REPORT FOR ACTION

Downtown Energy Strategy

Date: April 17, 2018
To: Planning and Growth Management Committee
From: Chief Planner and Executive Director, City Planning and Director, Environment & Energy
Wards: 20, 27 and 28

SUMMARY

This report recommends endorsement of the Downtown Energy Strategy (the Strategy) to guide implementation of the Downtown Plan. The purpose of the Strategy is to set out a series of actions that will achieve reductions in overall greenhouse gas (GHG) emissions, address constraints within the electricity distribution grid and enhance resilience to area-wide power outages.

Downtown is Canada's largest employment cluster with over 500,000 jobs, relying on Union Station, the subway system and the surface transit network to provide access to a city-wide and regional workforce. Close to 240,000 people live Downtown, with more than 7,500 residents added annually over the past 5 years. The Downtown and the South of Eastern and Liberty Village areas have the potential to reach between 850,000 and 915,000 jobs by 2041.

This growth and intensification may result in increased greenhouse gas emissions and growing electricity demand in the face of constrained supply. Increasing frequency of extreme weather events, compounded by stressed electricity infrastructure and the predominance of high-rise residential buildings where residents rely on electricity for essential services, demands preparations for power outages.

The Downtown Energy Strategy addresses the energy and related resilience needs within a growing Downtown, encompassing the 17-square kilometre area from Bathurst Street to the Don River and from the waterfront to the CP rail corridor/Rosedale Valley Road.

The Energy Strategy contains a series of transformative ideas and immediate and long-term actions. These include working with energy developers to develop local renewable energy solutions and establish new low carbon thermal energy networks. The actions also address promoting residential building retrofits, encouraging developers to achieve near-zero emissions buildings and preparing design guidelines for low-carbon thermal energy ready buildings. Developers will be encouraged to include back-up power for multi-unit high rise residential buildings and to salvage and reuse materials. The

Downtown Energy Strategy also serves to align the Downtown Plan with TransformTO, the City's climate action plan and the Toronto Green Standard.

Moving forward, Environment and Energy will work collaboratively with other City division and agencies, Toronto Hydro and energy providers and energy developers to advance implementation of the Strategy. The Downtown Energy Strategy's actions will be addressed comprehensively through TransformTO and reported out to City Council as appropriate. The implementation of the Strategy's actions will be largely addressed through application of the Toronto Green Standard and Energy Strategy reports submitted as part of the planning approval process. City staff will begin using the Strategy to review development applications, including the Energy Strategy Report provided by applicants.

RECOMMENDATIONS

The Director, Environment & Energy and the Chief Planner and Executive Director, City Planning recommend that the Planning and Growth Management Committee:

1. Endorse the Downtown Energy Strategy attached as Attachment 1 to this report to guide implementation of the Downtown Plan.

2. Direct the Director of Environment and Energy to consult with the Chief Planner and Executive Director, City Planning, General Manager, Toronto Water, General Manager Parks, Forestry and Recreation, General Manager Transportation Services, Director, Major Capital Coordination Office, and agencies including CreateTO, Toronto Hydro, Enbridge and Enwave Energy Corporation on implementation of the Energy Strategy.

3. Direct the Director, Environment & Energy and the Chief Planner and Executive Director, City Planning to use the Downtown Energy Strategy to review development applications, including the Energy Strategy Report, within the Downtown Plan area.

FINANCIAL IMPACT

There are no direct financial implications resulting from the implementation of the recommendations in this report.

Apart from the electricity distribution network provided through Toronto Hydro, energy infrastructure is not a City responsibility. Rather, responsibility for the electricity market and the planning for energy supply infrastructure rests with the Independent Electricity System Operator (IESO), while low-carbon thermal energy networks are owned and operated by private sector organizations such as Enwave Energy Corporation. Therefore, the City's role as reflected in the Downtown Energy Strategy is largely to work with the private sector to encourage and advance the adoption of renewable energy technologies and energy conservation practices.

The Downtown Energy Strategy provides a framework for the City to work collaboratively with the development industry, energy developers and/or asset owners and utilities to facilitate the expansion of thermal energy networks, identify and develop local renewable energy solutions, design low-carbon thermal energy-ready buildings and encourage additional back-up power for residential buildings.
Actions and recommendations in the Downtown Energy Strategy focus on additional requirements from development applications – required, incented and/or encouraged through the Toronto Green Standard and through the Energy Strategy Report that accompanies development applications. Implementation of the Downtown Energy Strategy will be fully aligned with TransformTO, including the development of a city-wide renewable energy strategy.

The Interim Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

TOcore

At its May 2014 meeting, Toronto and East York Community Council (TEYCC) considered a staff report entitled "Comprehensive to the Core: Planning Toronto's Downtown," which launched TOcore: Planning Downtown, and directed staff to develop an integrated planning framework and infrastructure growth strategy for Downtown to enable long-term liveability and competitiveness. The report can be found here: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2014.TE32.47

At its December 2015 meeting, City Council adopted a staff report entitled 'TOcore: Planning Toronto's Downtown – Phase 1 Summary Report and Phase 2 Directions' and directed Environment and Energy and City Planning staff to develop an energy strategy addressing electricity demand, resilience to power outages and opportunities for local energy solutions. The report can be found here: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.TE12.43

At its October 2017 meeting, City Council adopted a staff report entitled, 'TOcore: Proposed Downtown Plan' and directed staff to undertake stakeholder and public consultation on the five Downtown infrastructure strategies, including the Energy Strategy, and report back by mid-2018 with final strategies and any recommendations for future work to implement the strategies such as capital approvals, Environmental Assessments and/or Master Plans. The report can be found here: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.PG22.1

TransformTO

At its July 2017 meeting, City Council adopted 'TransformTO: Climate Action for a Healthy Equitable, and Prosperous Toronto – Report #2 – The Pathway to a Low Carbon Future'. The report recommends a number of city-wide objectives including: designing 100 per cent of new buildings by 2030 to be near zero emissions, 75 per cent of community-wide energy use by 2050 is low-carbon/renewable, and 30 per cent of

total floor area by 2050 is connected to low-carbon thermal energy. The report can be found here:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.PE19.4

Low-Carbon Thermal Energy Networks

At its March 2018 meeting, City Council adopted 'Strategic Development of Low-Carbon Thermal Energy Networks (District Energy)'. The report recommends an innovative approach to working with energy developers on implementation of low-carbon thermal energy networks (LCTEN) city-wide. The report can be found here:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.EX32.8

Toronto Green Standard

At its December 2017 meeting, City Council adopted the Toronto Green Standard Version 3, which includes a four-tiered framework for development to achieve near-zero greenhouse gas emissions by 2030 in support of Council's adoption of TransformTO and a goal to reduce community-wide greenhouse gas emissions by 80 per cent of 1990 levels by 2050. Toronto Green Standard Version 3 will come into effect on May 1, 2018. The report can be found here:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.PG23.9

Energy Strategy Official Plan Amendment 262

At its meeting November 2015 City Council approved amendments to the environmental policies of the Official Plan, including requiring the submission of an Energy Strategy as part of a complete application for large developments. OPA 262 was approved by the Province and came into effect in May 2016. The report can be found here:
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2015.PG7.2

COMMENTS

TOcore Overview

‘TOcore: Planning Downtown’ (the Study) has been a comprehensive and integrated look at Toronto’s Downtown, its relationship to the city and region around it, and the planning framework governing growth, development and the provision of infrastructure. The Study area is bounded by Lake Ontario to the south, Bathurst Street to the west, the mid-town rail corridor and Rosedale Valley Road to the north and the Don River to the East.

Initiating the TOcore Study in 2014, Council recognized that growth was outpacing the City’s ability to secure the infrastructure necessary to support growth. It signaled that a new planning direction for Downtown was required and that it should be accompanied by an infrastructure growth strategy. Without integrated planning of growth and infrastructure along with a balancing of residential and non-residential growth, the liveability of Downtown and the competitiveness of the city as a whole was seen to be compromised.

The purpose of the Study is to ensure growth continues to positively contribute to Toronto's Downtown as a great place to live, work, learn, play and invest by determining how future population and employment growth will be accommodated and shaped, and what physical and social infrastructure will be needed, where it will go and how it will be secured.

Led by City Planning, the Study has been a collaboration among sixteen City divisions and two offices, as well as with several supporting agency partners.

Through TOcore, staff has developed a 25-year Downtown Plan to ensure that Downtown Toronto remains the thriving, liveable, and connected heart of a successful and prosperous city and region. To guide implementation, the Downtown Plan is supported by five infrastructure-related strategies that address: parks and public realm, community services and facilities, mobility, energy and water.

Energy Strategy Overview

The Downtown Energy Strategy is designed to ensure that development Downtown is accompanied by the necessary infrastructure to support growth and contribute to the achievement of the City's climate action plan. The Energy Strategy sets out a series of actions to address energy-related issues in the Downtown and achieve the City's objectives to reduce greenhouse gas emissions and improve resiliency. The anticipated growth in Downtown may drive significant increases in energy consumption, electricity demand and ultimately greenhouse gas (GHG) emissions. Furthermore, the combination of growth, rising temperatures and electrification (primarily transit, vehicles, and space heating) could lead to substantial increases in electricity demand in a supply-constrained scenario. Finally, the anticipated increase in the frequency and severity of extreme weather events, which can cause area-wide power outages, could increase the vulnerability of residents in high-rise buildings as they rely on power for essential services (e.g. water supply, elevators, and security).

The Energy Strategy identifies immediate actions to address expected growth, and future-proofing measures to ensure the Downtown is prepared for longer term growth. There will be many solutions and many participants with a role to play in achieving a low-carbon, resilient Downtown. The focus of the Energy Strategy is on actions that can be scaled-up or initiated quickly and that the City has a key role in implementing.

Strategy Highlights

The Downtown Energy Strategy includes the following priority actions:

1. Work with thermal energy network owners and operators to reduce GHG emissions from existing thermal energy networks, such as through improved efficiency or fuel switching.

2. Work with energy developers in the development of new low-carbon thermal energy networks. Actions could include provision of information, analysis, and access to City assets, including rights of way, and facilities to assist energy developers in establishing new low-carbon thermal energy networks.

3. Work with energy developers to identify and develop local renewable energy solutions (solar photovoltaics, biogas, sewer heat recovery, and energy storage).
4. Promote residential buildings retrofits. Focus conservation and efficiency initiatives on existing multi-unit residential buildings Downtown.

5. Encourage development applicants to achieve near-zero emissions buildings and the highest tier of the Toronto Green Standard, through the Energy Strategy Report.

6. Prepare design guidelines for low-carbon thermal energy-ready buildings and make the guidelines available to development applicants in the Energy Strategy Report Terms of Reference.

7. Encourage multi-unit residential development applicants to follow the "Minimum Backup Power Guidelines" for multi-unit high-rise residential buildings, provided to applicants seeking higher levels of the Toronto Green Standard and through the Energy Strategy Report.

8. Encourage development applicants to salvage and reuse materials through the higher levels of the Toronto Green Standard and through the Energy Strategy Report. Update the Energy Strategy Report Terms of Reference to require accounting of embodied energy and to identify opportunities to limit its loss, including through the salvage and reuse of materials, when proposing demolition of existing buildings.

Growth and Challenges

Toronto’s Downtown functions as the economic and cultural hub of the city and region. The Downtown is the most prominent location for development activity in the City and contains the largest percentage of proposed development. Downtown currently accounts for 38 per cent of the residential units and 40 per cent of the non-residential gross floor area (GFA) proposed in the entire city.

Much of the residential growth Downtown between 2012 and 2016 took place south of Queen Street. Almost 50 per cent of all Downtown growth occurred in the King-Spadina and Waterfront West neighbourhoods. The Bay Corridor, King-Parliament and Waterfront Central saw moderate increases accounting for 36 per cent of new residents.

Downtown's population is projected to more than double from approximately 200,000 people in 2011 to a potential population of 475,000 by 2041. Downtown is Canada's largest employment cluster with over 500,000 jobs. By 2041, Downtown, together with the "shoulder" areas of South of Eastern and Liberty Village, has the potential to reach between 850,000 and 915,000 jobs.

Growth-related challenges as identified in the Downtown Energy Strategy include: rising greenhouse gas emissions, growing electricity demand in the face of constrained supply, and more frequent extreme weather events leading to power outages.

Energy Challenges

Increasing Greenhouse Gas Emissions

Build-out of the 2012–2016 development pipeline is estimated to increase electricity and natural gas consumption by 25 per cent and 18 per cent, respectively, leading to an increase in emissions of 22 per cent (approximately 380,000 tonnes of CO2). To meet 2050 GHG emissions targets, Downtown building emissions will need to be reduced by nearly 1.3-million tonnes from current levels. This will have to be done while growing, meaning that estimated emissions from new development will need to be avoided.

Increasing Electricity Demand

With electricity distribution infrastructure already constrained in areas anticipating the most growth, the estimated 22 per cent increase in electricity demand due to development pipeline build-out will be a challenge. Electricity demand will also increase due to electrification of the GO rail network and the UP Express along with planned construction of the Relief Line and the Waterfront East LRT. Downtown's transit-based electricity demand is already large compared to its area, and is set to more than double within 15 years based on current plans.

Constrained Electricity Supply

The concern with the anticipated increase in electricity demand is that the default solution could be a second natural gas-fired power plant next to the existing Portlands Energy Centre. The energy centre is currently Toronto's single largest source of GHG emissions (emitting 371,000 tonnes of CO2 annually). Adding a second plant would make meeting long-term GHG emissions reduction targets challenging.

Extreme Weather

Extreme weather events are expected to increase in frequency and severity due to climate change. These events can cause area-wide power outages. Residents of multi-unit residential buildings are especially vulnerable given their reliance on electricity for essential services such as water supply, elevators and security. The majority of residential units in the Downtown development pipeline will be located in tall buildings. This means that almost all new Downtown residents will rely on electricity for essential services, and are therefore vulnerable to area-wide power outages.

Energy Opportunities

Reducing Emissions from Existing Thermal Energy Networks

Downtown has three operating thermal networks—Enwave (Deep Lake Water Cooling and District Heating), University of Toronto St. George campus, and Toronto Community Housing’s Regent Park—and several new systems planned or in progress. Fuel switching and improvements to the efficiency of these thermal networks have the potential to deliver substantial GHG emission reductions.

Developing Low-Carbon Thermal Energy Networks

Low-Carbon Thermal Energy Networks (LCTEN) are the most-effective way to reduce emissions in dense, growing areas like Downtown, and they will be a critical component to achieving GHG emissions reduction targets. The City has an important role to play in LCTEN development as it controls access to rights-of-way and, in some instances, to low-carbon energy sources.

Developing Local Renewable Energy Solutions

Local renewable energy solutions will be important to reducing GHG emissions and electricity demand and improving resilience. For example, local electricity generation and storage will be needed to manage increasing electricity demand and ensure resilience to power outages. Development of large-scale renewable thermal energy sources will be key to reducing GHG emissions from buildings.

Retrofitting Existing Buildings

Reducing energy use, and using needed energy as efficiently as possible, are essential steps towards cost-effective emission reductions in existing buildings. Reducing natural gas consumption, and to a lesser extent electricity consumption, will directly reduce emissions. Reducing electricity demand will also reduce emissions by making room in the electricity grid for electric (i.e., low-carbon) solutions.

Developing Near-Zero Emissions New Buildings

Toronto Green Standard Version 3 establishes a four-tiered framework for near-zero emissions buildings by 2030. Tier 4 targets represent a near-zero level of emissions performance, at which point fuel switching is promoted to foster a shift away from natural gas towards electricity and renewable energy sources. Achieving Tier 4 targets in new buildings today will curtail energy use and emissions in the future.

Designing Low-Carbon Thermal Energy Ready Buildings

In order to achieve near-zero emissions levels, Downtown building mechanical systems must be designed to be ready for future integration of low-carbon thermal energy sources, whether through thermal networks or in-building solutions. In cases where a thermal network is not yet built, or on-site renewables are not currently economically viable, buildings should still be designed as if these opportunities were available given that retrofits later will likely be more complex and costly.

Providing Backup Power in Multi-Unit Residential Buildings

Given the extent to which multi-unit high-rise residential building residents rely on electricity for essential services, it is critical that these buildings have backup power. Key solutions include: powering essential loads beyond life safety requirements, such as additional elevators, domestic water pumps, and common areas; ensuring backup power provision for at least 72 hours; and using natural gas generators.

Salvaging and Reusing Building Materials

Much of the development in the Downtown involves demolishing an existing building to build a new one. This can result in the loss of the embodied energy—energy that was consumed to build the existing building. Salvaging or reusing the materials will reduce the loss of embodied energy and will assist the City to achieve its GHG reduction targets.

Tools to achieve the Energy Strategy through new development include the Energy Strategy report and the Toronto Green Standard Development Charge Refund Program. Large projects (over 20,000 square metres) are required to submit an Energy Strategy report as part of a complete application to identify opportunities to reduce GHG emissions and improve energy efficiency. Applicants to the Toronto Green Standard Development Charge Refund Program must hook up to district energy if available, must be designed to accommodate connections to solar technologies and can chose to provide additional 72 hours of back-up power to fulfil requirements.

Process and Engagement

City Planning and the Environment and Energy Division collaborated in the preparation of the Downtown Energy Strategy to ensure alignment of the objectives of both Divisions. Discussions with Toronto Water also shaped the Strategy.

While the Downtown Energy Strategy was being prepared, it was introduced to the community and other stakeholders at various stages of its development for feedback, as part of the TOcore public consultation process. This included information provided on the City's website, an online survey that sought input on a summary of the Strategy, and seeking public and stakeholder input at public meetings and presentations, workshops, an exposition, and meetings with stakeholder groups. Further details of the TOcore engagement process in Phases 1 through 3A can be found on the project website: www.toronto.ca/tocore.

Implementation Approach

This report recommends the use of the Energy Strategy by stakeholders including City Divisions, agencies, corporations, the development industry, energy developers, asset owners and utilities, to support growth and achieve the objectives of the Downtown Plan.

Actions and recommendations in the Downtown Energy Strategy focus on additional requirements from development applications – required, incented and/or encouraged through the Toronto Green Standard and through the Energy Strategy Report that accompanies development applications. Implementation of the Downtown Energy Strategy will be fully aligned with TransformTO, including the development of a city-wide renewable energy strategy.

The Strategy is intended to be updated on a regular basis to reflect progress made on implementing the priority actions.

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SIGNATURE

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ATTACHMENTS

Attachment 1: Downtown Energy Strategy