



REPORT FOR ACTION

Reducing Greenhouse Gas Emissions in the Building Sector: Response to the Fall 2017 Ontario Building Code Consultation

Date: September 26, 2017

To: Planning and Growth Management Committee

From: Chief Building Official and Executive Director, Toronto Building (Acting)

Wards: All

SUMMARY

The purpose of this report is to provide City Council with background and recommendations on significant areas of proposed changes to the Ontario Building Code, intended to address Greenhouse Gas (GHG) emissions in buildings. The report focuses on several key policy areas which address the matter of how the Ontario Building Code can support the City's goal of reducing GHG emissions in the building sector, including:

- Energy Efficiency in Houses and Large Buildings
- Energy Efficiency Upgrades to Existing Buildings through Renovation
- Municipal Green Standards, Including Green and Reflective Roofs
- Electric Vehicle Charging in New Multi-Unit Residential Buildings
- Measures Supporting Adaptation to Climate Change

These proposals, if adopted, would support the City's own climate change mitigation strategies, including City Council's recently adopted TransformTO initiative. The City of Toronto's work in recent years to minimize the environmental impact of new construction has helped expand the Building Code's environmental focus. This work has included: Toronto's Green Roof By-law, the Toronto Green Standard and partnering with the Province to investigate opportunities for increased energy efficiency through renovation.

The Chief Building Official, in consultation with a number of City Divisions, submitted comments on the proposed Building Code changes during the consultation (July 14 to September 29, 2017). Toronto Building staff will continue to participate through the fall on Technical Advisory Committees reviewing the public comments. A new edition of the Ontario Building Code is anticipated in 2018, with the Building Code changes expected to take effect at the start of 2019.

RECOMMENDATIONS

The Chief Building Official and Executive Director, Toronto Building (Acting) recommends that:

1. City Council request that the Government of Ontario continue to expand the list of items in the Ontario Building Code's list of "green standards" to include incremental energy efficiency provisions for all buildings, to further expedite the City's objective of new net zero buildings by 2030.
2. City Council request that the Government of Ontario, in considering potential changes to increasing renovation requirements related to energy efficiency in the Ontario Building Code, take measures to discourage the growth of illegal renovation and develop technical support and training for the building industry, building officials and building owners.
3. City Council request that the Province of Ontario continue to review the Ontario Building Code for other potential amendments to mitigate against the effects of extreme weather such as flooding, ice storms and extended periods of heat and extreme winds. Specific areas which should be addressed include passive cooling measures in buildings, and a review to ensure that climatic data in the Ontario Building Code reflects current conditions.

FINANCIAL IMPACT

There are no direct financial implications associated with this report. Future implementation of technical amendments may result in additional costs for Toronto Building in order to comply with additional administrative responsibilities and enforcement of new standards. Any request for additional resources will be made in the budget submission for the year in which the new requirements take effect.

DECISION HISTORY

In 2011, Toronto City Council adopted the recommendation to "endorse further examination of requiring energy efficiency improvements at the time of renovation, in order to affect the provincial consideration of energy efficiency in existing buildings beyond the next Ontario Building Code Cycle."

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2011.PG3.4>

Toronto is the first City in North America to have a by-law to require and govern the construction of green roofs on new development. It was adopted by Toronto City Council in May 2009, under the authority of Section 108.1 of the City of Toronto Act.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.PG25.3>

COMMENTS

Ontario Building Code Act and the Ontario Building Code

Ontario's Building Code (the Code) is a regulation made under the Building Code Act (the Act). The Code sets out province-wide technical and administrative requirements for the construction, renovation, change of use and demolition of buildings in Ontario.

The Act and the Code are developed and administered by the Ministry of Municipal Affairs. Ontario municipalities are responsible for enforcing the Code within their boundaries. Ontario Municipalities, including Toronto, are not permitted by the Act from passing by-laws which conflict with the Code, such as setting standards for building construction, or exceeding the Code requirements. Toronto's Green Roof By-law is an exception, as the authority to govern green roofs was expressly set out in the City of Toronto Act, 2006.

Ontario Building Code Development

Every five to seven years, the Province issues a new Code, which reflects changes in the model national codes, technology and provincial policy interests. Model national codes are used by provinces across Canada as the basis for the provincial building codes. In key areas, Ontario includes Code provisions which reflect key areas of provincial interest.

Code amendments are the result of an extensive process which relies on broad stakeholder input, usually during a focused province-wide public consultation. Following a consultation, the Ministry of Municipal Affairs' Technical Advisory Committees review public comments. The Technical Advisory Committees are comprised of a balanced group of building industry experts from various stakeholder groups, including the City of Toronto. The Ministry of Municipal Affairs then reviews the comments and makes recommendations to Cabinet for review.

2016 Phase 1 - Ontario Building Code Consultation

In setting the minimum requirements for construction, the Building Code can support policy objectives of mutual interest to the City of Toronto and the Province of Ontario. In the (Phase 1) fall 2016 Code consultation, Toronto Building, in consultation with other City Divisions, reviewed and responded to approximately 500 proposed technical changes for consideration as interim changes, or as part of the next edition of the Building Code.

Proposals targeted to retirement homes and secondary suites, both of which are intended to improve access to adequate, suitable and affordable housing were supported by staff. In addition, radon mitigation requirements for new homes would promote public safety in low-rise dwellings, and increased sound proofing requirements would assist the City's growing population living in high-rise condominium buildings.

The Chief Building Official also raised additional items to be considered for amendments to the Ontario Building Code during its submission and again during a follow-up meeting with provincial staff in early-2017. These issues included: views to the outdoors from bedrooms in multi-residential buildings, distributed antenna systems, and requirements to ensure acceptable safety and privacy for persons using transgender washrooms.

Provincial Climate Change Action Plan and TransformTO: Getting to Near Net Zero Ready Buildings by 2030

The City of Toronto has undertaken a number of initiatives which are aligned with the Province's objective of reducing carbon emissions from buildings. Most recently City Council adopted the **TransformTO** initiative aimed at identifying strategies and actions to support Toronto in reducing emissions by 80% from 1990 levels by 2050. "Energy and Building Standards" were consistently identified by the public, industry and the City in consultations as key building blocks of Toronto's long-term, low-carbon pathway. One of the recommendations adopted by Council was that 100 per cent of new buildings be designed and built to be near zero greenhouse gas emissions by 2030.

The Chief Planner's report on the **Toronto Green Standard** also before the October 12, 2017 Planning and Growth Management Committee sets out a four-tier performance measure to achieve the City's goal of near zero emissions buildings by 2030. This modelling framework, adopted in 2010, is administered through the planning process and is intended to start a conversation with developers about going further than the Code. The Toronto Green Standard is intended to be a market transformation tool and has been successful in moving the industry to a higher state of readiness for increased energy efficiency requirements.

In 2015, the City Manager wrote to the Assistant Deputy Minister, Climate Change and Environmental Policy Division, Ministry of the Environment and Climate Change in response to the Province's Climate Change Discussion Paper (EBR Registry Number: 012-3452). On the matter of climate mitigation and adaptation, the letter stated that the Province is "encouraged to review the Ontario Building Code for further opportunities and tools to address climate change mitigation and adaptation." The submission further recommended that the Ontario Building Code be reviewed and comprehensive consideration be given on how a changing climate and severe weather events will affect buildings.

In June 2016, the provincial government launched its [Climate Change Action Plan](#), with the objective of reducing emissions from fossil-fuel use in buildings by setting lower-carbon standards for new buildings. The Action Plan stated that, "*The government intends to update the Building Code with long-term energy efficiency targets for new net zero carbon emission small buildings that will come into effect by 2030 at the latest, and consult on initial changes that will be effective by 2020.*"

2017 Phase 2 - Ontario Building Code Consultation

On July 14, 2017, the Ministry of Municipal Affairs launched the Phase 2 consultation seeking input to help guide potential future changes to the Building Code, many of which would support actions in the provincial Climate Change Action Plan. The key Code proposals and their anticipated implementation timelines are set out in Appendix A. As the lead City Division on the Code, Toronto Building co-ordinated an inter-divisional response to consultation and submitted technical comments to the Ministry of Municipal Affairs.

The comments in this report do not focus on the detail or technical nature of many of the proposed amendments. Instead, the comments which follow focus on several key policy areas which illustrate how the Building Code can further support the City's goal of reducing GHG emissions in the building sector.

Energy Efficiency Requirements for Houses and Large Buildings

Beginning with the 2007 Code, Ontario set out a framework where energy efficiency requirements were gradually phased-in, to provide certainty and clarity for builders, designers and building officials. In early-2017, the last package of 2012 Building Code energy efficiency requirements took effect. The Province has stated that a new house (under the 2017 provisions) consumes 50 per cent less energy than its 2005 equivalent, and a large building consumes 35 per cent less energy than its 2005 equivalent.

In the Phase 2 consultation, the Province has proposed to amend the Code with a package of changes to take effect beginning in 2019. The Province's long-term goal as articulated in the Climate Change Action Plan, is to reduce overall GHG emissions by 80 per cent below 1990 levels by 2050. The nearer term targets are 15 per cent below 1990 levels by 2020, and 37 per cent below 1990 levels by 2030. The year 2030 is also the date when net zero carbon emissions targets for small buildings are to come into effect (at the latest), which supports the provincial GHG emission targets. There were no similar net zero carbon emissions targets for large buildings in the Phase 2 consultation.

Energy Efficiency in Houses

Similar to the approach in previous Codes, the Province is proposing to implement a series of energy efficiency measures for houses beginning in 2019, 2020 and 2022. (See Appendix A). Beginning in 2020 and continuing in 2022, the Province is proposing to introduce more stringent provisions, resulting in new houses that would use approximately 60 per cent less energy than their 2005 equivalents. Proposed requirements include continuous insulation, triple-pane windows and sliding doors.

Also proposed, by 2020, is the completion of air tightness testing as a condition of occupancy. Air tightness is an important measure of how leaky the building is, and consequently a measure of the building envelope's energy efficiency. However, there would be no specific performance level for the air-tightness until 2022. In 2022,

additional measures such as improved insulation requirements and enhanced mechanical efficiency measures are proposed.

While new house construction does not comprise a significant majority of the new construction in Toronto, improvements to the energy efficiency of these building types is important as they are not captured through the Toronto Green Standard. Requiring building testing, such as blower door tests (for air tightness) help increase the awareness of building envelope performance, similar to the modelling of larger buildings through Toronto's Green Standard. Staff have expressed support of the proposed measures addressing energy efficiency in houses. Staff have also advised the Province that it should be collecting and reviewing testing data, to help inform future Building Code development.

Energy Efficiency in Large Buildings

Similar to the approach for increasing energy efficiency in smaller buildings, the package of proposed Code changes for larger buildings in 2019 and 2022 focusses on building envelope performance. Larger buildings referenced in the Code are generally those greater than three storeys or over 600 m² in building area.

In 2019, it is proposed that voluntary air tightness targets be introduced for use by designers. In 2020, changes to insulation requirements are aimed at improving the thermal performance of the building envelope by reducing thermal bridging. In 2022, a package of improvements are proposed to reduce energy efficiency consumption in large buildings by 20 per cent compared to a building constructed in 2017 and 48 per cent compared to 2005. This would be accomplished in part by removing the possibilities for trade-offs between building envelope components and mechanical heating systems. Without trade-offs, designers and builders will be unable to compensate for heat loss in the poor performing envelopes of large buildings by relying on super-efficient mechanical systems; this is a significant change from current practices. Air leakage testing is also being considered for large buildings in 2022. It is proposed that credits continue to be offered against air-tightness targets.

Toronto Building supported these measures in its response to the Province, on the Phase 2 consultation. In addition, the submission also recommended that the objective of near net zero buildings be expanded in the Code to include all building types.

Municipal Green Standards

Green Roofs/Reflective Roofs

In May 2017, Bill 68 amended the City of Toronto Act, 2006 to provide a new ability for the City of Toronto to voluntarily adopt "green standards", if the technical requirements for those standards are included in the Building Code. Introducing a green standard framework in the City of Toronto Act (with similar provisions in the Municipal Act) and implementing it through the Building Code provides clarity that the Code remains the

proper regulatory tool to establish and enforce construction standards. In the Phase 2 consultation, the Ministry of Municipal Affairs proposed only to include standards in the Building Code for green and reflective roofs at this time. Toronto has had its own Green Roof Construction Standard since 2010 when it became the first North American jurisdiction to require green roofs and set requirements for their construction.

Toronto Building, in consultation with City Planning and the Energy & Environment Division have provided the Ministry of Municipal Affairs with extensive comments on the draft Building Code provisions for green and reflective roofs. The submission also recommended that City of Toronto staff be included in discussions when the Provincial Technical Advisory Committee meets in the fall. It is important to note that the authority for the City of Toronto to set its own green roof construction standards has not been impacted by the recent City of Toronto Act amendments. Toronto Building and City Planning will continue to administer and enforce the existing Toronto Green Roof By-law.

Green Standards: Energy Efficiency

The Chief Building Official, in her submission for Phase 1 of the consultation, stated that the Building Code remains the most appropriate regulatory tool for establishing and enforcing energy efficiency goals in new buildings as it provides clarity and certainty for building officials, designers and builders. Introducing a green standards framework in the City of Toronto Act and implementing it through the Building Code provides clarity that the Code remains the proper regulatory tool to establish and enforce construction standards, such as energy efficiency requirements, in buildings.

To achieve energy efficiency goals in new buildings and support GHG reductions in the building sector, the government could consider providing a number of levels (or "tiers") of energy efficiency within the Code itself and allowing municipalities such as Toronto to adopt the tiers in advance of other areas of the Province. Recent Code cycles have adopted the practice of a tiered approach, requiring different levels of energy efficiency over time. The development of tiers for adoption by the City of Toronto ahead of the Code schedule would then be developed with the same technical rigour and analysis currently applied to the Code, while maintaining the principle that municipal by-laws cannot supersede the Building Code on matters of building construction.

Regarding the targets themselves, ambitious long-term energy targets for buildings (i.e., near net zero) are necessary if provincial GHG emissions targets are to be achieved. The need for long-term planning is contained in both the City of Toronto and Ontario's climate change action plans. However, it is important to recognize that advance notice of change is necessary for all building sector participants; building officials and builders need to be trained and manufacturers must be able to provide appropriate, affordable products in the marketplace.

The Province should also consider expanding the list of technical standards to include matters related to construction and design of buildings, some of which are currently contained in the Toronto Green Standard. It is recommended that City Council request that the government expand the list of technical standards the City may adopt in its

green standard, under the authority of the City of Toronto Act, to allow the City to adopt energy efficiency requirements ahead of the Code schedule.

Energy Efficiency Upgrades for Existing Buildings Through Renovations

The current Building Code requirements that must be met during renovation are intended to assist as much as possible with the integration of renovation construction with existing buildings. However, older, existing buildings account for the majority of GHG emissions. Currently, energy efficiency can be improved on a voluntary basis by building owners undertaking renovations. There are no requirements to increase energy efficiency. The potential for improvements in energy efficiency in existing buildings undergoing renovation, therefore, is significant in large urban areas, such as Toronto, where the urban fabric is largely built out. If Ontario and Toronto want to collectively meet long-term GHG emissions targets, the energy efficiency of these buildings needs to be a component of a broad-based climate change strategy.

In considering the report from the Chief Building Official on the 2011 Code consultation, Toronto City Council adopted the recommendation to "endorse further examination of requiring energy efficiency improvements at the time of renovation, in order to affect the provincial consideration of energy efficiency in existing buildings beyond the next Ontario Building Code cycle." With this direction, Toronto Building partnered with the Ministry of Municipal Affairs and completed research in order to identify exactly where opportunities in the Code may be found for both the existing housing stock and office, retail and large buildings.

Based in part on the joint research in this area, the Province is proposing that energy efficiency be an outcome of renovation work under the Building Code. To achieve this, the proposed changes, to take effect on January 1, 2019, would change requirements related to insulation, ventilation systems, space and water heating systems, lighting systems, windows and doors, air barriers and vapour barriers. Special provisions are made in the proposals for heritage buildings, or situations where particular renovations may not be practicable, or cause structural or construction difficulties.

While there is a significant potential positive impact of adding energy efficiency requirements to renovations, any changes must also consider broader impacts such as affordability and the potential expansion of the underground economy. For example, the implementation of new requirements for renovating existing buildings should be undertaken in conjunction with provincial funding or financing options, in order to mitigate the potential negative impact on affordability for building residents. The provision of such renovation and retrofit financing options would align with provincial priorities and City of Toronto priorities for action on climate change, energy efficiency improvements, poverty reduction and housing affordability.

The potential negative impact on the renovation industry must also be addressed by discouraging the growth of black market renovation. Finally, as buildings become more complex, additional requirements should be accompanied by technical support and training for the building industry, building officials and building owners. This report recommends that Toronto City Council request that the Province consider and address

these issues as it expands energy efficiency requirements through renovation in the Code.

Other Key Proposals

Electric Vehicle Charging in New Multi Unit Residential Buildings

As Electric Vehicle (EV) infrastructure and charging requirements develop along with the vehicles themselves, it is important to support their future adoption now, while minimizing unnecessary future renovation costs to building owners.

To support the provincial EV strategy, in May 2017, the Province introduced interim Code amendments for workplaces (Part 9 buildings larger than 600m² and Part 3 buildings) requiring EV charging in 20 per cent of parking spaces and "rough-ins" in the remaining spaces. These requirements take effect on January 1, 2018. The Province is now proposing identical requirements for new multi-unit residential buildings where parking is provided in the building, to take effect in 2019.

Toronto Building has suggested that Code requirements should not favour a particular vehicle manufacturer over another and that further discussion be carried out with industry stakeholders and utility providers.

Adaptation to Climate Change: Hurricane Straps and Backwater Valves

Both the July 8, 2013 severe storm and the December 2013 Ice Storm, were weather driven events in Toronto which are forecast to increase in severity and frequency. In response, the City of Toronto undertook a comprehensive analysis to identify opportunities to improve resilience to extreme weather events and manage future risk.

There is support across the City Divisions involved in climate resiliency planning that the Province should expand Code requirements to include backwater valve requirements and hurricane straps. Toronto City Council has previously [endorsed](#) these specific changes when considering the Toronto Building response to the 2011 Ontario Building Code consultation. The 2011 staff report noted that these changes would provide additional benefits to homeowners with only a minimal cost increase in the construction of new buildings.

While hurricane straps and backwater valves are two measures to address climate change and increase resilience of buildings, the Chief Building Official has consulted with other City Divisions to recommend that the Province continue to review the Code for other potential amendments to mitigate against the effects of extreme weather such as flooding, ice storms and extended periods of heat and extreme winds. Specific areas which should be addressed include passive cooling measures in buildings, and a review to ensure that climatic data in the Code reflects current conditions.

Next Steps

This report has focussed on several of the key recommendations of the recent provincial consultation on potential amendments to the Building Code to address GHG emissions in buildings. The report highlights these proposals and, if adopted, can support the City's own climate change mitigation strategies such as the TransformTO initiative. Toronto's own work to minimize the environmental impact of new construction, such as the Green Roof By-law, the Toronto Green Standard and Council decisions on key matters have helped drive the move towards increased measures in the Code, to reduce GHG emissions. However, as this report recommends, there are additional opportunities through recent regulatory changes to broaden the ability of the City of Toronto to require additional environmental measures through the building permit process.

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ATTACHMENTS

Appendix A: Proposed Building Code Change Implementation Timelines

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Source: [Ministry of Municipal Affairs](#)

Proposed to come into effect January 1, 2019	Proposed to come into effect 2020	Proposed to come into effect 2022
<p>Proposals include:</p> <ul style="list-style-type: none"> • Energy efficiency requirements for renovations • Electrical vehicle charging in new multi-unit residential buildings • Green building standards and green roofs • Referencing a new standard for grey-water reuse • Water conservation • Solar-ready roofs • Hurricane straps in new houses • Option to meet air tightness targets in exchange for credits in large buildings • Other technical proposals 	<p>Proposals include:</p> <ul style="list-style-type: none"> • Energy efficiency requirements for houses • Continuous insulation • Triple-pane windows and sliding doors • Air leakage testing • Further limitations to building envelope trade-offs • Energy efficiency requirements for large buildings • Removal of insulation exceptions to reduce thermal bridging effects 	<p>Proposals include:</p> <ul style="list-style-type: none"> • 20 per cent decrease in energy consumed by houses • Air tightness requirement • Improved wall insulation • Under-slab insulation • More energy efficient triple-pane windows and sliding doors • Eliminating building envelope trade-offs • Enhanced mechanical equipment efficiency • 20 per cent decrease in energy consumed by large building types • Mandatory air tightness testing without concern for results • Further limitations to building envelope trade-offs • Expansion of heat or energy recovery requirements to apartment buildings