



## **Green Buildings – Improving Health and Health Equity while Fighting Climate Change**

### **Energy Efficient Buildings Fight Climate Change**

Buildings are responsible for 13% of the greenhouse gases (**GHGs**) emitted in Canada; 18% when the electricity used in buildings is included. About 90% of these emissions come from the use of natural gas in furnaces, water heaters, and stoves, with 10% coming from the generation of electricity used in buildings. The International Energy Agency estimates that energy demand for heating buildings in Canada could be reduced by 85% by 2050 by improving building envelopes and shifting from furnaces to heat pumps.

Three reports produced by the Taskforce for Housing and Climate found that the building of 5.8 million new homes in Canada could lock in an additional 147.2 million tonnes (**MT**) of GHGs per year if weak building and development standards are applied to their design and construction. Those reports concluded that those GHGs could be reduced to as little as 43 MT/year if ambitious policies were applied to building materials and design, building performance (e.g., energy efficient design/technologies), and land use decisions (e.g., walkable neighbourhoods vs. sprawled neighbourhoods).

### **Energy Efficient Buildings Reduce Outdoor Air Pollution**

Air pollution continues to be a significant source of illness, chronic disease, and premature deaths in Canada. Buildings that are heated with oil and natural gas can release substantial quantities of pollutants into the air. These air pollutants can be particularly problematic in urban areas that are impacted by air pollution from heavy traffic, industry, and/or upwind sources. Extensive building retrofits that substantially reduce the use of oil and natural gas will also reduce air pollution.

### **Indoor Environments can Harm Health**

Poor indoor environments have been associated with eye and respiratory irritation, hay fever, asthma, respiratory infections, and cardiovascular disease. Sources of indoor health risks can include:

- outdoor air pollutants and indoor air pollution from fireplaces, cooking appliances, building materials, furnishings, consumer products, and second-hand smoke;
- radon gas that can enter buildings through cracks in foundations;
- allergens such as dust mites, mould, and pet dander; and
- viral, bacterial, and fungal infections that can result from over-crowding, poor ventilation, or contamination of heating, ventilation and air conditioning (**HVAC**) systems.

## **Indoor Environments can Amplify Health Inequities**

Older people, individuals with pre-existing health conditions, and people living in crowded or materially deprived conditions are more vulnerable to the health risks presented by poor indoor environments. They may also be at greater risk of exposure to these environments. In addition, these populations often have fewer resources to protect themselves, or recover, from climate-related events such as heat waves, floods and wildfires.

## **Energy Efficient Buildings Improve Health and Health Equity**

Highly energy efficient buildings can improve indoor air quality, comfort, and noise levels with better ventilation, air filtration, and high levels of insulation. Correct ventilation rates can reduce levels of indoor air pollutants, efficiency filters can limit infiltration of outdoor pollutants and allergens, and high levels of insulation can minimize the penetration of cold, heat and sound. Building retrofits that improve the comfort and quality of indoor environments can also improve overall health, respiratory health, and mental health, with particular benefits for those with pre-existing respiratory conditions. Several studies directed at energy efficiency projects applied to multi-unit buildings have found that they improve the health and comfort for occupants as well.

## **Extreme Heat Claims Lives**

Extreme heat events, that will become more frequent and intense with global warming, pose a significant risk to people in Canada. They can aggravate cardiovascular and respiratory conditions, and increase emergency room visits, hospital admissions, and premature deaths. The 2021 heat dome that hit British Columbia (**BC**) gave rise to over 600 premature deaths. A few studies have found that extreme heat is increasing rates of premature deaths in cities across Canada. Extreme heat has also been linked to adverse reproductive outcomes such as miscarriages and congenital defects, and increases in aggressive behaviour and violent and non-violent crimes.

The experience with the BC heat dome re-affirmed that extreme heat poses a much greater risk for some populations. During the heat dome, death rates were much higher for people who live on low incomes, for those without air conditioning, and for those who live in neighbourhoods with lower levels of greenness. They were also much higher for those between the ages of 65 and 74.

## **Building Retrofits can Improve Climate Resilience**

Building retrofit programs can be designed to strengthen climate resilience as well as energy efficiency. Improved roof insulation, roof coatings that reflect more solar energy, and air conditioning can mediate indoor temperatures. Particle filtration systems can reduce exposure to wildfire smoke. Backflow valves installed in basement drains can prevent flooding of basements and exposure to mould. And fire-resistant roofing materials can be used to help protect people and their property from wildfires.

## **Heat Pumps Increase Climate Resilience**

Heat pumps that operate on electricity are much more energy efficient than electric baseboard heaters and furnaces that run on oil or natural gas. Over the last 5 to 10 years, air source heat pumps have been improved so they can now heat buildings to temperatures as low as -25°C. These cold climate air source heat pumps can completely replace conventional heating systems, while also cooling buildings in the summer months. They use up to 70% less energy than conventional home heating systems so they can cut costs for homeowners and renters while also cutting emissions of GHGs and air pollutants. However, the upfront cost of installing heat pumps can limit many households from installing them.

## **Building Retrofits Reduce Energy Poverty**

Energy efficiency programs that substantially cut energy costs can also reduce health inequities by reducing energy poverty. Energy poverty forces some households to choose between the energy needed to heat their homes and other essentials such as healthy food, clothing, and medicine. Almost one in ten households in Canada spend more than 6% of their income on energy. Energy poverty is associated with an increased risk of cardiovascular and respiratory diseases, hospital admissions, and premature deaths, as well as poor general and mental health.

**To learn more: <https://chasecanada.org/public-health-addressing-health-health-equity-and-climate-change/>**

