

TransformTO: Critical Steps for Net Zero by 2040

Date: November 19, 2021

To: Infrastructure & Environment Committee

From: Deputy City Manager, Corporate Services

Wards: All

SUMMARY

The climate crisis grows more urgent every year. The window to make significant and lasting change is disappearing. Action must happen immediately and it must be at the necessary scale required to respond to this crisis.

In 2017, TransformTO was unanimously approved by City Council demonstrating Toronto's commitment to a global call for action to limit global temperature rise in line with international goals. Since 2017, the Intergovernmental Panel on Climate Change (IPCC) has shown that to limit global temperature rise to below 1.5 degrees Celsius, cities globally need to achieve carbon neutrality by 2050 and halve global emissions by 2030.

City Council's 2019 declaration of a global climate emergency shifts Toronto's focus to align with the IPCC's recommended pathway - net zero by 2050 or sooner.

This Report recommends that Toronto adopt a new net zero by 2040 goal. By doing so, Toronto will ensure alignment with the 2030 trajectory to meet the necessary scientific-based commitments to keep the planet's temperature habitable.

Technical modelling of Toronto's net zero pathway shows us that in order to reach net zero greenhouse gas (GHG) emissions by 2050 or sooner, Toronto must first be on the correct trajectory for achieving its 2030 City Council adopted goal of 65 per cent emissions reduction from 1990 levels. Without aligning our action and implementation to that steeper trajectory, net zero by 2040 or 2050 will be out of reach.

The City is taking action to tackle Toronto's emissions through established programs and major policy achievement such as the Net Zero Existing Building Strategy, Net Zero Carbon Plan for City-owned buildings, an update to the Toronto Green Standard, the Electric Vehicle Strategy, advancing the City's Cycling Plan, and greening City and TTC fleets. Steady progress has been made to reduce emissions in recent years and community-wide GHG emissions have decreased since 1990. Toronto is on track to achieve its 2020 GHG emissions target of a 30 per cent reduction from 1990 levels. Despite population growth, community-wide emissions continue to decline while Toronto's gross domestic product (GDP) rises. The decrease in GHG emissions in

recent years can be attributed to a less carbon intensive electricity grid and lower transportation emissions from gasoline and diesel fuels.

Toronto's current 2019 greenhouse gas inventory shows that our emissions are currently tracking on the trajectory of an 80 per cent reduction by 2050, from 1990 levels, however, emissions have not decreased fast enough in recent years. Data shows that acting incrementally will not be enough to put us on the net zero trajectory. Rapid action to scale up existing programs, additional authorities for the City of Toronto (City) to implement nimbly and effectively, significant levels of investment and coordinated action with other levels of government will be needed to match City Council's ambition.

TransformTO Net Zero Framework

The TransformTO: Critical Steps for Net Zero by 2040 Report approach is presented in the following parts:

- This staff report outlines the rationale, roles and opportunities needed for successful delivery on climate action, and presents an overview of the actions the City will take to reach the 2030 interim targets
- Attachment A is the TransformTO Net Zero Strategy Short-Term Implementation Plan 2022 to 2025.
- Attachment B is the TransformTO Net Zero Strategy, which includes the rationale behind the net zero pathway and opportunities needed to successfully reach the net zero target.
- Attachment C is the TransformTO Net Zero Framework Technical Report, which provides details on the pathway and specific actions that can be taken by the City, other governments, residents, and businesses.
- Attachment D provides highlights of Toronto's programs that are reducing emissions.
- Attachment E provides a summary of public and stakeholder consultations from 2018 to 2021 that have supported the development of this strategy and actions.
- Attachment F responds to a City Council request on the impact of small engine law and garden equipment.

Achieving net zero is not simply a technology solution. The combination of attentive urban design, city planning, active transportation, and transit systems, changes in consumptive behaviour and supportive net zero consumer choices, will all need to work in step to cumulatively increase the efficiencies of corresponding urban systems.

No municipal government has the legislative tools or fiscal capacity to achieve ambitious targets on its own. Reaching net zero by 2040 will require additional authority or action from other levels of government, the private sector, and resident action. For example, the City of Toronto does not regulate electric vehicle sales targets, but the City can enable uptake through providing charging infrastructure. Similarly, implementation of the Existing Buildings Strategy to retrofit homes and buildings will require additional legal authority to set performance standards from the provincial government.

The Net Zero Strategy presents a set of 2030 interim targets for community-wide emissions as well as City of Toronto corporate targets to demonstrate leadership by

example. These targets are designed to reduce emissions by 6.8Mt in the next eight years. This is equivalent to about 2 million cars off the road. The 2030 targets presented in the Strategy are:

1. 100 per cent of new buildings are designed and built to be near zero greenhouse gas emissions;
2. 50 per cent reduction in greenhouse gas emissions from existing buildings, from 2008 levels; this means that approximately 100,000 buildings must be retrofitted in the next 8 years, or approximately 12,500 buildings per year;
3. 50 per cent of community-wide energy comes from renewable or low-carbon sources; this will mean that approximately 35 million MWh of energy will need to be sourced from renewable or low carbon sources
4. 25 per cent of commercial and industrial floor area is connected to low carbon thermal energy sources
5. 75 per cent of school/work trips under 5km are walked, biked or by transit
6. 30 per cent of registered vehicles in Toronto will be electric; this means that by 2030, an estimated 332,000 vehicles will need to be electric
7. Identify pathways to more sustainable consumption in City of Toronto operations and in Toronto's economy
8. 70 per cent residential waste diversion from the City of Toronto's Integrated Waste Management System
9. Reduce corporate emissions by 65 per cent, over 2008 levels, to demonstrate leading by example; this will mean that approximately 330 kt of emissions will need to be reduced cross-corporately

Achieving these 2030 targets requires action now. A summary of thirty (30) near-term actions to be implemented between 2022 and 2025 are listed below. More detailed descriptions of each action including their timeline for report back is included in the TransformTO Short-Term Implementation Plan 2022-2025 (Attachment A) and in the Net Zero Strategy (Attachment B).

Meeting Targets

Achieving the targets in the Net Zero Strategy will not just be the work of the City government. The City of Toronto Corporation can control only a small portion of Toronto's community-wide emissions directly -- nearly 5 per cent according to recent greenhouse gas inventories.

However, the City plays a clear role in defining the ways we build, travel, and consume and when policies are effectively implemented and programs are easily accessed to realize maximum uptake and engagement, our municipal government can have a greater impact on the community's emissions.

In order to meet the 2030 targets, the City will use its influence to regulate, advocate and facilitate rapid transformation in five critical steps:

- **Demonstrate carbon accountability locally and globally by establishing a carbon budget** – Leading by example, the City will establish a carbon budget to track climate actions against annual emission limits to drive accountability. The City's

actions will be measured against these limits each year until net zero is achieved, with any gaps in action identified and solutions proposed so we stay on course.

- **Accelerate a rapid and significant reduction in natural gas use** – Toronto will take further action to limit the use of natural gas. Natural gas use for water and space heating represents over half of Toronto’s total greenhouse gas emissions. In addition to new buildings eliminating natural gas use through the Toronto Green Standard, the Net Zero Existing Buildings Strategy articulates ambitious targets to replace conventional heating systems with more efficient electric heat pumps drawing from a green provincial electricity grid.
- **Establish performance targets for existing buildings** – Toronto will establish mandatory emissions performance reporting, disclosure, and emissions performance targets for buildings so we can better understand and limit emissions from our homes and buildings. These mandatory targets will be preceded by voluntary targets. Catalyzing the electrification of building heating systems, as a preferred alternative to the use of fossil-fuel heating systems, will be key.
- **Increase access to low carbon transportation options, including walking, biking, public transit and electric vehicles** – Toronto will increase the use of active and public transportation reduces greenhouse gas emissions, energy use and congestion while promoting equity and health benefits. The City will also advance options to incentivize electric vehicle adoption and disincentivize the use of carbon-polluting gasoline and diesel vehicles, through supporting the transition to electric vehicles.
- **Increase local renewable energy to contribute to a resilient, carbon-free grid** – Toronto will work in step with Toronto Hydro to successfully support the growth and prosperity of the city through reliable, uninterrupted electric service provision. By increasing opportunities for local renewable generation to be located within the City's boundary, Toronto will be more resilient and will contribute to a decarbonized provincial electricity grid.

Although these five steps will put the community on the correct path to 2030, it is critical that these steps be sustained through to the year 2040 in order to achieve net zero emissions by 2040. Technical modelling suggests that if every single resident, business, non-commercial institution, industry and the City of Toronto government itself was enabled to choose net zero choices now, 2040 is achievable.

Summary of Short Term Implementation Plan Actions (2022-2025)

100 per cent of new buildings are designed and built to be near zero greenhouse gas emissions, by 2030	
1	Ensure near zero emissions for all new construction
2	Evaluate and limit impacts of embodied carbon in construction

Greenhouse gas emissions from existing buildings are cut in half, from 2008 levels, by 2030

3 Advance Implementation of the Net Zero Existing Buildings Strategy

50 per cent of community-wide energy comes from renewable or low-carbon sources & 25 per cent of commercial and industrial floor area is connected to low carbon thermal energy sources, by 2030

4 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

5 Support adoption and mainstreaming of net zero, resilient energy sources for new and existing developments

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

7 Actively support, advocate to and partner with Toronto Hydro, as well as the Provincial and Federal governments and agencies, to decarbonize the provincial electricity grid, promote energy conservation and enable local renewable energy generation

75 per cent of school/work trips under 5 km are walked, biked, or by transit, by 2030

8 Expand biking and pedestrian infrastructure, including the rollout of cycling routes, bicycle parking and bike share at or near TTC stations

9 Increase existing bus and streetcar service levels to encourage shifts to low-carbon, sustainable transportation

10 Update and accelerate implementation of city-wide Transportation Demand Management Strategy

11 Develop tools to address emissions of greenhouse gases and air pollutants on an area or project level

30 per cent of registered vehicles in Toronto are electric, by 2030

12 Align the City's Electric Vehicle (EV) Strategy to the net zero goals and implement the EV Strategy

13 Determine options to incentivize EV adoption and disincentivize use of gas and diesel vehicles

14 Encourage the adoption of electric commercial and freight vehicles, including EVs and e-bikes for last mile deliveries

Identify pathways to more sustainable consumption in City of Toronto operations and in Toronto's economy	
15	Continue to pursue policy and programmatic interventions that help the City reach its aspirational goals of zero waste and a circular economy, and which identify pathways to more sustainable consumption in both municipal operations and in all sectors of the economy
70 per cent residential waste diversion from the City of Toronto's Integrated Waste Management System	
16	Continue implementation of the City's Long Term Waste Management Strategy which sets a goal of diverting 70 per cent of waste managed from City customers away from landfill, by focusing on waste reduction, reuse and recycling activities that promote resource conservation and reduce environmental impact
Develop and implement strategies to improve greenspace infrastructure to build climate resilience	
17	Increase canopy cover and biodiversity and enhance greenspaces
Ensure equitable implementation and ongoing improvement of engagement and reporting	
18	Support resident-led climate action and engagement
19	Work with Indigenous rights holders and urban Indigenous communities to share knowledge and learnings
20	Develop and implement youth engagement strategy
21	Design and launch a climate advisory group for 2022 and beyond to ensure implementation of the Net Zero Strategy is equitable and reflects the priorities and interests of the community
22	Develop equity indicators to be reported out as part of the TransformTO implementation status update
23	Encourage the growth of green industry to provide the products and services needed to enable a net zero cit
24	Leverage Live Green Toronto to develop and implement a city-wide climate action awareness campaign
Lead by Example – City of Toronto corporate greenhouse gas emissions are reduced by 65 per cent over 2008 base year	
25	Develop and apply a Climate Lens in decision-making
26	Design and implement a Toronto Carbon Budget

27	Ensure net zero City-owned buildings
28	Reduce emissions from City and Agency-owned vehicles
29	Encourage City staff to adopt sustainable and climate positive practices at work and in their commute
30	Lead by example in managing waste and producing renewable energy from biogas at City facilities

City staff will begin further analysis and engagement on the thirty (30) short-term actions outlined in Attachment A as the City transitions to implementation.

Before 2030, two short-term implementation plans will be presented to Council -- the first one identifies actions to be delivered 2022 to 2025 (Attachment A), and the second one covering the period from 2026 to 2030 will outline additional actions that will ensure that we are on track to reach the 2030 target. Detailed reports outlining recommendations for bylaws, policies, and new programs will be brought back to City Council for consideration starting in 2022 and continuing over the following four years. Included in this report back will be an assessment of our progress towards the goal of net zero by 2040.

For the most part, the short-term actions do not require Toronto to pursue dramatically new climate actions -- they require Toronto to do them faster and at a larger scale. Existing strategies and plans such as Electric Vehicle Strategy, the Toronto Green Standard, the Net Zero Existing Buildings Strategy, Corporate Real Estate Management's Net Zero Carbon Plan for City-owned buildings, and the TTC Green Bus Program are examples of plans that identify detailed steps and considerations to get to net zero.

The 2030 greenhouse gas emission reduction targets and short term actions have been developed through extensive consultation across City divisions and agencies, and with stakeholders and the public. Since 2019, the City has engaged over 5,000 residents, businesses, and other stakeholders to understand key priorities, opportunities and challenges. Consultations from recent years, particularly in 2021, have highlighted the issue of responding to the climate crisis with urgency.

Current City Plans and Investments

The City has approved a number of ambitious plans and targets to reduce emissions from its own operations, including the Corporate Real Estate Management's Net Zero Carbon Plan which was adopted earlier this year. The Net Zero Carbon Plan focuses on City-owned buildings. Beginning with the 2023 Budget, staff will be integrating the Net Zero Carbon Plan for City-owned buildings into the capital planning process synchronously with the application of a Climate Lens and Financial Planning's Asset Management Strategy. The City will continue to make investments every year to achieve City Council-identified emissions reduction targets and net zero emissions status in its buildings. Like the Net Zero Carbon Plan for City-owned buildings, the Sustainable Fleets Plan, the TTC Green Bus Program, and other key City plans will

follow a similar process. Implementation of these plans is underway and will go a long way to reduce emissions from City operations.

For the first time in Toronto's history, a Climate Lens was utilized in the 2021 budget process. Initial data reported through the Climate Lens identified that Toronto invested \$611.3 million on capital projects that have components related to GHG reduction or climate resilience in 2021. As 2021 reflected the first year of this initiative, data has not yet been collected across all divisions and agencies and these figures excluded climate investments made by key services such as Toronto Water, Toronto Community Housing Corporation (TCHC) and the Toronto Transit Commission (TTC). The 2022 Budget Process builds on the 2021 Budget process to evidence progress in cross corporate culture change including projects being flagged by programs that did not do so last year. City staff are working to capture investments directly related to climate action in the 2022 budget. For example, the recommended 2022 Rate-Supported Budgets for water, solid waste, and parking identify climate related investments. In addition to this investment, the City is making significant capital investments in the TTC – the 2021-2030 10-year Capital Plan totals \$11.907 billion and includes \$1.576 billion alone for vehicles such as buses, streetcars and subway cars, including the acquisition of electric buses to enable residents to reduce their transportation related GHG emissions. Further, Toronto has also issued \$630 million in Green Bonds which have financed a range of key climate projects targeting mitigation and resilience activities such as extending subway lines and expanding the local cycling network, to energy retrofits in social housing and flood protection projects.

Collaboration

Many challenges outside of the City's control have also been identified through consultation, including the slow pace of market transformation, labour force training and matching expertise for implementation, consumer education and awareness, education of service providers, strong provincial and federal policy and financial support for decarbonization.

This report emphasizes that in order to be successful, bold leadership and collaboration will be required from public and private stakeholders. Furthermore, innovative partnerships and business models must be supported and evolve and traditional economic priorities must include environmental cost-benefit analyses and climate outcomes. To summarize, climate action means collective action.

Lastly the opportunities to avoid 'lock in' of carbon emissions in city systems are being missed. Achieving the targets set out in this report, the TransformTO Short-Term Implementation Plan 2022-2025 (Attachment A) and the Net Zero Strategy (Attachment B) will require a different means of delivery and decision-making will need to be re-oriented so that the net zero choice becomes the best choice now and in the future.

RECOMMENDATIONS

The Deputy City Manager, Corporate Services recommends that:

1. City Council endorse the targets and actions outlined in Attachment B entitled TransformTO Net Zero Strategy (December 2, 2021) from the Director, Environment & Energy.
2. City Council approve the following community-wide greenhouse gas reduction targets:
 - a) 45 percent reduction in community-wide greenhouse gas emissions by 2025, from 1990 levels, and;
 - b) net zero greenhouse gas emissions by 2040.
3. City Council direct the Director, Environment & Energy to report back:
 - a) in the second quarter of 2025, with a status update on progress in meeting the City of Toronto's 2030 corporate and community-wide greenhouse gas reduction targets, as outlined in recommendation 2 and Attachment B titled TransformTO Net Zero Strategy dated (December 2, 2021) from the Director, Environment & Energy.
 - b) in the second quarter of 2025, with a four year implementation plan for 2026-2030 on any additional actions and authorities required to achieve the City of Toronto's 2030 greenhouse gas reduction target.
 - c) annually on progress towards achieving community-wide greenhouse gas reduction targets and 2030 goals.
4. City Council direct the City Manager, in consultation with all appropriate Divisions Heads, including the City Solicitor, or their designates, to develop and implement a plan that outlines how to refer to TransformTO Net Zero Strategy goals and targets as and where appropriate in all relevant:
 - a) submissions that the City of Toronto makes or the City of Toronto staff make in federal and provincial public comment processes; and
 - b) filings that the City of Toronto makes in proceedings before federal and provincial regulatory bodies, administrative tribunals and courts.
5. City Council authorize the Deputy City Manager, Corporate Services, or their designate, until December 31, 2030, to negotiate and enter into agreements, as may be required, to support the implementation of the City Council-adopted recommendations presented in the TransformTO Net Zero Strategy, dated December 2, 2021 with non-profit, public, and private sector organizations to:

- a) enter into non-competitive procurements under Toronto Municipal Code Chapter 195, Purchasing;
- b) collaborate on projects or initiatives;
- c) provide in-kind and/or financial support from the approved Environment & Energy Division budget on projects or initiatives; and/or
- d) receive funding,

on terms and conditions acceptable to the Deputy City Manager, Corporate Services, in consultation with the Director, Environment & Energy, and in a form satisfactory to the City Solicitor.

6. City Council authorize the Deputy City Managers to negotiate and enter into non-competitive agreements, including those with a value exceeding \$500,000 for which City Council approval would normally be required under City of Toronto Municipal Code Chapter 195, Purchasing, with companies that have won Climate Champion status through the MaRS Discovery District's Mission from MaRS Climate Impact Challenge, on the following conditions:

- a. that the provision of goods or services from the company will assist the City to reduce greenhouse gas emissions and is aligned with the City's Net Zero Strategy;
- b. that any agreement is within the budget of the respective Division within the Deputy City Manager's Service Area;
- c. that the agreement is on such terms and conditions satisfactory to the Deputy City Manager; and
- d. that the agreement is in a form satisfactory to the City Solicitor

7. City Council direct that the Chief Procurement Officer report, as part of the Annual Controller's Report, on any non-competitive agreement that the Deputy City Managers enter into with companies that have won Climate Champion status through the MaRS Discovery District's Mission from MaRS Climate Impact Challenge.

8. City Council authorize the City Solicitor, in consultation with the City Clerk, to submit a Bill to Council to codify the currently Council-adopted targets, strategies, policies, programs and initiatives pertaining to green energy and climate change, in the first instance from this report, as additional articles in Chapter 669 of the City of Toronto Municipal Code, as and where appropriate.

9. City Council direct the City Manager and Deputy City Managers, in consultation with the Director, Environment & Energy to report back by the first quarter of 2023 on:

- a. what aspects of existing City programs and/or by-laws aimed at reducing natural gas use in new and existing buildings need to be strengthened or accelerated; and
- b. what additional programs and/or by-laws aimed at reducing natural gas use in new and existing buildings need to be developed and implemented.

in order to achieve the greenhouse gas emission reduction targets as outlined in recommendation 2 and Attachment B entitled TransformTO Net Zero Strategy dated (December 2, 2021) from the Director, Environment & Energy Division.

10. City Council direct the Director, Environment & Energy, in consultation with the the Controller, the Director, Accounting Services, the General Manager, Transportation Services, the Chief Planner and Executive Director, City Planning and other appropriate City Divisions, to report in 2023 with options for financial and other incentives that the City could provide to encourage uptake of personal electric vehicles and disincentives to discourage use of fossil-fueled personal vehicles within the City of Toronto boundaries.

11. City Council direct the Director, Environment & Energy in consultation with the Controller, the Director, Accounting Services, the Chief Planner, and Executive Director, City Planning, Chief Building Official and Executive Director, Toronto Buildings, and other appropriate City Divisions, and with Toronto Hydro, to report back in the first quarter of 2023 on options for additional financial incentives, disincentives and other mechanisms to further encourage deep retrofits of existing buildings.

12. City Council direct the Director, Environment & Energy and the Chief Financial Officer and Treasurer to report back in the first quarter of 2023 on design and implementation options for a Toronto Carbon Budget covering corporate and community emissions in Toronto, with a goal of implementation by no later than 2025.

13. City Council request the Government of Ontario and provincial agencies and corporations to:

a) Develop and implement new or amend existing legislation, regulations, policies and/or programs in order to prioritize:

- (i) demand response and conservation as sources of electricity generation in IESO generation selection; and
- (ii) increase the share of renewable electricity generated on the provincial electricity grid.

b) Implement legislation, regulations, policies/or programs to encourage the transition to electric vehicles (EVs), including:

- (i) financial incentives for new and used EVs;
- (ii) financial incentives for home, workplace and fleet EV charging infrastructure;
- (iii) establish a provincial sales mandate for Zero Emission Vehicles ("ZEVs" are battery-electric vehicles, plug-in hybrid electric vehicles or hydrogen fuel cell vehicles) that meets or exceeds any federal sales mandate for ZEVs;
- (iv) support and encourage EV-ready new construction;

- (v) funding for publicly-accessible EV charging infrastructure; and
- (vi) maintain existing benefits for EV drivers (e.g. HOV lane access on provincial highways);

- c) Require all new and replacement equipment for building heating systems to be greater than 100 per cent efficiency.

14. City Council request the Government of Canada and federal agencies and corporations to:

- a) Create and enforce a national clean electricity standard to ensure decarbonization of the electricity grid as soon as possible;

- b) Ensure all new and replacement equipment for building heating systems be greater than 100 per cent efficient as soon as possible

- c) Implement new and maintain existing financial incentives to encourage the transition to electric vehicles, including:

- (i) maintain purchase incentives for new electric vehicles and providing purchase incentives for used electric vehicles;

- (ii) provide financial incentives for home, workplace and fleet electric vehicle charging infrastructure; and

- (iii) provide funding to provinces and municipalities for public electric vehicle charging infrastructure;

- d) Create and fund a national workforce and skills development strategy to enable a just net zero transition.

- e) Conduct a strategic review of international and national supply chain requirements and issues to ensure that municipalities have sufficient access to all goods and services necessary to enable a transition to the net zero emission economy.

- f) Provide mechanisms and tools to lower the risk to lenders or similar entities involved with financing projects that enable decarbonization at scale.

15. City Council direct the Director, Environment & Energy, in coordination with Executive Director, Social Development, Finance & Administration and the Chief Procurement Officer, Purchasing and Materials Management Division, to identify ways that the City can support the reduction of the greenhouse gas emissions associated with food the City of Toronto procures, in alignment with the City's Cool Food Pledge and the C40 Good Food Cities Declaration, and to report back in the second quarter of 2025 on the status of corporate food-related emissions and recommended actions for the TransformTO 2026-2030 short-term action plan.

FINANCIAL IMPACT

There are no additional financial impacts expected to the 2022 Budget Year arising from the recommendations contained in this report, however, significant future budget impacts are expected from affected divisions as the implementation of existing programs continue or are accelerated and as new actions are initiated. Any financial impacts associated with the short-term implementation actions for 2022-2025 identified in the Short-Term Implementation Plan 2022-2025 (Attachment A) will be included in the 2022 Budget for Council's consideration as part of the 2022 budget process and will be included in future year Budget submissions.

The full financial impacts of achieving the proposed 2025 GHG reduction target, the 2030 GHG target, and the net zero by 2040 target to the City of Toronto is unknown. Technical modelling estimates that the full investment required by the entire community, including the City, businesses, other levels of government, and residents, is \$57 billion over the next thirty years. For its part, the City will have to identify appropriate funding models and financial mechanisms to make these needed investments, which will include partnership with community organizations and businesses and other orders of government.

See Table 1 below for planned report back and budget cycle timing for the short-term actions that may require additional resources. The Environment and Energy Division is also exploring funding opportunities provided by other levels of government and associated programs to support the implementation of the Net Zero Strategy.

Short-term Action	Report Back Date	Proposed Implementation Timeline	Expected Budget Year (new or enhanced)	Divisions with potential budget/resource impacts
Buildings				
Evaluate and limit impacts of embodied carbon in construction	Q1 2023	Ongoing	TBD	City Planning
Advance Implementation of the Net Zero Existing Buildings Strategy (Refer to the Net Zero Existing Buildings Strategy, adopted by City Council in July 2021 for a detailed financial impacts and timing)	2022	Ongoing	2022	Environment & Energy, Toronto Buildings, Municipal Licencing and Standards, City Planning, Social Development, Finance and Administration
Energy				

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	Q2 2022	TBD	2023	Environment & Energy
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	Q4 2022	TBD	TBD	Environment & Energy
Transportation				
Expand biking and pedestrian infrastructure, including the rollout of cycling routes, bicycle parking, and bike share at or near TTC stations	N/A	Ongoing	2023	Transportation Services, TTC
Increase existing bus and streetcar service levels to encourage shifts to low-carbon, sustainable transportation	2022	Ongoing	TBD	Transportation Services, City Planning, TTC
Update and accelerate implementation of city-wide Transportation Demand Management Strategy	2022	2023	2023	Transportation Services, Environment & Energy
Develop tools to address emissions of greenhouse gases and air pollutants on an area or project level	2023	2024	2024	Transportation Services, City Planning
Align the City's Electric Vehicle (EV) Strategy to the net zero goals and implement the EV Strategy	Q4 2022	Ongoing	2023	Environment & Energy, Transportation Services, Toronto Parking Authority, Toronto Hydro, City Planning, Fleet Services, Municipal Licencing and Standards, Social Development, Finance and Administration, Corporate Real Estate Management, Economic Development and Culture

Determine options to incentivize EV adoption and disincentivize use of gas and diesel vehicles	Q4 2022	2023	2023	Environment and Energy, Transportation Services, Toronto Parking Authority, City Planning
Encourage the adoption of electric commercial and freight vehicles, including e-bikes and EVs for last mile deliveries	N/A	ongoing	TBD	Transportation Services, City Planning, Toronto Parking Authority, Toronto Hydro, Environment and Energy, Fleet Services
Waste				
Conduct a consumption based emissions inventory and identify targets that would meaningfully reduce consumption based emissions	Q2 2023	2024	2023	Environment & Energy
Engagement				
Support resident-led climate action and engagement	N/A	Ongoing	2023	Environment and Energy
Develop and implement youth engagement strategy	N/A	2022	2023	Environment and Energy
Design and launch a climate advisory group for 2022 and beyond to ensure implementation of the Net Zero Strategy is equitable and reflects the priorities and interests of the community	N/A	2022	2023	Environment and Energy
Encourage the growth of green industry to provide the products and services needed to enable a net zero city	Q3 2024	Ongoing	2023	Economic Development and Culture
Leading by Example				
Ensure net zero City-owned buildings	TBD	Ongoing	2023	Corporate Real Estate Management
Reduce emissions from City and Agency-owned vehicles	N/A	Ongoing	TBC	Fleet Services TTC, Corporate Real Estate Management

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

EQUITY IMPACT STATEMENT

This strategy has the potential to have a significant positive equity impact, but only if multiple needs are addressed and implementation is done with equity at the core.

Locally, the impacts of climate change will be felt by everyone, but some of us will feel its impacts more than others. We also know that the outcomes of the delivery of climate action can provide significant opportunities to improve equity, economic prosperity, resilience and health.

Systemic discrimination and past policy decisions, including Toronto's land use and transportation policies, have contributed to the continuing oppression of Indigenous people, racialized and other disproportionately impacted communities. As a result, certain communities are more impacted by issues of poverty, lack of services, and unequal opportunities. Moving forward, City policies need to work to address this. This Net Zero Strategy intends to understand these challenges as they relate to fighting climate change and inequity, and work to address them throughout implementation.

Ensuring that those facing the greatest impacts are meaningfully represented in program and policy development. Thoughtful program and policy design will also ensure that the benefits of our climate actions are felt by communities that have been hit hardest by social and economic injustices.

Reducing the emissions from our buildings means we will have to build new buildings to a high performance standard and retrofit and upgrade all buildings to ensure they are energy efficient. Building to this level of performance and retrofitting existing buildings will cost money up front. While these costs can save money in the long term, the upfront costs can be out of reach for some small businesses and low-income households. It will be important to ensure that costs of upgrades are not passed down to tenants and owners who cannot afford them.

The Net Zero Strategy intends to dramatically reduce greenhouse gas emissions from transportation by encouraging people to walk, cycle and use transit as much as possible, and by electrifying personal or commercial vehicles that are needed for any remaining trips. It is clear, however, that access to safe, continuous and inviting walking and biking infrastructure is not easily available for everyone in the city. Moreover, the cost to purchase a new electric vehicle can be high and not all buildings have charging available. As we transform our transportation system, it will be crucial that we ensure equitable access to safe, easy and affordable ways for everyone to get around.

As individual policies and programs recommended in the Net Zero Strategy undergo detailed design, thorough equity analysis will be conducted to ensure that they improve equity and support equity-deserving groups as we move towards a net zero future.

DECISION HISTORY

On July 14, 2021, City Council adopted several measures relevant to the present report.

Council adopted recommendations based on the findings of the Net Zero Existing Buildings Strategy (ExB Strategy). The ExB Strategy charts a path to a decarbonized and net zero emissions building sector. It presents the background information and set of recommended building-scale actions and city-wide policies necessary for the City of Toronto to transform its existing building sector, to achieve the City's climate targets while maximizing potential co-benefits and minimizing potential harms to owners and tenants.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.IE23.1>)

City Council considered the ExB Strategy and the Building Net Zero Emissions City Buildings: Corporate Real Estate Management's (CREM's) Net Zero Carbon Plan item together. CREM's Net Zero Carbon Plan was received for information by City Council. This plan describes how buildings in the City's portfolio will achieve net zero emissions status, contribute to the city-wide reduction of greenhouse gas emissions based on City Council-set targets, and lead by example, supporting the broader strategic work of TransformTO. The Plan identifies fuel switching and efficiency retrofits as the primary means of reducing emissions.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.IE23.2>)

Also on July 14, 2021, City Council adopted the Toronto Green Standard (TGS) Version 4 performance measures, a three-tier framework for new development with a focus on carbon reductions and green infrastructure enhancements. Changes made in TGS Version 4 are consistent with recommendations in the Building Net Zero Emissions City Buildings: Corporate Real Estate's Net Zero Carbon Plan and the Net Zero Existing Buildings Strategy. TGS v4 updates the standard to incorporate zero emissions buildings at the highest-performing voluntary tier, conducting materials emissions assessments of upfront embodied carbon from structural and envelope components, enhanced electric vehicle infrastructure requirements in certain building types, and restructuring the TGS to prioritize green infrastructure objectives.

Finally, on July 14, 2021, City Council endorsed the call for a Fossil Fuel Non-Proliferation Treaty. Council requested the City Manager to send a letter to the Prime Minister of Canada requesting the Federal Government to negotiate a global treaty for the non-proliferation of fossil fuels. Council also affirmed its ongoing commitment to the goals of the Paris Climate Agreement and the greenhouse gas reduction targets and aspires to meet its proportionate greenhouse gas reductions.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.MM35.29>)

On February 18, 2021, City Council approved the 2021 Capital and Operating Budgets. City Council directed the Environment and Energy Division (EED) to report back to the Infrastructure and Environment Committee in the third or fourth quarter of 2021 on delayed climate emergency commitments currently deemed "ongoing". Council requested that EED report back to the Infrastructure and Environment Committee in the

third quarter of 2021 on a climate lens that evaluates the climate impacts of major City decisions as part of the 2022 City Budget.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.EX21.2>)

On January 29, 2020, City Council approved the Electric Vehicle Strategy focused on the electrification of passenger vehicles. Council requested the Director of Environment and Energy to oversee engagement, implementation, and evaluation for the strategy.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.IE11.17>)

On October 2, 2019 City Council declared a climate emergency and strengthened Toronto's carbon-reduction goal by establishing a net-zero greenhouse gas emission target for Toronto by 2050 or sooner. In that decision, City Council committed to accelerating the implementation of TransformTO climate actions at every opportunity. City Council requested staff to report back in the second quarter of 2020 on a number of specific items, and include others in a TransformTO implementation plan. This report responds to those requests. Council's request to report back in the fourth quarter of 2020 on actions to achieve net zero will be the focus of a future Net Zero Strategy report.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.MM10.3>)

On July 4, 2017, City Council unanimously adopted TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto. TransformTO is the City's climate action strategy to meet Council's long-term, GHG-reduction target while creating an equitable, healthy, prosperous and resilient Toronto that benefits all.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.PE19.4>)

On December 13, 2016, City Council adopted the first short-term implementation plan for TransformTO. It set out actions to be taken by the City over 2017-20 to address climate change.

(<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PE15.1>)

In July 2007, Toronto City Council unanimously adopted the 64 consolidated actions proposed in the Climate Change and Clean Air Action Plan (item 2007.EX10.3) and the following community-wide greenhouse gas reduction targets:

- 6 per cent reduction against 1990 levels by 2012;
- 30 per cent reduction against 1990 levels by 2020; and
- 80 per cent reduction against 1990 levels by 2050.

COMMENTS

This TransformTO: Critical Steps for Net Zero by 2040 Report brings together the results of detailed technical emissions modelling and three years of public, stakeholder and internal divisional consultation to focus on five critical steps where accelerated emissions reduction action is imperative.

It then outlines in the attached "Strategy" (Attachment B) how these themes are translated into specific 2030 targets based on Toronto's current emissions state and the

highest carbon emitting sectors -- buildings, transportation and waste. Without aligning our targets and actions to match the steeper trajectory of 2030, net zero by 2040 or 2050 will be out of reach; therefore, the 2030 targets are the focal point and are further broken down into specific actions that put Toronto on an accelerated 2030 timeframe.

The key message here is that Toronto's climate actions were always the right ones -- they just need to be done much faster and at a much bigger scale.

Even though the scale of the global climate emergency extends beyond the City of Toronto's jurisdiction, achieving our climate goals will be an important contribution to this global effort.

Toronto's Action on Climate to Date

Implementation of TransformTO is well underway. In 2018, City Council fully funded the implementation of the TransformTO 2017-2020 short-term strategies which accelerated existing climate action and established new programs and policies that further engaged residents and local businesses.

A recent review of Toronto's financial commitment to climate action found that in the City's 2021 Capital Budget, 429 capital projects totalling \$611.3 million had some climate component related to the work while at the same time carrying out the regular and necessary business of the City.

A number of recently adopted policies which target buildings emissions (57 per cent of community-wide emissions) begin the process of phasing out natural gas through conservation, electrification, and renewable energy. Similarly, the 36 per cent of emissions from the transportation sector are predominantly being addressed through electrification of personal vehicles through the City's recently adopted Electric Vehicle Strategy.

To date, Toronto has also issued \$630 million in Green Bonds which have financed a range of key climate projects targeting mitigation and resilience activities such as extending subway lines and expanding the local cycling network, to energy retrofits in social housing and flood protection projects.

More information of some of the key policies and programs that have been implemented to date can be found in Highlights of Toronto's Programs to Date (Attachment D).

Developing the Strategy

The TransformTO Net Zero Strategy was developed over the course of 2019-2021 and consisted of two main components: technical modelling, and extensive internal and external consultation.

A. Technical Modelling:

In 2020, the Environment and Energy Division retained a consultant team to undertake an update to the scenario modelling from TransformTO (2017) to align actions to match

the Climate Emergency Declaration's targets of achieving net zero emissions by 2050 or sooner.

The combination of detailed technical modelling, a comparative financial analysis of costs and benefits of four different scenarios, and insights on the feasibility of implementing climate actions have informed the 2030 targets presented in this report and Net Zero Strategy for the highest emitting sectors - buildings, energy, transportation and waste.

A full report outlining the modelling process and analyses can be found in Attachment C or at www.toronto.ca/transformto

B. Community and Stakeholder Engagement

The actions presented in this report and Strategy have been developed through extensive consultation across City divisions and agencies, and with stakeholders and the public. Since 2019, the City has engaged over 5,000 residents, businesses, and other stakeholders to understand key priorities, opportunities and challenges of delivering on climate action. Several opportunities for engagement found that residents prioritize aggressive GHG reduction targets and implementation strategies that encourage immediate climate action. There continues to be considerable emphasis on ensuring that climate actions are equitable and affordable, particularly for seniors, renters and equity-deserving communities.

Consultations from recent years, particularly in 2021, have raised the issue of responding to the climate crisis with urgency.

The Net Zero Strategy is consistent with the recommendations of the Toronto Office of Recovery and Rebuild. Both emphasize the need to move Toronto forward (to build back better) rather than simply returning to the pre-COVID-19 state.

A summary of this consultation can be found in Attachment E – Summary of Engagements (2019 Reference Panel, 2019 Consultation Summary, TORR engagement, 2021 Engagement Summary) and reports on other consultation findings can be found online at www.toronto.ca/transformTO.

TransformTO Net Zero Strategy

The TransformTO Net Zero Strategy focuses on achieving an ambitious 2030 GHG emission-reduction target, a critical milestone on the path to net zero by 2040.

Achieving the 2030 Target is a Necessary Milestone on the Pathway to Net Zero

Nine million tonnes – this is where we need to be in 2030.

Toronto's latest published greenhouse gas inventory shows that despite emissions reductions since 1990, Toronto's emissions are currently at 15.6 million tonnes. While this is 38 per cent lower than 1990 levels and puts Toronto on track to achieve our 2020

target of a 30 per cent reduction ahead of schedule, it means that by 2030, we will need to halve our emissions to achieve a 65 per cent reduction.

This means that we must decline by an average of 1 million CO₂e per year to reach the 2030 target¹.

Figure 1 shows that buildings remain the largest source of GHG emissions in Toronto and are responsible for just over half (57 per cent) of GHGs emitted, primarily from natural gas used to heat space and water. Transportation is responsible for just over one third (36 per cent) of local GHG emissions, mainly from gasoline in personal vehicles. Waste is responsible for an estimated 7 per cent of GHG emissions, largely from landfills.

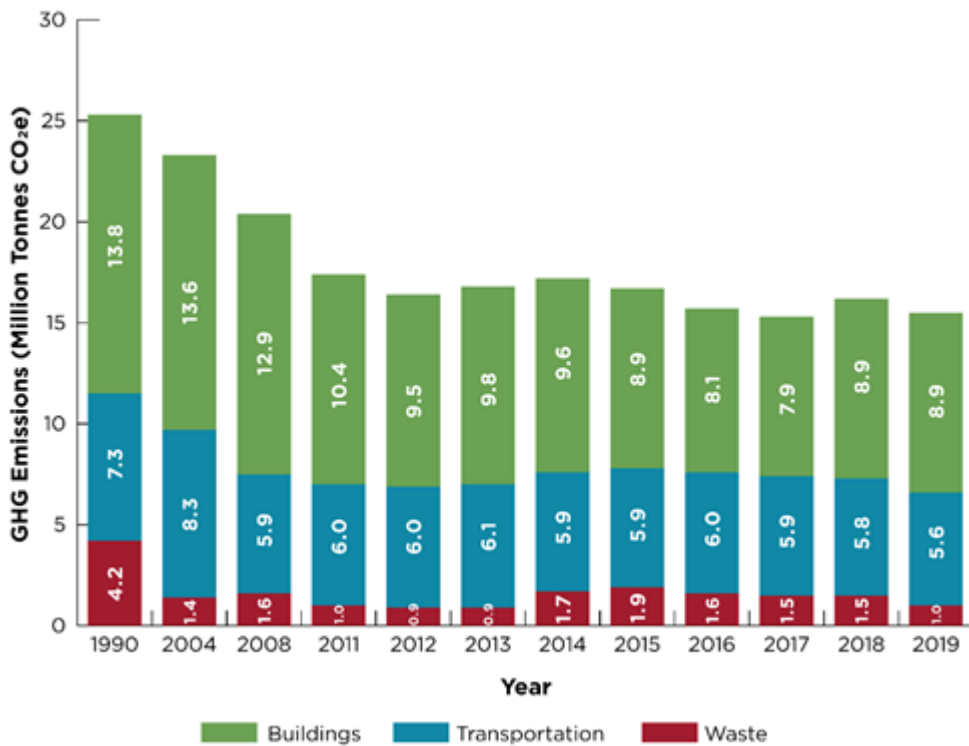


Figure 1 - GHG Emissions 1990-2019

Defining Net Zero

In this report, net zero means zero. Net zero emissions are achieved when decarbonization reduces GHG emissions to as close to zero as possible, and any remaining human-driven emissions are balanced out by an equivalent amount of carbon removals. Carbon removals are achieved through carbon sequestration, which focus on restoring natural systems (including vegetation, land, soil) or through direct air capture and storage technology. Achieving net zero emissions is also referred to as carbon neutrality.

¹ Emissions are tracked in CO₂e, a unit that allows emissions of different GHGs (such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O)) to be expressed as a single unit of measurement.

Although the specifics of how to achieve net zero may vary by sector, this Net Zero Strategy takes the approach that first and foremost, Toronto must reduce all human-caused carbon pollution as fast as possible and then, when emissions mitigation and carbon sequestration activities are exhausted, the use of offsets or technological sequestration activities can be explored.

Achieving Net Zero

In 2020, technical modelling was undertaken to understand exactly what would be needed to achieve net zero by 2050 and 2040.

Four different scenarios were considered bundling and implementing a package of actions across key emitting sectors -- buildings, transportation and waste -- with varying levels of ambition. The four scenarios are:

- "Do Nothing" = What happens if the City makes little to no additional effort or investment in climate action?
- "Business as Planned (BAP)" = What happens if Toronto implements current plans that are already approved? Approved projects considered include district energy expansion, transit expansion, personal vehicle and City fleet electrification and the Toronto Green Standard (TGS). This scenario shows the benefit of approved plans, and the future trajectory that Toronto would be on, given current approved plans and authorities, without implementation of the Net Zero Strategy.
- "Zero by 2050" = What actions can reduce GHG emissions that can be implemented to their fullest?
- "Zero by 2040" = What happens if the actions in Net Zero by 2050 are implemented more quickly?

Figure 2 below illustrates the aggregated results of the modelling:

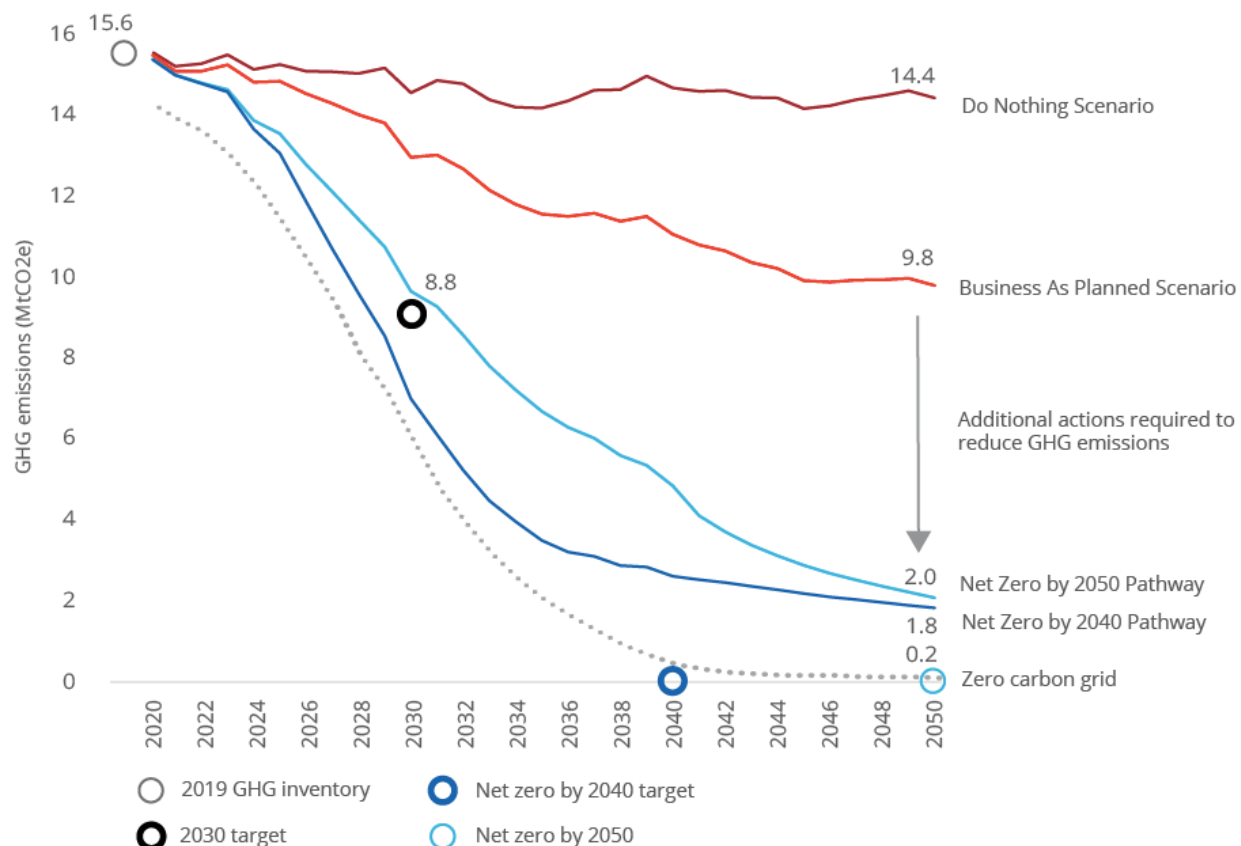


Figure 2 - Overview of the net zero modelling process

Some key observations from Figure 2 are:

- No scenario reaches net zero through actions alone; a remaining residual will need to be 'zeroed' out through the purchase of carbon offsets, renewable energy credits or through carbon capture/storage technologies.
- The BAP scenario, our current trajectory, will not achieve existing 2030 City Council adopted GHG target of 9 million tonnes of CO₂e.
- Today, Toronto's emissions are approaching the 80 x 50 trajectory, Council's existing target of an 80 per cent reduction by 2050 from 1990 levels. Significant additional, new actions and authorities, as outlined in the Net Zero Strategy, are needed to reduce Toronto's future emissions from the BAP scenario to meet the 2030 target and any of the net zero trajectories.
- Only the most ambitious net zero by 2040 pathway will put Toronto on a sufficient enough trajectory to reach Toronto's 2030 target of 9 million tonnes CO₂e emitted that year.

The modelling also examined a "zero carbon grid", which shows Toronto's greenhouse gas emissions trajectory if the provincial electricity grid eliminated the use of fossil fuels in electricity generation. Currently, there are no commitments to ensure that the provincial electricity grid in Ontario will become zero emissions by 2050 or sooner. A key finding from the modelling was that with a clean provincial grid "close to zero"

emissions is possible with only 0.2 million tonnes, the equivalent of 60,000 gas powered cars on the road, remaining in 2050.

As demonstrated by Figure 2, the 2030 target requires immediate and bold action implementation to be realized. If we wait much longer, the curve will steepen and the actions will need to be even more ambitious.

To further support this point, an additional GHG reduction target of 45 percent reduction in community-wide greenhouse gas emissions by 2025, from 1990 levels, is also being recommended, in response to City Council's direction to determine feasibility of setting interim targets. A 2025 target will serve as an interim checkpoint on our progress to net zero by 2040.

Also by 2025, Toronto's Carbon Budget will provide details on the greenhouse gas reduction impact of City-led actions to forecast whether Toronto is on track to achieve annual greenhouse gas emissions limits and to understand what further actions will be necessary to fill gaps. The Carbon Budget is described in more detail below.

While this modelling provides high-level direction for policy, it does not examine all technical details of a certain energy system. A second phase of more granular level modelling of greenhouse gas reduction actions will be undertaken to support precision in understanding the actions necessary to deliver on Toronto's GHG reduction targets.

For further details on the Net Zero Technical Modelling please refer to the technical report (Attachment C) which is also available at www.toronto.ca/transformto.

Five Critical Steps - Toronto's 2030 Plan

One outcome of the technical modelling is the story that it tells about where Toronto is best positioned to exert its influence when designing and implementing climate action.

In reality, the City corporation can control only a small portion of Toronto's community-wide emissions directly -- nearly 5 per cent according to recent greenhouse gas inventories. However, when policies and programs are designed with equity at their core and are easily accessed, maximum uptake and engagement can be achieved and result in meaningful impact on the community's emissions, improved air quality, improved building occupant comfort, and quality of life.

Climate action presents opportunities to develop a more equal and inclusive city by improving building quality, increasing access to transportation infrastructure, creating economic benefits for equity-deserving communities, reducing household costs, improving quality of life, and increasing access to daily needs including employment options.

The City plays a clear role in defining the ways we build, travel, and consume and in order to meet the 2030 targets, must use its influence to regulate, advocate and facilitate rapid transformation in five critical steps below.

Actions in these five critical areas must be sustained over the long term in order to meet any goal, whether it be 2030, 2040, or 2050. Actions, priorities and targets within these critical steps will likely change over time as technology, innovative ways of working and achievements are realized. This report, the TransformTO Short-Term Implementation Plan 2022-2025 (Attachment A) and the Net Zero Strategy (Attachment B) set out the first series of targets within the 2030 timeframe. They identify that Toronto will need to check-in and course correct in 2025 and again in 2030. Annual reporting to City Council on progress will create opportunities to adjust actions as needed.

In the attached Strategy, each 2030 target is further paired with a set of actions that advance the work towards one of the critical steps.

	Critical Steps	2030 Targets
1	Demonstrate carbon accountability locally and globally by establishing a carbon budget	Design and implement a Toronto Carbon Budget with a goal of implementation no later than 2025
2	Accelerate a rapid and significant reduction in natural gas use	100 per cent of new buildings are designed and built to be near zero greenhouse gas emissions; GHG emissions from buildings will be cut in half, from 2008 levels; 25 per cent of commercial and industrial floor area is connected to low carbon thermal energy sources
3	Establish performance targets for existing buildings	GHG emissions from buildings will be cut in half, from 2008 levels;
4	Increase access to low carbon transportation options, including walking, biking, public transit and electric vehicles	30 per cent of registered personal vehicles in Toronto will be electric 75 per cent of school/work trips under 5km are walked, biked, or by transit
5	Increase local renewable energy to contribute to a resilient, carbon-free grid	50 per cent of community-wide energy comes from renewable or low-carbon sources

1. Demonstrate carbon accountability locally and globally by establishing a carbon budget

To achieve the 2030 community-wide target, transparency, accountability and informed decision-making must be core to our plan.

A strong, overarching “Climate Governance” regime fills the gap between ambitious GHG reduction on the one hand and robust policy roadmaps on the other hand.

Jurisdictions that demonstrate climate leadership in ambition and delivery all have a strong climate government structure in common.

To ensure effective Climate Governance, City staff will take a leading-edge approach by:

- Enabling a Climate Lens program to give staff the resources, tools and support necessary to make informed climate decisions both at the project-level (especially capital projects) and the strategic level (especially policies, programs and by-laws with city-wide effect); and
- Designing a Toronto Carbon Budget to track action against annual emission limits and drive accountability
- Requiring City staff to provide annual updates regarding the City's progress toward Toronto's GHG reduction targets, including corporate emission targets, as part of a Carbon Budget report produced in tandem with financial budget proposals and reported in the City's climate-related disclosures included in the annual consolidated financial statements.

The City of Toronto does not currently institutionalize climate change mitigation and adaptation considerations into decision-making processes. Doing so requires standardization of practices, integrating coordinated oversight and building climate literacy across the corporation.

Climate Lens

It is anticipated that the Climate Lens will spur an organizational culture shift at the City by facilitating the mainstreaming of climate considerations into operations and capital project planning, management and executions. The Climate Lens program will aim to achieve the following objectives and outcomes: (1) Integrate climate considerations into strategic decision-making; (2) Build staff climate competency and leadership; (3) Increase climate accountability; (4) Increase transparency through reporting; and (5) Monitor climate performance. The Climate Lens program has already inserted reporting requirements regarding greenhouse gas emissions and climate change risks into the budget process - this will continue and become more detailed over the next few years.

The Climate Lens program will initially focus on ensuring GHG and climate risk assessments are conducted on new/enhanced capital projects and operating programs by 2022, to ensure future investments are aligned with the City's GHG reduction goals

and climate risk adaptation needs. Resources, tools and training will be provided to City staff through an internal “Climate Hub” website expected to be operational in 2022.

The Climate Lens program resources will also be utilized to assess the GHG impacts of and climate risks associated with all existing City assets as part of the asset management planning process pursuant to the Asset Management Planning for Municipal Infrastructure Regulation, O. Reg. 588/17, and Toronto's Corporate Asset Management Policy (section 8.1.6 (iv)). This will be done in alignment with the regulated deadline for asset management planning, which is currently 2024.

Toronto Carbon Budget

A Toronto Carbon Budget would take the approach every municipality already uses to track, review, manage and control financial expenditures and apply it to GHG emissions instead of dollars. It allows decision-makers to think in terms of revenues (annual GHG emission limit), expenses (actual GHG emissions) and deficits/surpluses (annual GHG emission limit minus actual GHG emissions). A carbon budget for the City would set out annual emission reduction limits; identify and quantify governmental actions that reduce GHG emissions (everything from procurements of electric buses to by-laws regulating emissions from buildings); and project whether upcoming annual emission limits will be respected. For each emission reducing action the carbon budget would clearly state the costs and the City divisions and/or agencies accountable for implementation and reporting. Ideally the City's carbon budget would be reported in parallel with the fiscal budget, thereby increasing public awareness of climate action in Toronto which supports accountability. Alignment with the City's annual budgeting process would also ensure that the City is preparing for added costs that may result from the City's failure to meet the annual GHG emission limit, preparation to achieve the annual GHG emission limit, or other related risks. Finally, by highlighting gaps in Toronto's climate action on an annual basis, the City can make timely course corrections to ensure its GHG reduction targets do not slip out of reach. This latter point is critical as significant emission reductions are needed year-after-year to achieve net zero emissions.

Key dependencies for a Climate Lens program and a Toronto Carbon Budget include: (i) consistent staffing resources so that the programs can be built up and iterated over time, in alignment with best practices that continue to evolve across other Canadian and international municipalities; (ii) dedicated prioritization of climate issues from senior leadership, ideally through a permanent body of Director-level representatives that meet periodically to provide direction on climate priorities to staff; and (iii) organization-wide support in identifying, monitoring, and reporting on the City's progress toward GHG reduction targets through the annual Carbon Budget report and the use of climate-related disclosures in the City's annual consolidated financial statements

Co-benefits of effective Climate Governance include long-term cost savings from adapting Toronto's long-term financial plans, infrastructure and programs to climate impacts before they occur; clarity and predictability regarding the GHG emission reductions that must be planned for across corporate operations; anticipating and addressing climate-related risks on a proactive basis to minimize the risk associated with service interruptions, reductions in Toronto's quality of life, or unanticipated costs; providing transparent and relevant reporting to City Council and members of the public;

and demonstrating continued climate leadership among Canadian and international municipalities and global climate action oriented groups, such as CDP Global.

2. Accelerate a rapid and significant reduction in natural gas use

To achieve the 2030 community-wide emissions reductions target, natural gas, which is primarily used for heating in buildings will need to be on a clear path to phase out. In 2019, approximately 50 per cent of all GHG emissions in Toronto originated from natural gas use.

The specific 2030 targets proposed in the Strategy signal that any new buildings must be designed without reliance on natural gas as a fuel before they are even built, that existing buildings will need to be retrofitted and fuel switched away from natural gas by using heat pumps and electrically fuelled appliances, and that carbon free district energy systems will network commercial and industrial properties in the City.

The targets which address this Critical Step are:

- 100 per cent of new buildings are designed and built to be near zero greenhouse gas emissions;
- GHG emissions from buildings will be cut in half, from 2008 levels;
- 25 per cent of commercial and industrial floor area is connected to low carbon thermal energy sources

The implications of phasing out natural gas may entail limiting the expansion of natural gas systems and reversing connections, where feasible.

In the near term, the phase out of natural gas connections and equipment will require well timed intervention by all levels of government; at the City level, program support will need to coincide as much as possible with the end of useful life and planned replacement of equipment.

According to the modelling, to reach net zero by 2040, this means that installations of natural gas furnaces will need to be prohibited by 2030, at the latest, in order to phase out the stock of natural gas furnaces by 2040. It takes on average, ten years for the stock of equipment to turn over.

Some of the already adopted existing programs or policies requiring accelerated implementation:

- Net Zero Existing Buildings Strategy to decarbonize all existing residential, commercial and institutional buildings within the next 30 years
- Net Zero Carbon Plan to reduce emissions in City-owned buildings
- Toronto Green Standard to achieve net zero emissions in new development by 2030.

3. Establish performance targets for existing buildings

To achieve the 2030 community-wide emissions reduction target, building performance targets will need to be established to an extent where sufficient scale of this action achieves a reduction in building emissions by half in the next eight years.

The 2030 target which addresses this Critical Step is:

- GHG emissions from buildings will be cut in half, from 2008 levels.

57 per cent of local GHG emissions comes from energy use in buildings -- in residences for heating and cooking and for heating and other end uses in manufacturing and industry. Natural gas for heating continues to be the largest single source of emissions, accounting for approximately 50 per cent of all GHG emissions in Toronto.

In July 2021, City Council passed the Net Zero Existing Buildings Strategy (ExB Strategy), which sets out a plan to decarbonize all existing residential, commercial, and institutional buildings by 2050. The Net Zero Existing Buildings Strategy identifies fuel switching and a clean electricity grid as the two most significant technical requirements for achieving net zero emissions buildings which are consistent with the five critical steps identified in this report and the Net Zero Strategy (Attachment B).

The ExB Strategy takes the approach of first introducing voluntary programs and policies in the near-term, followed by a transition to mandatory requirements in the medium to long-term. Lessons learned from the operation of voluntary programs, along with detailed discussions with partner City Divisions and further stakeholder engagement, will inform the specific design details and implementation plans for any mandatory requirements. A key aspect of this work includes analysis of equity and affordability impacts and development of implementation strategies that mitigate negative impacts and enable positive ones for equity-deserving groups.

Other key insights from the ExB Strategy focus on a thorough equity and affordability analysis which have highlighted that:

- The cost of the needed retrofit actions represent a significant net investment for building owners and these measures do not pay back on their own.
- Financial supports will be needed to enable market transformation.
- The City does not have all of the authorities needed to unilaterally implement the ExB Strategy in full. Dialogue with the province will be necessary.

The first step is to establish a system of performance reporting. Energy and emissions performance reporting, ratings and labels are critical data management tools that can be used to inform decision-making. For home and building owners, energy and emissions ratings provide information on how their building is performing in comparison to others and how changes to their buildings either through renovation, maintenance or operating behaviour, can impact their buildings' performance.

Displaying or disclosing energy ratings is a key next step because it informs choice for tenants and future buyers when deciding to lease, rent or purchase a space. Knowing

in advance what your energy bills are going to look like in the future helps decision-making.

Lastly, for the City and other levels of government, the information disclosed can be used to design more targeted programs specific to either building sectors or geographical areas of the city where the most need for improvement can be identified.

The ExB Strategy report also recommends looking at additional ways to accelerate this work through financial or other incentives that the City could provide to encourage uptake of deep retrofits, including electrification of building heating systems and disincentives to discourage use of fossil-fuel heating systems.

Retrofitting existing buildings to net zero poses significant challenges due to the diversity of buildings by age, size, system and type. To achieve the 2030 community-wide GHG reduction target, Toronto will need a massive scaling up of deep retrofits and fuel switching in the coming years, with tens of thousands of Toronto's 436,000 homes undergoing deep retrofits every year.

Over the next several months, implementation will focus around development of new standards for emission-focused audits, re-commissioning and retrofit roadmaps and an interim reporting framework for building owners to voluntarily report.

For more information on the implementation plan, please refer to the [Net Zero Existing Buildings Strategy Staff Report](#).

Already existing programs or policies requiring implementation and acceleration:

- Net Zero Existing Buildings Strategy to decarbonize all existing residential, commercial and institutional buildings within the next 30 years

4. Increase access to low carbon transportation options, including walking, biking, public transit and electric vehicles

Increasing the use of active and public transportation reduces greenhouse gas emissions, energy use and congestion while promoting equity and health benefits. When a car is still required, the City supports the transition to electric vehicles by advancing options to incentivize electric vehicle adoption and disincentivize the use of carbon-polluting gas and diesel vehicles.

According to the most recent greenhouse gas inventory, transportation is the second largest source of GHG emissions, accounting for 36 percent of total emissions with approximately 97 per cent of all transportation emissions originating from passenger cars, trucks, vans, and buses. Gasoline accounts for about 30 per cent of Toronto's total GHG emissions.

The 2030 targets which address this Critical Step are:

- 75 per cent of school/work trips under 5km are walked, biked, or by transit
- 30 per cent of registered personal vehicles in Toronto will be electric

These targets recognize that mobility choices might differ depending on type of trip or availability of infrastructure, but that low carbon options should be available for any type of trip:

- For short trips, under 5 km - increasing access for all mobility types should be provided so that walking, cycling and transit are the most convenient, safe, desirable way to travel
- For trips greater than 5 km - provision of low-carbon transit as the most convenient and inexpensive way to travel should be prioritized and where needed, personal vehicle owners should be encourage and supported to switch to an electric vehicle

Complete compact communities

Land use has a critical impact on transportation emissions. In 2021, City Planning launched consultation on Our Plan Toronto: the review and update of the City's Official Plan policies. Environment, climate change, sustainability and the need for a healthy and resilient community have been repeatedly identified as one of the key challenges for the City's future.

Through Our Plan Toronto, the City of Toronto is undertaking an intensification strategy to satisfy the *A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019)* policies. This intensification strategy is intended to direct Transit Oriented Development and prioritize growth where transit and other infrastructure currently exists or is planned, including in Major Transit Station Areas, Urban Growth Centres, and other Strategic Growth Areas. The draft polices will be consulted on in early 2022 and be before Council for adoption late spring 2022.

The draft polices will be consulted on in early 2022 and be before Council for adoption late spring 2022.

Electrifying transportation

Electric vehicles are currently more expensive for most households but this is changing rapidly. The Government of Canada has recently set a mandatory target for all new light-duty cars and passenger trucks sales to be zero-emission by 2035, accelerating Canada's previous goal of 100 percent sales by 2040 and has invested over \$1 billion to support increased zero-emission vehicle adoption.

Toronto can complement this federal sales targets by accelerating its plans to advance a network of public charging installations across the city while encouraging EV uptake through incentives, and disincentivizing the use of gasoline and diesel vehicles. Incentives and disincentives may be financial and/or non-financial. Financial incentives for purchasing EVs help with the initial higher purchase price point while non-financial incentives such as preferred parking or EV only lanes have been shown to encourage EV ownership. Cities have used disincentives such as congestion charges and parking charges for gasoline vehicles as ways to discourage fossil-fuel powered vehicles. The City will explore these and other options, evaluate equity impacts and report back to City Council in 2023 with recommendations on opportunities to encourage EV adoption.

For those not able to purchase a private electric vehicle, the electrification of our public transit fleet enables a long distance carbon free ride. Currently, subways and streetcars are virtually emissions free while the TTC's Green Bus Program, approved by the TTC Board in November 2017, will see the procurement of only zero-emission buses starting in 2025 and achieving an entirely zero emissions bus fleet by 2040. By 2032, the TTC bus fleet will be almost 50 per cent converted.

Some of the already existing programs or policies requiring implementation and acceleration:

- Cycling Network Plan
- Toronto Electric Vehicle Strategy
- TTC Green Bus Program
- RapidTO Bus & Streetcar Priority Plan
- Bike Share Toronto
- TTC's 5-Year Service Plan & 10-Year Outlook
- Transportation Demand Management Strategy

5. Increase local renewable energy to contribute to a resilient, carbon-free grid

To achieve the 2030 community-wide target, expanding local renewable energy generation in Toronto alongside energy storage will be critical.

The 2030 target which addresses this Critical Step is:

- 50 per cent of community-wide energy comes from renewable or low-carbon sources

Reaching net zero requires reducing energy consumption, electrifying the consumption that remains, and ensuring that the electricity available from the provincial grid and locally is net zero carbon. This will involve expanding local renewable energy generation in Toronto along with energy storage. The benefits of this approach go beyond limiting climate change - local renewable energy generation will increase resilience to power outages from extreme weather and other causes

As a city, we use a lot of energy but generate very little of our own. Most of Toronto's electrical energy comes from the provincial electricity grid.

Toronto's plans for reaching net zero are predicated on electrifying heating and transportation fuels through the use of key technologies -- heat pumps and electric vehicles -- because they are extremely energy efficient. Electric vehicles can go further per unit of energy than gasoline vehicles. Similarly, heat pumps are three times more efficient than natural gas heating.

But switching our energy consumption from fossil fuels to electricity is exceeding less effective if Toronto does not draw from a zero-carbon, resilient electricity supply. While conservation of electricity is the cheapest option to dampen the demand for electricity, it will not be enough to meet all of our consumptive need.

Furthermore, even though Ontario currently has a relatively low emission grid compared to other provinces, grid emissions are expected to rise starting in 2023 due to an

increase in gas fired electricity generation when nuclear stations come offline. This trend has wide-ranging implications for Toronto's ability to rapidly reduce GHG emissions. Currently, there are no commitments to ensure that the provincial electricity grid in Ontario will become zero emissions by 2050 or sooner.

If the provincial grid is not decarbonized, Toronto will need to generate its own electricity renewably to achieve net zero.

To set us on this path, the City will work with Toronto Hydro, the Province, and other partners to ensure that electricity supply is enhanced by local generation. This will entail addressing barriers and developing strategies to increase deployment of renewable energy and storage technologies. These technologies include solar, wind, biomass, geothermal, waste heat recovery, and heat pumps.

This will entail addressing barriers and developing strategies to increase deployment of renewable energy and storage technologies. Permitting and connection processes were identified as key opportunities to reduce installers' and therefore, customers' permitting costs and timelines for installation for both small-scale residential and large-scale commercial installations. Affordability was identified as a barrier that needs to be addressed in order to rapidly expand distributed renewable energy generation in Toronto. While the cost of solar generation has declined over the years, the payback period is still relatively long, which deters further uptake particularly for residential projects, highlighting the need for financial incentives.

These challenges and opportunities illustrate the need for coordination and problem-solving with Toronto's local utility. This work will include direct focus on promoting and acceleration local adoption of renewable energy generation through a review of regulatory options, potential incentives, and permitting and connection processes as well as other identified restrictions.

The renewable energy sector brings multiple benefits with respect to job creation and resiliency. It is estimated that for every megawatt (MW) of solar generated, 25 to 35 jobs are created in the sector. During grid outages, resilient renewable energy systems such as "solar plus storage" provide critical emergency power that can help people in need and ease demand on emergency fuel supplies.

Achieving Net Zero by 2040

City Council's Climate Emergency Declaration requested staff to report back on the feasibility of achieving net zero by 2040. Technical modelling demonstrates that achieving net zero by 2040 is feasible, but dependent on significant acceleration of climate actions and well-coordinated efforts at local, regional, national and global levels.

To achieve net zero emissions by 2040 governments, residents and businesses will need to take bold action. This will include all homes and buildings undergoing deep energy retrofits and using heat pumps for space and water heating, eliminating natural gas appliances, and electrifying all public transit and personal and commercial vehicles. Please refer to the TransformTO Net Zero Framework Technical Report for more details (Attachment C).

The actions the City government will take to lead, enable, and advocate for climate change to achieve the net zero will be aligned with the actions presented in this report. Getting to net zero by 2040 will require the City to continue taking bold action to reduce GHGs from buildings, transportation and waste. The approach on how to implement these actions will change depending on the progress Toronto has made, available technology and innovations, and leading practices. This report includes specific actions that the City will deliver from 2022 to 2025 found in Attachment A. Detailed reports outlining recommendations for bylaws, policies, and new programs will be brought back to City Council for consideration starting in 2022 and continue over the following four years.

Dependencies to Achieving Net Zero

Although the recommendations in this report and the Net Zero Strategy (Attachment B) are intended to support action-oriented delivery of a net zero future, a number of 'dependencies' need to be addressed in order to realize our targets:

- **Action must begin now and must focus on equity:** Achieving the 2030 GHG target requires that all existing climate actions continue and for additional bold action to begin as soon as possible. A focus on equity in program and policy design and delivery will maximize participation of all Toronto residents so that benefits can be realized sooner and last longer.
- **Action from all levels of government will also need to align and accelerate:** Provincial and federal policy and resources are required to enable Toronto's ability to realize a net zero future. Aligned action will also amplify local efforts so that financial returns are realized sooner and GHG emissions reductions start earlier.
- **The electricity system needs to be carbon free:** The emissions intensity (amount of GHG emitted per unit electricity) of Ontario's electricity grid is projected to increase. For Toronto to get to net zero, the grid needs to be carbon free. Failing this, the city can only rely on the "net" part of the target and will need to purchase carbon offsets or renewable energy certificates, both of which add significant cost to becoming net zero. Ensuring that electricity generation does not produce carbon pollution also addresses the scale of the global challenge.

At a local level, while it is important to decarbonize the grid (reducing the carbon or GHG emissions of Ontario's electricity supply), the electricity system needs to be able to adapt to new demands as heating and transportation are electrified.

Focusing on conservation first can reduce electricity consumption and is the most inexpensive way to provide additional electricity capacity; however, additional work will be necessary to fully understand how to enable large-scale electrification of transportation and buildings and manage peaks in electricity demand.

- **The labour market must shift and local supply chains must be developed:** The labour market must shift and new critical supply chains need to be developed to bring down costs. The skills mix and capacity of the labour force will need to scale up rapidly and new robust supply chains for new technologies, such as heat pumps

and electric vehicles, will need to be in place in order to deliver the actions required to achieve net zero.

- **Innovative and adaptive delivery mechanisms must be adopted to scale up:**

Although all actions presented in the strategy are technologically feasible, conventional delivery mechanisms are likely too slow and costly to deliver the rapid transformation envisioned to achieve the 2030 target. City processes will need to be nimble, as already demonstrated in the quick implementation of new programs in response to the COVID-19 pandemic. ActiveTO is one of those programs where dedicated road space facilitated active transportation for essential trips and physical activity keeping residents safe and healthy during the pandemic. ActiveTO demonstrated a quick response to support a crisis by "instituting priority bus lanes, improved cycling infrastructure, expansion of bike share and weekend recreational street closures, among others."

Similarly, quick action will need to be applied to the volume of building retrofits needed to reach Toronto's proposed targets. The current model of retrofitting one house at a time will need to be replaced by a bulk retrofit program where many houses are improved at once. To do this, municipal processes and programs will need to adapt and be aligned in order to address barriers that households might face. For instance, a household wishing to undertake a retrofit or use an electric vehicle should not face any barriers in terms of information or action that might result from conflicting municipal, provincial or utility policies.

- **Impacts on material and land resources should be accounted for:** The economy will need to produce large numbers of electric vehicles and deliver building retrofits and renewable energy in short order. Supplying or manufacturing these resources creates demand for concrete, wood, insulation, batteries, and land. The environmental, social, and economic implications will need to be carefully considered to ensure this does not result in additional GHG emissions and negative impacts to the environment. Indigenous worldviews and circular economy principles are required to minimize impacts on resources and ensure principles of global sustainability are maintained.

It is also crucial to note that we will only achieve a successful implementation through a respectful approach to the land, water and air, collaboratively with the diverse communities across Toronto. In 2010, the City adopted the Statement of Commitment to the Aboriginal Communities of Toronto, and in 2015 City Council, in consultation with the Aboriginal Affairs Committee, identified eight Calls to Action from the Truth and Reconciliation Commission's final report as priorities for implementation by the City. Included in this, is the Call to Action for the federal, provincial, territorial, and municipal governments to fully adopt and implement the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) as the framework for reconciliation.

Meaningfully working with members of Toronto's Indigenous communities, and including an Indigenous worldview in the Net Zero Strategy, are important to the ongoing relationship with Indigenous communities on climate issues and the successful implementation of the Net Zero Strategy.

Coordination and Partnerships

No municipal government has the legislative tools or fiscal capacity to achieve ambitious targets on its own. Almost all of the key actions in the Strategy require additional approval, authority, or action from other levels of government to enable our success. For example, implementation of the Existing Buildings Strategy to retrofit homes and buildings will require additional legal authority to set performance standards from the provincial government.

The recommendations in this report identify that transformative policy to phase out natural gas and to clean up the way that electricity is generated in the province are critical enablers to our success. In other recommendations, Toronto has identified where coordinated support will need to align with provincial and federal policy to enshrine net zero emissions in building requirement and to accelerate EV uptake.

Federal and provincial government support

There is already alignment being signalled at the federal level. Of note are: a signal that the price on carbon pollution will rise by \$15 per year from 2023 to 2030 reaching \$170 per tonne by 2030; a mandatory target that at least 50 per cent of new light duty vehicles will be required to be "zero emission vehicles" by 2030, with 100 per cent by 2035; and 100 per cent net zero emitting electricity system by 2035.

Toronto will need a matching workforce poised with the necessary communication, technical and business skills to meet accelerated job growth in these areas.

Continued and increased funding and financial incentives to encourage consumer uptake from both the provincial and federal governments will be necessary to drive climate retrofits of buildings.

Leadership and Innovation

Toronto is considered a leader amongst its peers but is also a member of a coalition of more than 1,000 cities are delivering their science-based commitments and solutions as part of the C40 Cities Race to Zero initiative. As part of Cities Race to Zero, Toronto is contributing to the largest ever coalition of any order of government committed to and delivering on the 1.5 degree objective of the Paris Agreement. More information about Toronto's programs can be found in Attachment D: Highlights of Toronto's Programs To Date.

In addition to being a leader, Toronto is seeking opportunities to innovate through collaborative relationships with organizations such as the MaRS Discovery District and their Mission from MaRS Climate Impact Challenge. The Mission from MaRS Climate Impact Challenge is a national challenge made up of prequalified companies showcasing climate-tech solutions with the highest potential to reduce GHG emissions with the goal of widespread adoption of new technology. The City intends to leverage these types of solutions to drive down our own emissions while encouraging others to do the same.

Achieving Co-Benefits from Climate Action

In 2017, TransformTO proposed guiding principles for the design and delivery of climate action so that public benefit is maximized and harm is minimized. These guiding principles remain as the driving force behind the development and implementation of the Net Zero Strategy:

- Advance social equity;
- Improve affordability particularly for vulnerable residents;
- Protect low-income residents;
- Contribute to poverty reduction;
- Enhance and strengthen the local economy;
- Maintain and create good quality local jobs;
- Improve public health; and
- Create resilient communities and infrastructure.

To ensure that implementation continues to be guided by these principles, an Advisory Group of public members will be convened, and designed to ensure that the implementation of the Net Zero Strategy is equitable and reflects the priorities, interests and values of the broader community. The Environment & Energy Division will convene the advisory group of community members, including youth and Indigenous representation, in 2022 to ensure equity is integrated and supported through the implementation of actions as outlined in the TransformTO Short-Term Implementation Plan 2022-2025 (Attachment A) and the Net Zero Strategy (Attachment B).

Investing in a Net Zero Toronto

Climate change, climate resilience, and the economy are deeply connected. Recent events, including the COVID-19 pandemic and increasing incidences of extreme weather, have demonstrated the impacts that unexpected events can have on the economy.

Impact on Toronto's economy

Existing climate action has already strengthened Toronto's economy. Toronto's green industries are one of the fastest growing sectors of Toronto's economy. The sectors' employment continues to grow twice as fast as the overall employment in Toronto (3.9 per cent vs. 1.6 per cent annually between 2015 and 2019) and contributed an estimated \$6.55 billion to the local GDP in 2018.

Transitioning to a low- or zero-carbon economy will continue job growth and is expected to impact labour markets in four ways: additional jobs will be created in emerging sectors, some employment will be shifted (e.g., from fossil fuels to renewables), certain jobs will be reduced or eliminated (e.g., combustion engine vehicle mechanics), and many existing jobs will be redefined. Technical modelling shows that pursuing the net zero by 2040 pathway will add an additional 1.2 million person-years of employment. This amounts to approximately 40,000-50,000 jobs annually with the majority in building retrofits and infrastructure projects.

Financial analysis suggests that achieving a net zero Toronto will cost \$57 billion to the entire community over the next 30 years. If broken down annually, these investments are equal to approximately 5 per cent of Toronto's GDP until declining to zero in 2040. After 2040, investments are expected to generate a net annual savings. The greatest costs come from required investments in transit infrastructure and building retrofits.

Financial Impact on Toronto households

For households, the energy transition will be experienced most directly in how we heat and cool homes, and how we move around the city. Net zero pathways show the share of Toronto households' income spent on energy services (home heating, electricity, and transportation) could decrease by an average of 70 per cent as we move to net zero, with an average reduction of nearly \$1,200 per household per year compared to the status quo. More information and a detailed financial analysis is available in Attachment C - TransformTO Net Zero Framework Technical Report.

Conclusion

The Net Zero Strategy provides detailed targets and a strategy to reach net zero greenhouse gas emissions for the City of Toronto by focusing on the near term Council adopted target of a 65 per cent reduction by 2030 in order to meet net zero greenhouse gas emissions by 2040. Investments in infrastructure, building retrofits, electric mobility, and new energy technologies in present time will result in reduced GHG emissions, create new jobs, improve resident health and quality of life, as well as open up numerous innovative economic opportunities for years to come.

The pathway to net zero represents a transformation of the energy system and the built environment, which will require a coordinated mobilisation of the City and the Toronto community at a scale where there are few precedents.

The impacts and total costs of climate change will be determined by how quickly actions are implemented and by how deeply GHG emissions are reduced over the next decade. For instance, each year, new investments are made in carbon-intensive infrastructure and technologies "lock us" into a carbon-intensive pathway. Undoing these investments to upgrade or retrofit them at a later date not only delays the expense, it delays the benefits that the community can receive and will likely be the more costly option in future potentially increasing or prolonging the city's exposure to damage.

While this Strategy requires continued and additional support from all levels of government, neighbouring municipalities and regions, utilities, businesses, academia, and residents alike, it also requires the City of Toronto to commit to making net zero choices at any juncture in decision-making starting from now.

The City of Toronto will continue to pursue actions within its own jurisdiction and authority. It is clear that achieving the climate targets required to maintain 1.5 degree warming pathways requires considerable collaboration and shared investment amongst all three levels of government. Toronto will need to take on stronger advocacy efforts to federal and provincial governments to attain additional authorities that will be necessary for implementation.

In addition, an important consideration in the implementation of this Net Zero Strategy is that increased reliance on electricity for transportation and heating of buildings could mean more vulnerability if the electricity supply is for any reason jeopardized. Key resilience strategies in the near and long term will need to focus on ensuring a continuous and reliable supply of electricity to homes, businesses and institutions. Reduction of electricity consumption and demand management to reduce pressure on the current grid capacity and distribution network, and the diversification of electricity generation through widespread local renewable energy and storage, will be critical to meet the increased demand for electricity forecasted in this Strategy.

Toronto is part of a larger community of cities committing to a net zero by 2050 or sooner pathway. Toronto continues to be viewed as a climate leader by showcasing our innovation and entrepreneurship, but also as a contributor deep emission reductions worldwide.

Achieving the targets set out in this report will require a different means of delivery and decision-making that prioritizes emissions reduction at every possible opportunity.

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ATTACHMENTS

Attachment A - TransformTO Short-Term Implementation Plan 2022-2025
Attachment B - TransformTO Net Zero Strategy: A Climate Action Pathway to 2030 and Beyond
Attachment C - TransformTO Net Zero Framework Technical Report
Attachment D - Highlights of Toronto's Programs to Date
Attachment E - Summary of Public and Stakeholder Consultations (2018-2021)
Attachment F - Small Engine Lawn and Garden Equipment