

Update: City Renewable Energy Programs

Date: November 15, 2023

To: Infrastructure and Environment Committee

From: Executive Director, Environment & Climate Division

Wards: All

SUMMARY

This report principally provides an update responding to City Council direction (Part 40, 2021.IE26.16 TransformTO Net-Zero Strategy Report) on addressing barriers and developing strategies to increase deployment of renewable energy in Toronto.

The report requests City Council's continued support with specific recommendations to scale the City's renewable energy programs and initiatives, reduce barriers, strengthen existing partnerships, and establish new partnerships to advance renewable energy uptake to meet Council adopted TransformTO's ambitious target of 50% of community-wide energy from renewable sources by 2030.

By scaling up renewable energy in its own operations, the City leads by example. By deploying clean technologies using innovative delivery models on City-owned properties, the City charts new pathways for decarbonization and creates local demand for zero emissions goods and services. In addition to playing a leadership role, the City plays a necessary role in supporting community-wide renewable energy adoption, in particular given that community-wide emissions represent 95% of annual emissions versus 5% of annual emissions from City operations.

The City facilitates adoption by leveraging its own assets both hard and soft, such as enabling access to City-owned land and infrastructure to host renewable thermal energy projects and utilizing the City's existing information and software resources, including Geographic Information System (GIS) to help residents, businesses and institutions assess renewable energy potential. The City also has direct oversight of permitting and inspection procedures for renewable energy projects, and by implementing best permitting practices, the City can facilitate adoption.

In this report, there is a table (pages 13 to 15) with responses to outstanding Council directives in addition to updates on current and future City renewable energy programs, including deep geothermal exploration for the Port Lands, hosting renewable thermal energy below ground surface in City-owned land, and shallow-lake cooling and heating for building in the waterfront.

One key area that is expected to exponentially grow in deployment is solar and storage for local resilient renewable electricity generation and peak demand management.

- The City's [SolarTO program](#) helps Toronto residents, businesses and institutions with their decisions to adopt solar and storage. It provides an interactive online resource of Toronto's rooftops solar potential. By entering an address, a report is provided in real-time of the estimated potential solar energy production for that roof, including environmental and financial benefits. Also, by continuing to adopt renewable energy technologies including solar and storage on City facilities and land where feasible, the City demonstrates leadership.
- As adoption of renewable energy, and certainly interest from residents and businesses continues to grow towards mass adoption (anticipated exponential growth) to meet TransformTO goal of 50% of energy use from renewables before 2030, City staff will work with partners to review opportunities to streamline grid connection, and City regulatory and non-regulatory processes.
- Also, while solar hardware costs have fallen dramatically in recent years, "soft costs," such as grid connection, permitting, installation, financing, and related processes have not. Soft costs are driven up when processes for going solar are slow or inefficient. On average, a home roof top solar installation takes two weeks for on-site physical installation, versus over 20 weeks for an applicant to get all the necessary processes completed. City Divisions and partner agencies are working with industry and stakeholders to look at ways to improve this ratio.

RECOMMENDATIONS

The Executive Director, Environment & Climate Division recommends that:

1. City Council direct the Executive Director, Environment & Climate to continue to work with Toronto Hydro to accelerate efforts to streamline the grid interconnection process for solar and storage projects by:

a) identifying opportunities to streamline the interconnection process for small-scale projects with the aim to make it faster, cost effective, and easier for residents, and implement changes in the near-term, based on best practices.

b) having Toronto Hydro share its efforts to remove distribution system constraints that prevent customers from installing solar or storage, and identifying actions to remove or reduce information barriers, such as the location of grid constraints or expected interconnection timelines and costs, that can slow the interconnection of small-scale solar.

2. City Council direct the Executive Director, Environment & Climate, in consultation with Corporate Real Estate Management, and relevant divisions and agencies to work together to:

a) Develop a corporate standard for combining re-roofing programs/projects with roof-top-solar installations on City buildings, based on solar photovoltaic (PV) feasibility, funding availability and alignment with the capital plan.

b) Develop a corporate standard to assess the feasibility of surface parking lots for solar PV carport opportunities as part of repaving projects in the asset management planning/program.

3. City Council authorize the Deputy City Manager, Corporate Services, or their designates, to negotiate amendments to the Joint Development Agreement, dated April 4, 2018, between the City of Toronto and Enwave Energy Corporation (“JDA”) on terms acceptable to the Interim Deputy City Manager, Corporate Services, and in a form satisfactory to the City Solicitor, as a condition for the City agreeing to renew the JDA for a second 5-year term.

4. City Council direct the City Manager or their designates, in consultation with relevant City Divisions, Agencies and Corporations, to establish a framework for reviewing proposals to establish renewable thermal energy infrastructure under City land assets to reduce emissions in buildings.

5. City Council direct the Executive Director, Environment & Climate, Executive Director, Corporate Real Estate Management, and the Director, Waterfront Secretariat in City Planning to establish a framework for reviewing energy projects that require locating heat exchange infrastructure on the Lake Ontario lakebed and to consult with the Province of Ontario and the Government of Canada on a combined regulatory approach to better facilitating such projects.

6. City Council direct the Executive Director, Environment & Climate, in consultation with relevant City Divisions, Agencies and Corporations, involved with any of the initiatives discussed in this report, to report to the Infrastructure and Environment Committee on the status and progress of the above recommended directions in alignment with the annual TransformTO reporting requirements.

FINANCIAL IMPACT

There are no immediate financial impacts to current budgets arising from the recommendations contained in this report. Any related potential future financial impact will be communicated in report back to Committee and Council.

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

EQUITY IMPACT

The TransformTO Net Zero Strategy (TransformTO) and contributing City plans and strategies have the potential to impact equity significantly and positively in Toronto. The outcomes of climate action can improve equity, economic prosperity, community resilience and health when implemented with equity as a core focus. The Net Zero Existing Buildings Strategy (the Strategy), a key strategy supporting the City's net zero by 2040 target, is designed to accelerate the update of retrofits by home and building owners, while maximizing benefits and minimizing potential harms to building owners and tenants.

As the City scales existing renewable energy programs and develops new ones, consideration will be given to affordability concerns of owners in both the commercial and residential sectors.

The Environment & Climate Division is in the process of developing equity indicators for actions associated with TransformTO. Subsequent progress reports on the TransformTO and the Strategy will include more detailed analysis about the impacts of climate actions on equity deserving groups.

DECISION HISTORY

On October 11, 2023, City Council adopted Member Motion 2023.MM11.25 that directs the Executive Director, Environment & Climate to include in the report on renewable energy programs an update on activities underway at the City on large scale battery storage. <https://secure.toronto.ca/council/agenda-item.do?item=2023.MM11.25>

On May 10, 2023, City Council received Toronto Hydro and City of Toronto Memorandum of Understanding for Toronto Hydro's Climate Advisory Services that sets out how the two parties will coordinate to advance climate action. <https://secure.toronto.ca/council/agenda-item.do?item=2023.EX4.2>

On July 19, 2022, City Council authorized the General Manager, Toronto Water to review and approve up to nine additional wastewater energy projects as proposed by Noventa Energy Partners, or affiliate thereof, provided the projects generate benefits to the City and do not create inefficiencies or complications in the operation and maintenance of the City's sewer collection and wastewater treatment systems. <https://secure.toronto.ca/council/agenda-item.do?item=2022.MM47.61>

On December 15, 2021, City Council adopted the report, TransformTO - Critical Steps for Net Zero by 2040 (2021.IE26.16). In adopting that report, City Council endorsed the TransformTO Net Zero Strategy on climate, including the TransformTO Short-Term Implementation Plan 2022-2025. City Council adopted the community-wide target of net zero greenhouse gas emissions by 2040 and interim targets.

<https://www.toronto.ca/legdocs/mmis/2022/mm/bgrd/backgroundfile-228796.pdf>

At its meeting on November 17, 2021, City Council adopted decision 2021.IE26.18 that directed the Deputy City Manager, Corporate Services, and the Deputy City Manager, Infrastructure & Development Services, to establish a working group to develop an implementation plan that includes, without limitation, post-screening application review process and procedures, design and technical standards, template agreements, real estate valuations, and project revenue allocations, and to report back to the Infrastructure and Environment Committee with details about the implementation plan for the WEP Program and with recommendations for authority needed to launch the full program. <https://www.toronto.ca/legdocs/mmis/2021/ie/bgrd/backgroundfile-173428.pdf>

On March 26, 2018, Council authorized the Deputy City Manager, Internal Corporate Services to enter into the Joint Development Agreement between the City and Enwave on the terms set out in Attachment 1 to the report (March 8, 2018) from the Deputy City Manager, Internal Corporate Services, and such other terms as may be satisfactory to the Deputy City Manager, Internal Corporate Services, and in a form satisfactory to the City Solicitor. <https://secure.toronto.ca/council/agenda-item.do?item=2018.EX32.8>

COMMENTS

The TransformTO Net Zero Strategy (TransformTO) is the City's climate action strategy to reach net zero greenhouse gas (GHG) emissions by 2040 and was adopted by City Council in December 2021. It includes a set of low-carbon goals and short-term actions to reduce Toronto's GHG emissions while improving health, encouraging economic growth, improving social equity and increasing climate resilience. TransformTO identifies key GHG emitting sectors – buildings, transportation and waste. Achieving Toronto's goals will require:

- coordination and accountability across all City divisions, agencies and corporations;
- engaging with Toronto residents, organizations and businesses;
- seeking additional City authorities to effectively scale-up and implement strategies and programs; and
- significant investment and coordination with other orders of government. The full financial impacts for the required investments to achieve net zero by 2040 are still to be determined.

Technical modelling suggests that over the next thirty years, the total investment required by the entire community, that is, the City corporation, the business community, other levels of government and individual residents, to retrofit existing buildings is \$145 billion. This number includes the financial investments made by homeowners towards retrofitting an estimated 476,000 homes and buildings, or about 27,000 home retrofits each year until 2040, as well as individual purchases of 333,000 electric vehicles before 2030. These investments will need to be complemented by provincial government actions to support and maintain a clean and carbon-free provincial electricity grid. The City will work to regulate, advocate and facilitate transformation in five priority areas:

- Demonstrate carbon accountability by establishing a carbon budget for its own operations and the community as a whole.
- Continuously improve the Toronto Green Development Standard (TGS) towards 100% net-zero emission new buildings by 2028 or earlier and establish emissions performance standards for existing buildings across Toronto.
- Increase access to low-carbon transportation options, including walking, biking, public transit and electric vehicles.
- Increase local renewable electricity energy to contribute to a resilient, carbon-free grid.
- Increase local renewable thermal energy to accelerate reduction in natural gas use.

The City of Toronto has vast untapped renewable energy potential. For example, rooftop solar in Toronto could produce the equivalent energy to power 800,000 homes, and new district energy systems can provide low-carbon thermal energy for entire new communities in Toronto.

Unlocking this potential will require a collaborative effort by City Divisions and partners to facilitate development and reduce impediments to renewable energy to meet the City's ambitious climate goals. The City has innovated on renewable energy programs and associated initiatives to execute on these climate goals. Below are key strategies to advance the City's renewable energy programs:

- SolarTO: The City can facilitate solar adoption via the SolarTO map of roof-top solar potential and by working with partners, including Toronto Hydro, to streamline regulatory and non-regulatory processes.
- Corporate Solar PV: Combining solar PV projects with planned re-roofing and parking lot resurfacing projects will advance uptake across City buildings.
- Wastewater Energy Projects: Utilize wastewater flows from the City's sanitary sewer system, specifically large sanitary trunk sewers for noncontact thermal energy exchange, which is used to cool and heat buildings renewably and thereby reduce fossil fuel burning and reduce CO2 emissions from these buildings. A wastewater energy pilot project is currently under construction in Toronto at Toronto Western Hospital (TWH) which is being delivered by Noventa Energy Partners ("Noventa") under an agreement signed with the City in 2021.
- Renewable District Energy (aka Low Carbon Thermal Energy Networks) – Toronto's First Net Zero New Community: The Etobicoke Civic Centre Precinct is the first project delivered under the Joint Development Agreement between the City and Enwave and will deliver one of Toronto's first near-zero carbon communities.
- Renewable Thermal Energy Infrastructure Under City-owned assets: Establishing a review process for requests to locate for low carbon thermal energy infrastructure under City land could improve feasibility for more projects.

- **Shallow Lake-Based Heat Exchange:** Building on the success of the first City-owned lake-based heat exchange system at the Waterfront, there is opportunity to facilitate similar projects.
- **Deep Geothermal in the Waterfront:** The City, in partnership with WaterfrontTO, is exploring the potential of deep geothermal as a direct energy source to inform future business and energy infrastructure planning initiatives in large development precincts.
- **Battery Energy Storage System (BESS) Installations on City-Owned Land:** The City is working with Toronto Hydro, agencies and stakeholders to identify suitable City-owned locations to site battery systems to enable more renewable energy integration.

SolarTO Program

The City's SolarTO program helps Toronto residents, businesses and institutions with their decisions to adopt solar and storage and helps transform Toronto into a 'Solar Ready City' that is prepared for and supportive of mass adoption of solar. By simplifying local processes, mainly grid interconnection, but also opportunities for simplified regulatory and non-regulatory processes, the City along with Toronto Hydro and partner divisions can make it easier for residents and businesses to install solar and storage, and equally importantly get ready for the anticipated exponential growth in renewable energy adoption towards TransformTO goal of 50% of energy use from renewables before 2030.

While solar hardware costs have fallen dramatically in recent years, "soft costs," such as grid connection, installation, financing, and interconnection have not. By aiming for reduced complexity, cost and time involved in these processes, solar installations can become more financially viable. The City's Environment & Climate Division continues to work with Toronto Hydro to further streamline the solar and storage grid interconnection process. SolarTO, Toronto Hydro and The Atmospheric Fund (TAF) have established a monthly working group to accelerate the deployment of solar, including through streamlining the interconnection of distributed energy resources (DERs), which include solar and storage.

City Facilities

- The City has led on the installation of 110 roof-top solar installations on its facilities. This represents an approximate 5% adoption rate, which is significantly greater than the 1% adoption of roof-top solar installations community-wide. There are approximately 1,800 City-owned buildings (including Agencies, Boards and Corporations) with potential for rooftop solar PV resulting in a total estimated system capacity of 350 megawatts, and total electricity generation potential of 402,000 megawatt hours. Rooftop solar PV is best constructed on newly installed roofing. City-owned surface parking lots have potential for carport solar and should

be assessed for feasibility during resurfacing work. This will support alignment with the TransformTO Net Zero Strategy and Corporate Strategic Plan Priorities.

Combining Solar with Re-roofing Programs and Projects at City Facilities

- To accelerate roof-top solar PV installation on City facilities, the Environment & Climate Division has been working with asset management teams across the organization to combine solar with re-roofing programs, as well as parking lot reconstruction programs along with feasibility criteria, and procurement strategies.
- Generating electricity with solar PV has a quantifiable environmental impact and contributes to reduced greenhouse gas emissions. Through reduced utility costs, solar PV will more than pay for itself over its useful life, with free cash flow to relieve state-of-good repair (SOGR) budget pressures. Solar panels on roofs and parking lots remove heat and extend asset life spans. Incorporating renewables enhances resilience at both the building and grid level when paired with battery storage. Solar PV tends to be productive during times of high energy demand and decreases the need for generation at natural gas peaker plants, resulting in reduced GHGs.
- The Corporate Real Estate Management (CREM) Division is leading the development of the Owner's Project Requirements and Standard Specifications, aimed at establishing a standardized framework for the design and construction of building system replacement in the City. The Environment & Climate Division will contribute to this framework by providing input on functional and performance requirements for re-roofing in anticipation of solar PV installations.
- The recommendation targets buildings undergoing re-roofing (and recently re-roofed buildings) and surface lots slated for reconstruction for installation of solar PV, all in one project. By combining re-roofing and solar, soft costs are reduced, installation costs are also reduced, and warranty requirements are satisfied on the new roofing membrane. The solar PV portion of the projects are to be procured using the existing design-build agreement (using existing City solar PV project RFP documents).

SEPF funding

- Divisions as well as Agencies, Boards and Corporations (ABCs) can use the Environment & Climate Division's Sustainable Energy Plan Financing (SEPF) low-interest loan program to finance roof-top solar PV installations. Loan repayments are from savings in reduced electricity grid purchases. The loan amortization term is up to 30 years.

Next steps to scale solar on City Facilities

- To continue work on solar PV projects on City facilities, the next steps include developing a set of purchasing documents for combined re-roofing and solar projects, as well as, parking lot reconstruction and car port solar projects, conducting market sounding to test and finalize procurement documents, and liaise with asset

owning divisions and Purchasing & Material Management Division (PMMD) for implementation.

Wastewater Energy Projects

In 2021, City Council endorsed the use of the City's wastewater large trunk sewer infrastructure, where feasible, to facilitate renewable thermal energy projects. In 2022, City Council authorized the General Manager, Toronto Water to review and approve up to nine additional wastewater energy projects as proposed by Noventa Energy Partners, provided the projects generate benefits to the City and do not create inefficiencies or complications in the operation and maintenance of the City's sewer collection and wastewater treatment systems.

One wastewater energy pilot project is currently under construction (operation to commence in 2024) at Toronto Western Hospital (TWH) which is being delivered by Noventa Energy Partners ("Noventa") under a 2021 energy-transfer-agreement signed between Noventa and the City. This project will connect to and utilize wastewater flows from the Mid-Toronto Interceptor sanitary trunk sewer for noncontact thermal energy exchange, which will be used to cool and heat TWH's buildings. Once operational, this project is expected to reduce TWH's natural gas use by an estimated 90 per cent, which equates to an estimated reduction of TWH's CO₂ output by approximately 8,400 tonnes annually.

While the TWH wastewater energy project is under construction, an interdivisional working group was established in Q2 2023, consisting of City staff from Environment & Climate, Toronto Water, Corporate Real Estate Management, Transportation Services, Engineering & Construction Services, Legal Services and Financial Planning to consider requirements for the review and approval of other wastewater energy projects that may be proposed to the City in future. Topics of discussion of the working group have included:

- Proposal circulation, review and commenting, including fee structures
- Engineering design standards for sanitary trunk sewer connections
- Delegated authorities required for project approvals
- Policy development
- Template agreements
- Permit requirements
- Real estate valuations and methodology
- Allocation of project revenues.

To date, the interdivisional working group has developed a five-stage internal review and approval process that could be implemented for the City's consideration of future potential wastewater energy projects. Interdivisional discussions continue concerning the review and approval process and the aforementioned topics.

Finally, Toronto Water and other divisional staff have been engaged with Noventa during the construction of the TWH wastewater energy project. Most recently, a tour of the site by City staff took place on September 21, 2023. Once the wastewater energy project at TWH is commissioned and operational, Toronto will collect flow monitoring

data and monitor any potential impacts of the project on the Mid-Toronto interceptor trunk sewer, which will inform Toronto Water's consideration of future potential wastewater energy projects.

Renewable District Energy – Toronto's First Net Zero New Community

On April 4, 2018, the City of Toronto signed a joint development agreement ("Joint Development Agreement") with Enwave Energy Corporation ("Enwave") at the direction of City Council after selecting Enwave in a competitive process to find a development partner to deliver and advance district energy systems on City property. In the same decision that authorized City staff to enter in the Joint Development Agreement, Council directed Build Toronto, with administrative support from CreateTO, to act as a limited partner for the City (or in a similar capacity with respect to any similar structure) for any low carbon thermal energy network projects undertaken pursuant to the Joint Development Agreement.

- The Etobicoke Civic Centre Precinct is a 17.91-acre site, located at the intersection of Bloor Street and Kipling Avenue. This would be the first project delivered under the Joint Development Agreement. The site is comprised of seven (7) blocks, including the new Etobicoke Civic Centre, a public park, and five (5) development blocks. The joint project aims to develop a geothermal district energy system and enable the development of the City's first near zero carbon community.
- The original approach under the Joint Development Agreement contemplated a limited partnership approach unless another approach of equal or lesser risk was available. For the Etobicoke Civic Centre Precinct, CreateTO, in consultation with City staff, determined that an alternative approach, using a project agreement with income participation based on a percentage of consumption charges, was a simpler and more suitable option that provides more certainty and transparency in respect of the revenue sharing, and is within the scope of Council's direction. With a broad indemnity from Enwave to protect the City as well as a limited partnership arrangement and with additional Council approval on the new approach, the parties have now moved forward with the project.
- A joint development team consisting of City and Enwave staff continuously work to identify and propose potential projects where the City can play an active role by leveraging City-owned assets. Project Coordinators for the City and for Enwave review the work of a Development Team to move from a potential project to a project that can be recommended to Council and the Enwave Board for approval, respectively.
- This report seeks authority from Council to renew the Joint Development Agreement, with any mutually agreed-upon changes, based on the experience so far, as per the previously authorized 5-year renewal process.

Renewable Thermal Energy - hosting/encroachments below grade

To meet emissions reductions and renewable energy targets established by TransformTO, and to ensure clarity and consistency analyzing requests to encumber City-owned land assets, Environment & Climate is seeking direction to work with relevant City Divisions, Agencies and Corporations to establish a review process for requests to host sub-surface low carbon thermal energy features under City-owned land assets, in cases of last resort - other land/options are not available/feasible.

Shallow Lake-Based Heat Exchange (Lake Based Geothermal)

The City recently completed an ambitious comprehensive net-zero emissions energy retrofit project at the City Waterfront Building located at 627/635 Queens Quay West. One of the main features of the project was an innovative lake-based thermal exchange system that relies solely on electricity to provide 100% of the heating and cooling for the building.

This is the first lake-based heat exchange system at a City-owned facility. The hydrothermal system significantly improves the efficiency of the systems that heat and cool the building. The new cooling system uses lake energy, eliminating the need for a cooling tower (and water use), while improving the efficiency of the system's chiller. The new heating system uses heat pumps instead of gas-fired boilers, producing more than twice the amount of heat per energy inputted into the system.

As the City collects data over the next two years to back up project results, there is an opportunity to further explore lake-based thermal exchange for heat pumps providing heating and cooling as a reliable option for building retrofits and new buildings located on the waterfront.

Next Steps

- Next steps will include identifying and working with stakeholders to map lakebed ownership and create a process that will assist interested parties navigate the regulatory aspect of project implementation, as well as establish a framework for reviewing conceptual project proposals.

Deep Geothermal Potential in the Waterfront

In an effort to support the development and implementation of low-carbon thermal energy networks (district energy systems) that are necessary to achieve Toronto's Net-Zero Strategy, the City partnered with WaterfrontTO to explore deep geothermal systems at a depth of 5,000 to 7,000 meters below ground. These systems could provide zero-carbon, high-grade, baseload heating for buildings in the Port Lands, including Villiers Island, and connect into existing district energy infrastructure to supply buildings elsewhere in downtown Toronto.

- For the City of Toronto to assess the technical and commercial feasibility of a deep geothermal system in Toronto, the magnitude of deep geothermal resources must be studied and established, including the subsurface thermal and geological properties.
- This deep geothermal study seeks to collect data and describe these subsurface geological and thermal properties at a target depth of 2,000 meters, as key inputs to future business and energy infrastructure planning for Villiers Island, the broader Port Lands and other large development precincts.
- The project was designed in three phases with decision-making milestones. The City and WaterfrontTO have retained the services of an engineering consulting firm, RESPEC, specialized in deep geothermal exploration in Canada. The project is advancing towards drilling operations.

Battery Energy Storage System (BESS) Installations on City-Owned Land

The pursuit of utility-owned and operated Battery Energy Storage System (BESS) installations represents a significant step towards realizing Toronto Hydro's commitment to renewable enablement and grid modernization. The Environment & Climate Division is assisting Toronto Hydro in identifying potential BESS projects sites on City-owned land that will contribute to a sustainable and resilient energy future.

- BESS systems are usually composed of multiple Lithium-Ion Iron Phosphate (LFP) batteries housed in a small shipping container sized enclosure. Nine priority feeders around the City have been identified by Toronto Hydro as potential areas for implementing BESS projects. The deployment of BESS systems in these locations will help enable more renewable energy integration.
- The Environment & Climate Division and Toronto Hydro have worked to overlay City-owned properties onto priority feeder maps. This process aims to identify candidate lands suitable for Battery Energy Storage System (BESS) installation. Thus far, the Environment & Climate Division has reached out to the relevant Divisions/Agencies with jurisdiction over these candidate properties to initiate talks regarding BESS installation and discuss any associated site limitations, safety concerns, and other considerations. The Environment & Climate Division will continue to collaborate and seek out partnerships with different Divisions to implement BESS projects on City-owned land.
- Battery storage will play an increasingly important role in achieving the City's net zero target. Batteries can be deployed at multiple scales, including at the residential scale to enhance solar PV systems; provide emergency backup power; and deliver grid benefits such as load-balancing, deferring system expansion and improving power quality. The Environment & Climate Division is aware that Toronto Fire Services and Corporate Real Estate Services are currently working on policies for lithium-ion battery fire prevention and control.

Outstanding Council Mandates

The following table provides responses on outstanding mandates from Council.

Council Decision	Response
<p>Council Decision Part 1b. request the Director, Environment and Energy, in consultation with the Chief Planner and Executive Director, City Planning, to set goals to limit new natural gas expansion, and sunset the sale of new natural gas fired equipment and report back in 2023 with actions to be implemented to support this endeavour;</p>	<p>Natural gas utilities asset management decisions and rates are regulated by the province with no relevant delegated authority to municipalities. However, the City of Toronto has set GHG mandatory emissions performance limits for new buildings through the Toronto Green Standard (Tier 1). Emission Performance Standards for existing buildings are also being explored.</p>
<p>Council Decision Part 25. City Council request the Director, Environment and Energy to develop a plan to provide financing support for low carbon thermal energy systems, potentially including the use of Local Improvement Charges or other financial mechanisms, as well as mandatory connections or connection ready and low temperature HVAC design guidelines and standards for new buildings and report back in 2023 with implementation in 2024.</p>	<ol style="list-style-type: none"> 1. Low carbon thermal networks, including district energy companies active in Toronto, have received funding/financing from Portfolio Development from Canada Infrastructure Bank (CIB). From discussions with energy developers, there does not seem to be a need for municipal financial support at this time. 2. Developers are incentivized to use low carbon energy systems in several ways, including: City Planning’s Development Charge Refund Program, which was improved in 2022; and the ability to repurpose mechanical penthouse space for additional residential units through the rezoning process. 3. Mechanical System Design Guidelines for Low Carbon Buildings - Voluntary Design Guidelines for Existing and New Buildings were developed in 2021.
<p>Council Decision Part 26. City Council request the Interim Director, Environment and Energy to provide a clear definition of low carbon thermal energy sources in order to enable monitoring of progress against the target at their next annual report on the status of TransformTO.</p>	<p>Low Carbon Thermal Energy Sources are sources that displace fossil-fuel based, high carbon energy sources with alternative low carbon sources such as, but not limited to geo-exchange, geothermal, wastewater energy, lake-based exchanges, solar thermal, biomass, biogas.</p>
<p>Council Decision Part 40. City Council request the Director, Environment and Energy to report to the Infrastructure and Environment Committee on the following:</p>	<p>See responses to Council Decision Parts 40e, 40f, 40g, 40h, and 40i below.</p>

<p>e. district energy plans and other successful district energy plans that the City is aware of</p>	<p>Environment & Climate staff monitor all new and existing district energy systems. There are approximately eight existing systems in Toronto with several more under construction, near completion or in the planning stages, including the recently announced Etobicoke Centre Precinct.</p> <p>In October 2023, staff began surveying and collaborating with district energy system developers, owners and/or operators to develop a reporting tracker for new developments, system expansion and decarbonization of legacy systems.</p>
<p>f. the number of developments in the last two calendar years that have been approved that have Geothermal;</p>	<p>Environment & Climate staff track all new development applications and report on proposed energy systems, including geo-exchange.</p> <p>Since November 1, 2022, Environment & Climate Division staff have approved the energy model for nine development applications proposing the use of geo-exchange.</p> <p>In October 2023, staff began surveying geo-exchange system developers, owners and/or operators with the intent to report annually on new system development through TransformTO updates.</p>
<p>g. the ideal size for Geothermal application for a development – number of units or size of site;</p>	<p>There are no size limitations, which is a key benefit of geo-exchange as it can work at any scale.</p>
<p>h. an investigation of the green standards to include options for Geothermal; and</p>	<p>Toronto Green Standard (TGS) is performance based and purposely technology agnostic. However, geo-exchange is one of the most effective technologies to displace natural gas use in buildings.</p>
<p>i. all possible City operations or operations of Agencies and Corporations where significant energy capture and energy storage could take place.</p>	<p>Environment & Climate Division is currently working with Toronto Hydro and City divisions and agencies to find a suitable City-owned location to host grid-scale battery storage to relieve constrained feeders. Environment & Climate Division continues to work with the industry to develop and advance technical solutions. Unfortunately, technologies for long-duration energy storage are still in their infancy.</p>

<p>Short Term Action 4i. Work with industry experts to explore limiting the expansion of natural gas systems and reversing system growth, where feasible, and limiting installation of natural gas equipment.</p>	<p>Natural gas utilities asset management decisions and rates are regulated by the province with no relevant delegated authority to municipalities. However, the City of Toronto has set GHG mandatory emissions performance limits for new buildings through the Toronto Green Standard (Tier 1). Emission Performance Standards for existing buildings are also being explored.</p>
<p>Short Term Action 6. Address barriers and develop strategies to increase the deployment of renewable energy and storage technologies, including but not limited to solar, wind, biomass, geothermal, waste heat recovery and heat pumps.</p>	<p>This update report has been developed in response to this Council Directive.</p>

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