trends or disturbances related to climate change. Improving climate resilience involves assessing climate-related risks and taking steps to better cope with them[8].
- **Green procurement** refers to the procurement of products and services that have a lesser or reduced negative effect on human health and the environment when compared with competing products or services that serve the same purpose[9].
- **Equitable procurement** refers to measures and procedures that address barriers keeping businesses run by members of historically marginalized communities from fully participating in organizational procurement. It involves intentionally engaging a more diverse set of vendors and contractors in the procurement process[10].