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The Clean Air Council would like to thank the Province of Ontario for undertaking a consultation on the next proposed Ontario Building Code. The Clean Air Council recognizes that this first stage of the consultation ending on December 20th, 2016 will focus on the interim amendments that support the Long-Term Affordable Housing Strategy update as well as changes that would form the next edition of the Building Code. The Clean Air Council for this submission will focus on the preliminary changes the Province should consider to improve energy efficiency, water conservation, electric vehicles and climate change resilience measures that could be implemented quickly as well as over time.

The Clean Air Council[1] (CAC) is a network of 27 municipalities and health units from across the Greater Toronto, Hamilton, and Southern Ontario Area. CAC members work collaboratively on the development and implementation of clean air and climate change mitigation and adaptation actions. More information on the Clean Air Council is available here.

The Clean Air Council would like to provide this submission as a starting point and looks forward to working with the Province and the Ministry of Municipal Affairs to further clarify and improve on the feedback when the second phase of the proposed changes to the Ontario Building Code is undertaken in early 2017.

The Clean Air Council would like to acknowledge and thank the Province for its work on improving energy efficiency standards in the last Ontario Building Code update. Additional efforts will need to be undertaken in order to ensure that energy and water efficiency continually increases at as rapid a pace as feasible in order to bring us closer towards net zero energy/carbon buildings.

In addition Clean Air Council members would like to thank the Province for moving forward on the Clean Air Council recommendation that aims to provide greater clarity within the Municipal Act and the City of Toronto Act to recognize the authority of municipalities to enact climate change mitigation and adaptation by-laws and policies to achieve climate change mitigation and adaptation policy goals.

[1] Municipal staff representatives on the Clean Air Council (CAC) were consulted in the preparation of this submission to reflect the feedback of member municipalities but direct endorsement of this submission by municipal councils was not sought as many municipalities are preparing their own independent submissions. CAC representatives are the municipal change agents within leading climate action municipalities and have been working collaboratively across the region for the last 15 years to support and enable progress on clean air and climate change actions. The consultation undertaken were facilitated and are endorsed by the Clean Air Partnership, a charitable environmental organization that serves as the secretariat for the Clean Air Council.

Part 1: Increasing Energy Efficiency

Q # 1: How should the government proceed to achieve energy efficiency and greenhouse gas reduction goals in new buildings?

- In order to advance Ontario's movement towards the net zero energy/carbon building and community goals identified as a Provincial goal in the Climate Change Action and Growth Plan there is **the need for the Province and Municipalities to work together to advance the uptake of energy and water efficiency and climate change standards within the Ontario Building Code**.

- However it is also recognized that when the Province sets mandatory standards within the Ontario Building Code it has to take a very large geographical area with varying markets and capacity into consideration. As such, the Province is required to set the Building Code at a level that can be achieved across that very large geographical area. **By providing municipalities with the authority to mandate above the base requirements within the Ontario Building Code, Ontario municipalities can serve as living laboratories for energy efficiency and climate change resilience innovation and thereby test and advance the market at a smaller scale.** Successful adoption of standards at the municipal scale can then inform and be integrated into future updates to mandatory components of Ontario's Building Code thereby increasing capacity of the wider market more quickly and effectively across Ontario.

- A similar approach is being advanced in British Columbia whereby municipalities are able to require a higher voluntary standard than the minimum standard set within the Provincial Building Code.

Q # 2: Should areas of houses and large buildings undergoing significant renovation become more energy efficient, thereby helping to reduce its GHG emissions?

Advancing the energy efficiency of Ontario's existing building stock is imperative to enabling Ontario to achieve its energy conservation and greenhouse gas reduction goals. In addition, increasing the energy efficiency of Ontario's building stock will also result in the following co-benefits:

- Reducing Ontarians vulnerability to energy price increases over time;
- Retaining more energy dollars within the community;
- Building the energy efficiency market and increasing high quality local jobs associated with serving that market;
- Air pollution and public health improvements as a result of reduced fossil fuel use and reduced vulnerability to extreme heat; and

- Reductions in community vulnerability to energy disruptions and extreme weather events.

- It has been found from energy efficiency programs that the greatest opportunity to increase the uptake of deep energy retrofits is when home and building owners are planning on undertaking general building renovations. **Therefore the Clean Air Council strongly supports applying energy efficient requirements to significant renovation projects.** These energy efficiency improvements could be applied through a separate Code for existing buildings to help enable energy efficiency improvements across the existing building stock. These new requirements for existing buildings should be accompanied by energy efficiency programs and financing that would enable these measures to be undertaken without creating significant financial pressure and negatively impacting on affordability.

- In addition requiring the adoption of energy efficiency improvements/measures upon the undertaking of significant renovations may provide a lever to address energy poverty and the challenge of the split incentive problem (where tenants can't make upgrades to reduce their energy use but landlords have no incentive to invest in energy efficiency as they do not face the financial costs of energy use).

- The Clean Air Council would also like to highlight the need for more performance evaluation efforts to be undertaken in order to validate energy efficiency estimates being promoted by manufacturers and/or being used by energy models. There is a gap at present in studies that "reality test" energy reduction estimates. The Municipality of Clarington's Priority Green Project included performance monitoring of 6 demonstration homes over a one year period under owner occupied real-life conditions and is an example of the types of projects that need to be advanced. The results of such projects need to use an open and transparent methodology and be shared widely. Based on the results of Clarington Priority Green – Green Demonstration Project there is some concern related to the variation between manufacturers' claims on Drainwater Heat Recovery (DWHR) financial paybacks and energy savings (see here for more information on performance evaluation of DWHR). Factors that should be considered prior to making a specific measure mandatory in the building code include, but are not limited to: performance measurement evaluation; increasing carbon costs associated with natural gas; best estimates on energy price changes over time; price differential between installation of measure at time of building versus later retrofit.

- Requiring energy efficiency improvements upon the undertaking of significant renovations should also be accompanied by measures for multi-unit residential buildings (MURBs) that can reduce resident's vulnerability to extreme heat inside the buildings and thereby help prevent a predicted increase in premature deaths due to extreme heat, as well as to help to minimize the predicted increase in energy consumption due

to air conditioning. Examples of measures include external shades on windows, increased insulation, ceiling fans, and passive ventilation.

Part 2: Promoting Electric Vehicle Use

Ontario intends to increase access to infrastructure required to charge electric vehicles. We are seeking advice on how to implement the Climate Change Action Plan initiatives related to supporting the wider use of electric vehicles such as:

- requiring all new homes and townhomes with garages to be constructed with a 50-amp, 240-volt receptacle (plug) in the garage for the purpose of charging an electric vehicle
- requiring that all newly built commercial office buildings and workplaces provide electric vehicle charging infrastructure

Q # 5: The Climate Change Action Plan states that 50-amp, 240-volt receptacles will become mandatory in all new homes and townhomes with garages by January 1 2018. How should the Building Code be changed to make it easier to install and use these chargers (e.g., reflect the need for proper placement and adjacent unobstructed space in a garage to ensure convenience of access)?

- The Clean Air Council supports the requirements for 50-amp, 240-volt receptacles to become mandatory in all new homes and townhomes with garages by January 1 2018 and that that all newly built commercial office buildings and workplaces provide electric vehicle charging infrastructure. The costs associated with installing electrical vehicle charging systems will be lowest when it is installed at the construction stage for new building alongside the overall electrical system installations.

Q # 6: How should government proceed to support wider use of electric vehicles among residents of new multi-unit residential buildings?

- The Clean Air Council would like to recommend that all new multi-unit residential buildings (MURBs) be required to provide EV charging infrastructure on-site in parking areas.

- Clean Air Council recommends that the Province provide, in partnership with the private sector, convenient public charging infrastructure at popular trip destinations, to eliminate range anxiety.

- Clean Air Council also recommends that the Province and its partners promote EV lifecycle cost savings. This promotion would be targeted to populations of frequent

drivers with routine driving patterns without access to accessible and convenient transit options.

Part 3: Adapting to Climate Change

The Clean Air Council also recognizes that extreme weather events are happening more frequently as a result of climate change and that there is a strong need to increase the extreme weather resilience standards within the Ontario Building Code.

Q# 3: Should government be:

- Expanding backwater valve requirements to help prevent sewer backflow into houses?
- Requiring hurricane straps in all new houses to provide greater resilience against high winds?
- Updating the climatic data in the Building Code to reflect current weather conditions?

- **The Clean Air Council strongly supports the inclusion of all the above measures into the next Ontario Building Code update.** These measures plus the other resilience measures listed below provide a strong return on investment and play a significant role in strengthening the ability of Ontario buildings to being more resilient to extreme weather events and will also reduce governmental, insurance and individual costs as weather events become more extreme as a result of climate change. Clean Air Council member jurisdictions look forward to working with the Province and the Ministry of Municipal Affairs to further refine the below measures into standards that can be integrated into the next Ontario Building Code update.

Q # 4: What other elements should government consider to increase the ability of houses and buildings to better withstand the effects of extreme weather?

- **The Clean Air Council would like to recommend that the province consider the below measures identified within Durham Region's Resilient House Standard for inclusion into the next update to the Ontario Building Code.**

Component	Measure	Rationale
Basement Windows	**No basement windows below grade or within 20 cm of grade; OR** **Waterproof windows only**	Prevent overland flooding from entering the basement
Garage doors	**No double width garage doors**	Prevent blowout in high winds
Entry doors	**No double entry doors without steel centrepost**	Prevent blowout in high winds
Eaves	**Eaves over windows are at least 0.9 m wide (including eaves trough)**	Reduce solar gain, especially in summer
Sanitary sewage connection	**Sewage outlet and basement floor drains attached to separate sanitary sewage line (where available)**	Ensure no cross-connection to storm sewers
Storm water connection	**Footing drains connected through backflow prevention valve to separate storm sewer (where available)** **Downspouts drain to surface percolation features (LID)**	Ensure no cross-connection to sanitary sewers; manage storm water on site
Driveways and walkways	**Porous pavement on driveways and walkways**	Reduce runoff
Roof sheathing	**To be attached every 10 cm to roof truss with minimum 6 cm nails**	Reduce loss of sheathing in high winds
Roof finishing	**Shingles, tiles or metal roof finishing to be light coloured (albedo levels yet TBD)**	Reduce heat retention in attic and local exterior heating
Foundation walls	**Drainage membrane from grade to footings to be installed on all exterior foundation walls**	
Connection of external electrical generator	**Convenient connection point for external generator, with grid isolation protection**	To provide easy and safe connection of generator during blackouts

In addition to the above measures that reduce physical damage to buildings as a result of extreme weather there are also additional measures related to protecting public health that the Clean Air Council would like to recommend that the Province integrate into the next update to the Ontario Building Code including:

- Introducing OBC changes for multi-unit residential buildings that manage future increases in extreme heat by preventing the resulting increase in premature deaths due to extreme heat and minimizing the resulting increase in energy consumption due to air conditioning.

- OBC requirements that increase energy efficiency and reduce the need for air conditioning. Examples of potential OBC requirement and other approaches the Province could pursue to meet multiple goals include:

    - External shades on windows;
    - Increased insulation
    - Ceiling fans
    - Effective, passive ventilation
    - Windows that open wide high up to allow ventilation while preventing falls
    - High albedo (cool, reflective) surfaces for the roof, envelope and surrounding site such as parking lots
    - Shared cool rooms inside apartment buildings, to provide air conditioning to protect the health of the most vulnerable people who require active cooling
    - Shared cool spaces outside apartment buildings, to provide shaded, treed spaces with seating as a refuge from overheated apartments

- Measures and standards that enable and encourage building managers to utilize the options in the OBC that prevent falls from windows but still allow for ventilation. Measures related to this are found in the current OBC (Section 3.3.4.8 Protection of Openable Windows) and in the Residential Tenancies Act (Section 25 Window Safety Devices). A program could be modelled on that of New York City, which includes an approved list of window guard manufacturers and products. Information on New York City's program is available at: https://www1.nyc.gov/site/doh/health/health-topics/window-guards-faq.page.

- In addition, to help buildings and their occupants withstand extreme weather, the Clean Air Council supports the inclusion of "Minimum Backup Power Guideline for multi-unit residential buildings (MURBs) developed by the City of Toronto which presents a number of opportunities to help improve resilience to area-wide power outages in MURBs, both existing and new.