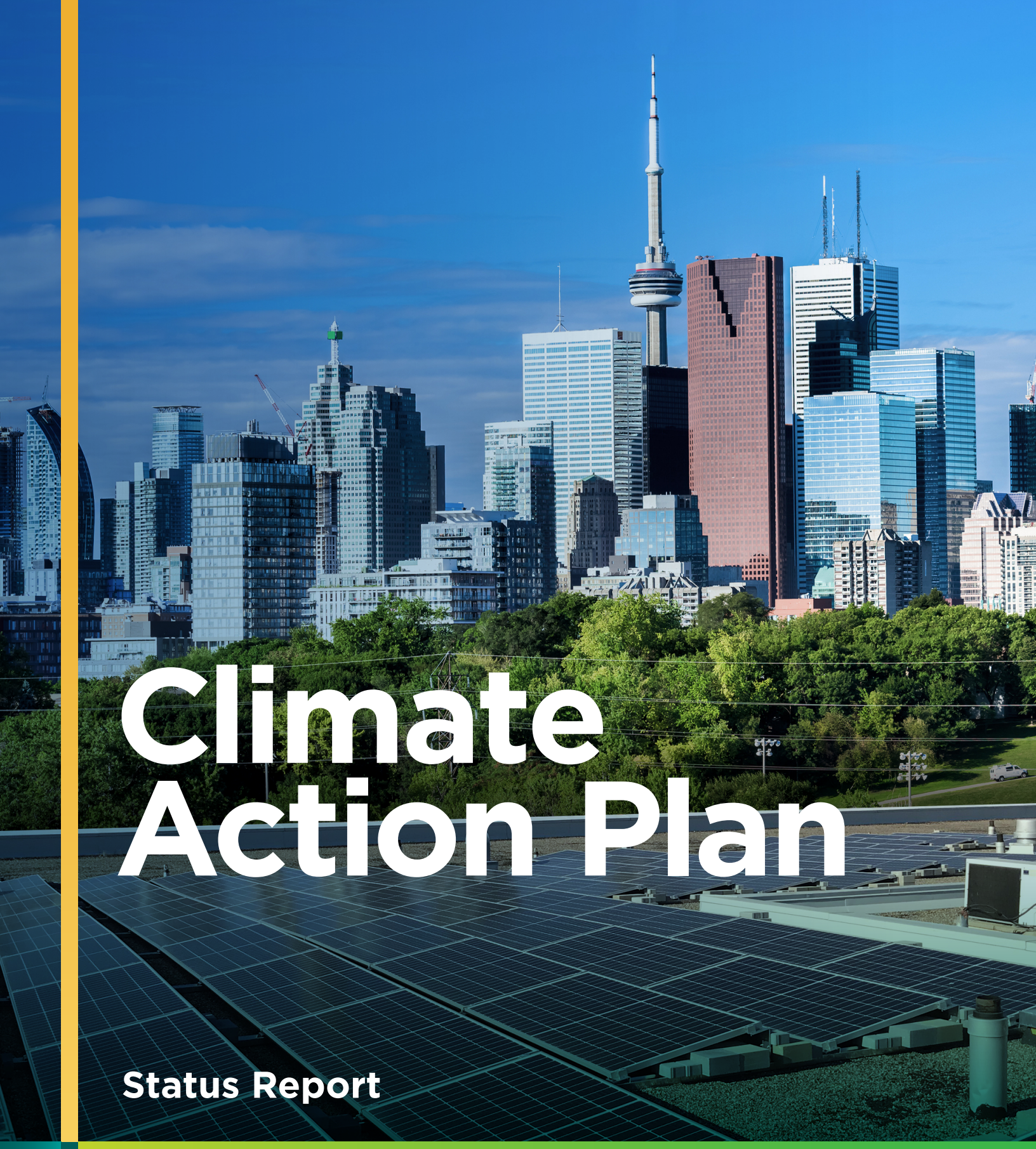

Climate Action Plan

Status Report

TORONTO HYDRO® Corporation

Executive Summary

Toronto City Council requested Toronto Hydro Corporation (Toronto Hydro) to provide its Climate Action Plan to the City Manager on September 30, 2021. The Climate Action Plan outlined Toronto Hydro's existing efforts to address the climate emergency as well as an action plan of what more it could do to support the critical objectives of the City's TransformTO vision and Net Zero 2050 Strategy (NZ50 Strategy).

In December 2021, the City both received Toronto Hydro's Climate Action Plan and revised the timeline of its Net Zero Strategy from 2050 to 2040 (NZ40 Strategy).[1] City Council requested that the City Manager and Toronto Hydro continue to collaborate with respect to the Climate Action Plan and NZ40 Strategy; make recommendations regarding new climate action mandates for Toronto Hydro; and address a number of specific climate-related questions.

This Climate Action Plan Status Report (Status Report) responds to these City Council requests. It is based on extensive collaboration with City Staff since 2020 and informed by outreach with funding agencies and prospective partners. This Status Report should be read in conjunction with Toronto Hydro's Climate Action Plan.

Section 1 outlines Toronto Hydro's existing provincial mandate to provide electricity distribution services (which are critical to enable local climate action) and proposes two new unregulated climate action mandates for a Climate Advisory Services business and LED streetlight conversion program. It recommends, based on consultations with City Staff,[2] that City Council defer a decision on a mandate for Climate Capital Investments until mid-2023.

Section 2 discusses the interplay between the NZ40 Strategy and the Climate Action Plan.

Section 3 provides additional details with respect to: a) the proposed Climate Advisory Services business, including the programs in early stages of development; b) the city-wide LED streetlight conversion; and c) the timing of a Climate Capital Investments mandate. This section also compares Climate Advisory Services and Climate Capital Investments, helping to clarify the differences and providing support for the recommendation to proceed immediately with the first approach while deferring the second approach.

Appendix A outlines background information regarding City Council's requests for Toronto Hydro to develop a climate action plan as well as ongoing collaboration with the City.

Appendix B provides Toronto Hydro's responses to City Council's December 2021 requests.

Appendix C describes the Expanded Electricity Distributor opportunity and process for the Provincial Government's Ontario Energy Board's approval of distribution system investments.

Appendices D, E, F and G provide program overviews, the business profile (including estimated costs and possible funding sources), federal climate change targets and prospective partnerships, respectively, for Climate Advisory Services.

Appendix H compares the advantages and disadvantages of pursuing selected projects through Climate Advisory Services or Climate Capital Investments.

Appendix I discusses corporate finance impacts of the Climate Action Plan and is provided on a confidential basis.

With the proposed mandates for climate action from the City as shareholder, Toronto Hydro can leverage its strengths and experience to be a Canadian leader in the climate action era and help deliver significant benefits to the City and its residents. Toronto Hydro recognizes there is no time to waste, and has already begun developing relationships and a pipeline of climate action projects, which will enable Toronto Hydro to move more quickly toward implementation should it receive the proposed mandates.

With the requested support and mandates, Toronto Hydro looks forward to taking its next steps to help build a greener city through climate action.

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1. Proposed New Climate Action Mandates for Toronto Hydro

For more than a century, Toronto's residents and businesses have thrived in part due to the diligence, expertise and collaboration of its municipal government and electric utility. As residents and businesses prepare for the climate change challenges and opportunities that lie ahead, the City and Toronto Hydro will continue to play a central role in shaping and supporting a healthy, prosperous and resilient future.

1.1 Toronto Hydro's Current Climate Action Mandate

Toronto Hydro Corporation and its subsidiaries were created as arm's length commercial enterprises out of the former utility commissions across Metropolitan Toronto in accordance with the *Electricity Act, 1998* and the *Ontario Business Corporations Act* with a mandate to provide electricity distribution services in the City of Toronto. This mandate is established through Toronto Hydro's licence issued by the Provincial Government's Ontario Energy Board, and is subject to provincial legislation, regulations, and rules of the Ontario Energy Board, the Independent Electricity System Operator, and other regulatory and oversight bodies. The mandate is also entrenched in the Toronto Hydro Corporation Shareholder Direction.

The Toronto Hydro Board of Directors — appointed by Toronto City Council — is legally responsible to supervise the management of the corporation in carrying out its mandate, including by approving annual business plans. In carrying out its responsibilities, Toronto Hydro must balance a number of objectives and principles noted within the Shareholder Direction, as well as legal obligations including the interests of stakeholders, in making strategic and other decisions.

Within this context, Toronto Hydro's principal business is its subsidiary electricity distribution utility, Toronto Hydro-Electric System Limited, which owns and operates the electricity distribution grid in the City of Toronto under a rigorous provincial legal and regulatory framework. Through its other subsidiary, Toronto Hydro Energy Services Inc., Toronto Hydro also owns and operates streetlighting assets pursuant to a contract with the City of Toronto. Under its existing mandate, Toronto Hydro has adopted an ambitious corporate objective to achieve net zero greenhouse gas emissions in its operations by 2040,[3] and has already taken or is taking numerous actions to ensure it is a strong environmental steward and performer.[4]

As the electricity distributor, Toronto Hydro-Electric System Limited builds and operates a grid that makes climate action (e.g. decarbonization) possible for its approximately 787,000 customers.

As set out in Toronto Hydro's Climate Action Plan, continuing to fulfil its existing provincial mandate as an electricity distribution company will lead to an Expanded Electricity Distributor.[5] Continuing to grow and adapt the regulated electric utility will enable ongoing customer growth, electrification, and incorporation of local renewable generation and storage.[6] Approximately 75% of the City's Net Zero 2040 Strategy — as measured by greenhouse gas reductions — depends on Toronto Hydro carrying out this existing mandate as an Expanded Electricity Distributor.

While the climate action that Toronto Hydro is already carrying out, and will increasingly carry out as an Expanded Electricity Distributor, arises out of an existing provincial mandate that is subject to independent provincial regulatory oversight, there will be ongoing engagement with the City in this area, including in its role as Toronto Hydro's shareholder.[7] To support this engagement and keep the City apprised of developments related to the expansion of the provincially regulated electricity distribution grid to support the City's Net Zero 2040 Strategy, City Staff and Toronto Hydro jointly recommend the following resolution of City Council:

> City Council, on behalf of the City of Toronto as shareholder, request Toronto Hydro to include in the publicly available portion of its annual report to the City of Toronto the status of the provincially regulated expanded grid capacity for growth, electrification and incremental local renewable generation in relation to helping the City of Toronto achieve its TransformTO: Net Zero Strategy goals.

1.2 Proposed New Climate Action Mandates

Toronto City Council requested that Toronto Hydro report on what it is currently doing, and prepare a plan for what more Toronto Hydro could do to support the critical objectives of the City's TransformTO vision and related Net Zero Strategy. The result of that analysis is the framework set out in Toronto Hydro's Climate Action Plan ("CAP"), filed with the City Manager in September 2021, and received at City Council in December 2021.[8]

In addition to the Expanded Electricity Distributor, the Climate Action Plan sets out three unregulated opportunities through which Toronto Hydro could play a larger climate action role to help the City achieve its goals set out in the Net Zero 2040 Strategy and thereby do more to confront the climate emergency:

- Climate Advisory Services
- Climate Capital Investments: Streetlighting
- Climate Capital Investments: Other

On the recommendation of the City Manager, adopted by Toronto City Council in December 2021, Toronto Hydro continued to work with City Staff and other stakeholders in the first half of 2022 to continue to assess these opportunities and develop implementation strategies as applicable.[9] As part of that process, Toronto Hydro responded to a third round of detailed questions from City Staff,[10] provided multiple drafts of this report to City Staff for feedback, and met with City Staff[11] 39 times over the span of six months.

The result of those discussions, and the escalating priority of climate action,[12] is a series of joint recommendations. The recommendations include:

- Climate Advisory Services — ***New Mandate Now***
- Climate Capital Investments: Streetlighting — ***New Mandate Now***
- Climate Capital Investments: Other — ***New Mandate Deferred***

In order for Toronto Hydro to carry out climate action beyond that associated with its work as a provincially regulated electricity distributor and the owner and operator of streetlighting assets in the City of Toronto, it requires new climate action mandates in the form of resolutions of City Council. As discussed further below, these resolutions serve as necessary, clear and tangible expressions of stakeholder expectations from the City, in its role as sole shareholder, to Toronto Hydro's Board of Directors that the City supports the reasonable trade-offs between the objectives set out in the Shareholder Direction required to carry out these incremental climate action activities and lines of business.

Reflecting on the input received from the City through its staff, Executive Committee, and City Council, and flowing from the work of the Joint City-Hydro Steering Committee, as well as the legal framework and best practices in corporate law and good governance, Toronto Hydro recommends the City enable Toronto Hydro's unregulated climate actions set out in the Climate Action Plan through the following resolutions:

a) *Climate Advisory Services*

1. City Council, on behalf of the City of Toronto as shareholder, request Toronto Hydro to expand its business activities beyond electricity distribution services by establishing a new stream of non-rate regulated operations within its regulated business, specifically Climate Advisory Services (the climate action opportunity that excludes Toronto Hydro owning and operating assets), in keeping with the proposal set out in Toronto Hydro's Climate Action Plan received by City Council at its meeting on December 2021 and the Toronto Hydro Climate Action Plan Status Report.

2. City Council, on behalf of the City of Toronto as shareholder, request Toronto Hydro to deliver publicly to the Executive Committee through the City Manager, the Chief Financial Officer and Treasurer, and the Deputy City Manager, Corporate Services, an annual report on the progress, key performance indicators, and next steps of Climate Advisory Services.

b) *Climate Capital Investments: Streetlighting*

1. City Council confirm its support in principal for proceeding with City-wide LED street and expressway light conversion, including the related enabling infrastructure investments.

2. City Council request the General Manager, Transportation Services and the Chief Financial Officer and Treasurer, in consultation with Toronto Hydro, develop implementation options for the City-wide LED street and expressway light conversion including applicable budget, and report back with a recommendation by the end of the second quarter of 2023.

c) *Climate Capital Investments: Other*

1. City Council direct the Executive Director, Environment and Energy to continue to investigate with Toronto Hydro on other possible Climate Capital Investment opportunities (whereby Toronto Hydro owns and operates climate action assets such as EV chargers) to implement Transform TO: Net Zero goals.

1.3 Proposed New Climate Action Mandates — Detailed Discussion

1.3.1 Proposed New Mandate: Climate Advisory Services

This mandate will empower Toronto Hydro to evolve its business planning and other corporate activities from the degree to which it currently focuses on financial performance objectives,[13] and give incremental weight in its balancing of priorities to climate change objectives provided for in the Shareholder Direction, while continuing to meet its legal obligations.[14]

Climate Advisory Services is designed to facilitate reductions in greenhouse gas emissions; stimulate the local cleantech economy; and advance social equity by addressing affordability challenges that can prevent low-income residents and other communities from participating in the energy transition. Climate Advisory Services is modelled in part on Toronto Hydro's highly successful Conservation and Demand Management ("CDM") line of business. Toronto Hydro employees would work directly with customers to: identify their situation-specific opportunities; help in choosing particular climate actions and the timing of implementation; provide recommendations on potential vendors; assist in applying for grants and loans; remove barriers faced by low income customers; as well as assisting with monitoring the implementation and evaluating the results. Toronto Hydro employees would then use the knowledge obtained from this work to ease the energy transition of other customers. Similar to CDM, Toronto Hydro is best positioned to provide these services because of its existing relationships with its customers and local cleantech companies, as well as its expertise in energy systems, project management, clean energy technologies, customer adoption challenges, energy use in buildings, electric vehicle charging, energy efficiency, and other key areas of project delivery knowledge.

Through Climate Advisory Services, Toronto Hydro expects to improve and accelerate the efficient deployment of private capital to remove barriers inhibiting climate action by tens of thousands of households, businesses and other organizations. It provides a path to grow the local cleantech economy in the program areas requested by City Council by facilitating electrification projects that are developed, owned and operated by others.

Examples of Climate Advisory Services program initiatives can be found in Appendix D.

In addition to the benefits of local climate action, Climate Advisory Services will help develop a cleantech ecosystem of companies, banks, financiers and service providers in Ontario that can leverage key lessons from projects in Toronto and apply them to scale up climate action in other jurisdictions, nationally or internationally. In this way, Climate Advisory Services can be a vehicle for

Toronto to provide outsized support for global efforts against climate change.

Toronto Hydro anticipates that Climate Advisory Services will be an impactful mechanism to mobilize our community and mitigate the impacts of climate change that are disproportionally affecting vulnerable populations such as seniors, people with health conditions, people with low incomes, people experiencing homelessness, as well as groups who face discrimination, such as Indigenous peoples and racialized communities.

As a gesture of goodwill, and in the interest of expediting that ramp-up period, starting in January 2022, Toronto Hydro began temporarily seconding some employees to the Climate Action Plan Project Team. To date, this team's work includes collaborating with City Staff to resolve lingering questions and put the City Manager in a position to recommend that City Council approve new climate action mandates for Toronto Hydro. The team also focused on developing a pipeline of Climate Advisory Services projects (see Appendix D). In the event that a mandate is established for Climate Advisory Services, the pipeline will expedite the timeline for project implementation.[15]

For more information on Climate Advisory Services, please refer to section 3.1.

1.3.2 Proposed New Mandate: Streetlighting LED Conversion

Toronto Hydro has a mandate to provide streetlighting services for the City of Toronto via a service agreement that has been in place since 2006. However, support in principal is required to proceed with the development of a detailed plan to conduct a city-wide LED conversion of those streetlights, as this work was not contemplated within the existing service agreement.

The Streetlighting LED conversion described in the CAP is a continuation of discussions that have occurred in recent years between Toronto Hydro and the City. Building on this past work, Toronto Hydro and Transportation Services convened a joint working group to align on a common recommendation, and both parties support a city-wide streetlight LED conversion. Toronto Hydro is collaborating with Transportation Services to develop an updated implementation plan that addresses technology, timeline, budget and funding sources for the conversion. As noted in the CAP, the implementation plan estimates an investment of $180 million for LED conversion.[16]

Based on discussions with Transportation Services, Toronto Hydro recommends a two-step process in order to quickly arrive at the benefits of this project for the climate, public safety and quality of life. The first step is City Council support in principal for the LED conversion and associated infrastructure reinvestment. This first step approval establishes a minimum deliverable. The second step is for Transportation Services and Toronto Hydro to take that clear mandate and develop potential implementation approaches. Toronto Hydro recommends the implementation plan return to City Council in Q2 2023.

For more information on the city-wide Streetlighting LED Conversion, please refer to section 3.2.

1.3.3 Deferred New Mandate: Other Climate Capital Investments

Climate Capital Investments is an approach through which the City would fund climate action projects that Toronto Hydro would directly own and operate. Toronto Hydro's Climate Action Plan recommends this only be deployed where other market actors are not able or willing (i.e. lower return on investment, high administrative costs) to undertake projects (i.e. the "provider of last resort"). This could include climate action projects in underserved areas based on community needs where targeted action can help remove barriers to uptake. In the absence of funding from other sources, these Climate Capital Investment projects would rely entirely on the City for funding.

While this may be a favourable future option to be weighed on a project-by-project basis, based on discussions with City Staff, a decision regarding a mandate for Toronto Hydro to create a separate business line for Climate Capital Investments should be deferred until mid-2023 pending further work related to the implementation of TransformTO, as well as an assessment of the effectiveness of Climate Advisory Services in driving forward climate action projects. At that time, Toronto Hydro and City Staff will revaluate the need for Climate Capital Investments based on progress

towards the NZ40 target, the pervasiveness of that progress across communities in Toronto, and the maturity of the region's climate economy and growth of the cleantech sector.

If and when City Council is interested in Toronto Hydro pursing Climate Capital Investments, a new mandate for that business will be required because it is not part of Toronto Hydro's existing provincial mandate to provide electricity distribution services, and is distinct from Climate Advisory Services and Streetlighting.

For more information on Climate Capital Investments, please refer to section 3.3.

2. Toronto Hydro's Climate Action Plan and the City of Toronto's NZ40 Strategy

2.1 The Climate Action Plan is responsive to the TransformTO vision and NZ40 Strategy

Toronto Hydro has adopted the assumptions, targets, specific goals and timelines used by the City in creating its climate action vision. As Toronto's sole electricity distributor, Toronto Hydro recognizes the significance of its role in supporting the City's vision.

Based on the City's specific NZ40 Strategy targets and objectives being met, Toronto Hydro expects that its Climate Advisory Services model will help deliver projects resulting in approximately 50,000 electric vehicle (EV) chargers, 60,000 building retrofits and 300,000 Distributed Energy Resources (DERs) (almost entirely solar photovoltaic (PV) and energy storage) by 2040.[17]

As the City develops additional specific targets to guide the transition to net zero, and as Toronto Hydro develops its climate action programs in cooperation with cleantech partners and technology providers, customers, funders, and other stakeholders, Toronto Hydro will update its performance expectations and report on those annually through its corporate reporting and Annual General Meeting.

Presently, the City's Net Zero Strategy provides a vision of the future: what it will take to get to climate impact neutrality. Certain other TransformTO reports that predate this Strategy (e.g. EV Strategy,[18] Net Zero Existing Buildings Strategy[19]) offer some indication of the magnitude of investments required to make meaningful progress. However, significant questions remain, including whether the funding exists at any level of government to enable the required investments, and how to deploy enough qualified professionals and tradespeople to carry out the building-by-building, project-by-project work required over the next 17 years.[20]

Toronto Hydro's Climate Action Plan is not only a commitment to work with the City to answer those questions, but to play a leading role in operationalizing these climate action projects. With the condensed timeline to reach net zero, Toronto Hydro is proud to play a significant role in helping: a) achieve the vision; b) expand the City's understanding of practical implementation challenges and opportunities; and c) grow the community of action among energy and other cleantech companies as a leader in the sector.

2.2 The Climate Action Plan is necessary to enable the NZ40 Strategy

Toronto Hydro's Climate Action Plan is necessary to enable the City's low carbon future, because the primary way the NZ40 Strategy seeks to reduce emissions is through electrification.

The City has determined that 100% of new sales of long-lasting equipment, including furnaces and vehicles, need to be electric by 2030, as it takes at least ten years for these items to turn over.[21] This net zero future in which customers overwhelmingly adopt clean electricity in place of fossil fuel sources of energy requires an expanded and upgraded grid capable of meeting these increasing demands.

The most significant opportunity for Toronto Hydro to enhance its contributions towards net zero emissions by 2040 is to expand and upgrade its electricity distribution grid to be capable of supporting the expected substantial increase in electricity demand.[22] Indeed, with its focus on energy efficiency and electrification, approximately 75% of the City's Net Zero 2040 Strategy depends on these investments by Toronto Hydro.[23]

The central element of Climate Advisory Services is working directly with Toronto Hydro customers to make timely transitions away from carbon-intensive fuels more cost effective and easier to implement and, as the grid is progressively expanded, creating additional capacity for the incremental use of electricity in Toronto.

2.3 The Climate Action Plan is more urgent given the City's adoption of NZ40

Toronto Hydro also recognizes the need for urgent climate action, which is consistent with its own internal commitment to implement an ambitious enterprise-wide program to achieve net zero emissions by 2040. The expedited timeline from NZ50 to NZ40 makes Toronto Hydro's Climate Action Plan all the more urgent and important to achieve the trajectory necessary for these goals to be accomplished, and to assist the community with the energy transition from fossil fuels to widespread electrification.

2.4 Climate Action Plan updates to reflect NZ40

As discussed above, the Climate Action Plan is aligned with the NZ40 Strategy. Though designed in the context of NZ50, the overall framework finalized by Toronto Hydro in September 2021 can accommodate NZ40. Accordingly, Toronto Hydro is not revising the Climate Action Plan document as filed. Key updates to how Toronto Hydro would execute the Climate Action Plan in light of NZ40 are discussed below.

Expanded Electricity Distributor

As a result of moving from NZ50 to NZ40, the utility has less time to create expanded grid capacity for growth, electrification, and incremental local renewable generation. Toronto Hydro currently has assessments underway to examine how to create that capacity within the narrower window, recognizing that the capacity must exist before load and generation can come online.

At a high level, with net zero emissions required by 2040, substantially all of the incremental grid capacity needs to be built by 2035 since the grid must be ready when called upon and there is a high degree of uncertainty surrounding exactly where and when fuel switching and heightened use of electricity will arise.

While the timeline for creating additional capacity is compressed, the system peak demand that Toronto Hydro will need to meet is not impacted by the shift to NZ40. Likewise, the aggregate incremental investment of up to $10 billion for the Expanded Electricity Distributor is not impacted by the shift to NZ40. However, there will now be a need for an even higher up-front capital investment within the first five to ten years (i.e. 2025-2035) than was the case with NZ50. For further details, please refer to Appendix I.

Importantly, NZ40 is one of several external drivers released since Toronto Hydro filed its Climate Action Plan with the City Manager that likely necessitate the Expanded Electricity Distributor. For example, the Federal Government has issued numerous climate-oriented policies[24] that potentially engage electricity distribution system investment, including the Clean Electricity Standard,[25] the Emissions Reduction Plan,[26] and various announcements contained within Federal Budget 2022.[27] Other examples at the provincial level include the releases of the latest IESO Annual Planning Outlook and Annual Acquisition Report and the establishment of an Electrification and Energy Transition Panel.[28]

Climate Advisory Services

The City's goal to achieve NZ40 means Climate Advisory Services will need to be deployed more rapidly. Early efforts will focus on scaling up cleantech action for proven technologies, securing Federal and Provincial funding for individual and aggregated projects at a more rapid pace, and working with the City to advocate for more urgent policy changes that are responsive to the practical needs of customers and cleantech firms based on on-the-ground experiences working with customers and cleantech to design and implement climate action projects.

Achieving net zero emissions by 2040 requires rapidly scaling up climate action programs, policies and investments, as well as an unprecedented mobilization and collaboration among key actors. Those with a significant role to play include the City, Toronto Hydro, other levels of government, cleantech providers, financial institutions, and customers. There is so much to do in such a short period of time that each organization will need to focus on what it does best. For example, based

on discussions with the Environment & Energy Division, Toronto Hydro expects that the distinct role of that City Division will be building momentum for climate action on a city-wide basis and coordinating the efforts of dozens of major climate action companies and key community stakeholders, as well as leading advocacy at the federal and provincial levels. By contrast, Toronto Hydro's Climate Advisory Services will be directed at working with its customers (households and businesses) and cleantech companies on getting projects identified, designed, funded and implemented.[29]

Recognizing the challenge of NZ40 and the urgency of the climate crisis, in January 2022, Toronto Hydro seconded existing staff to a Climate Action Plan Project Team to begin developing Climate Advisory Services on a goodwill basis in anticipation of a mandate. Toronto Hydro has developed a pipeline of climate action projects, which will enable Toronto Hydro to move more quickly toward implementation once a mandate is provided. For details of specific projects, please refer to Appendix D.

3. Toronto Hydro Climate Action Status and Next Steps

3.1 Climate Advisory Services — Leveraging Toronto Hydro's Expertise

Toronto Hydro has an exceptional record of success achieving positive environmental outcomes while stimulating the cleantech sector, including through non-rate regulated activities. The foremost example is during the 14 years when Toronto Hydro had a provincial mandate to implement its CDM programs. Toronto Hydro helped deliver over 1 million projects with a value of approximately $1.9 billion, which produced approximately 3.06 TWh of electricity savings for customers.[30]

With a new mandate from the City as shareholder for Climate Advisory Services, Toronto Hydro can use the same corporate strengths that worked in previous CDM frameworks to be a Canadian leader in the climate action era.[31]

Leveraging Toronto Hydro's expertise and knowledge to facilitate large-scale climate action projects within the City of Toronto offers many benefits for residents and businesses. Actions focused on critical emissions reduction projects, including decreasing energy demand through building retrofits for energy efficiency, decreased fuel costs through electrification of building systems, and decreased fuel costs through fleet electrification, will all result in lower operating costs for homeowners and businesses over the long-term, as well as contribute toward customers' own climate goals.

The benefits are attractive, but the key to enabling adoption will be making these projects accessible and affordable to businesses and residents, including low-income customers. Through Climate Advisory Services, Toronto Hydro can leverage its existing relationships to take a front-line role building customer awareness and interest, working with customers and cleantech partners to guide and help implement individual projects, and partner with the City, other governments, and other funders to make climate action more affordable. Toronto's business community supports this approach and its anticipated outcomes.[32]

Toronto Hydro proposes a model whereby the local utility works hand-in-hand with those seeking to build climate action projects in its local market is consistent with the approach taken in other jurisdictions[33] but is larger in scope and the first of its kind in Ontario.[34] This approach has multiple benefits across the stakeholder group, including enabling the local cleantech economy and local investment in new technologies, while also delivering significant emission reductions. The energy transition will not be easy to understand or respond to; Toronto Hydro is in a unique position to help make it less difficult, which is expected to lead to a more positive experience for customers, and to faster and greater climate action for our community.

3.1.1 Operating Costs

At the time Toronto Hydro prepared its Climate Action Plan, the City had a net zero target of 2050. Toronto Hydro projected operating costs of Climate Advisory Services to be $400 million based on a 28-year implementation period from 2022-2050. With the deferred approval of the Climate Action Plan and the shift to a net zero 2040 target, the 17-year implementation period estimate for 2023-2040 is $255 million.

As proposed in the CAP, Toronto Hydro will self-fund the operating costs of Climate Advisory Services. Specifically, the operating costs set out above will be generated through revenues and net income within Toronto Hydro's regulated electricity distribution business. As Climate Advisory Services is increasingly successful in helping customers make the energy transition to electricity, the effect will be further growth of the regulated distribution business, which leads to a virtuous cycle of greater net income, thus enabling further growth and financial capacity to cover the operating costs of Climate Advisory Services.

The annual costs for Climate Advisory Services are expected to ramp-up from approximately $8 million in 2023 to approximately $15 million in 2026. This expectation is based on Toronto Hydro's historical experience with its CDM program. The phased-in timing will allow Toronto Hydro to

develop the necessary expertise and programing in consultation with City Staff and other local stakeholders.

3.1.2 Project Costs

Toronto Hydro's Climate Action Plan forecasted $3.5 billion in project funding could be available through Federal grants, based on a per capita extrapolation of announced Federal climate programs in mid-2021. Since that time, the Clean Electricity Standard,[35] Federal Emissions Reduction Plan,[36] and Federal Budget[37] have all included announcements of additional funding for climate action. Toronto Hydro is in active discussions with departments of the Federal Government, and through that work is identifying unique or impactful roles that Climate Advisory Services can perform to increase the speed and volume of Federal climate grants coming to Toronto households, businesses and cleantech partners. Highlights of this ongoing work are set out in the Enabling Access to Funding Project Overview in Appendix D. Toronto Hydro also maintains active lines of communication with the Provincial Government with respect to opportunities to advance climate action.

3.1.3 Early Execution Programs

Toronto Hydro's Climate Action Plan highlighted four program areas[38] for climate action in the City of Toronto. Toronto Hydro is well-positioned to expedite delivery of low capital cost projects to Toronto residents and business through collaboration with cleantech and related firms, funding bodies and other industry stakeholders

As noted previously, since January 2022 Toronto Hydro has seconded team members to its Climate Action Project Team to begin readiness activities including preparation for climate action projects which could be pursued through Climate Advisory Services. In response to requests from City Council and City Staff for additional details on prospective climate action initiatives, Toronto Hydro has set out the following four appendices that provide information on project opportunities; estimated program costs; interested partners; and categories of initiatives:

- Appendix D sets out these prospective climate action project opportunities, including examples of projects that are currently underway or in development, as well as case studies highlighting climate action projects undertaken in other jurisdictions.
- Appendix E provides estimated program costs from 2023-2025 by primary technology stream and program along with potential funding sources.
- Appendix F sets out prospective partners for project delivery and Memoranda of Understanding in place for each of the primary technology streams.
- Appendix G summarizes key climate action targets expected to influence electrification in Toronto.

Toronto Hydro is ready to organize its business to execute on these projects through its proposed Climate Advisory Services business, pending a climate action mandate from the City. Many of these projects and partnerships will be curtailed or cancelled if the City ultimately decides not to issue a climate action mandate to Toronto Hydro.

3.2 City-Wide Streetlight LED Conversion

As the City seeks to urgently mobilize large-scale projects with significant greenhouse gas emission reduction benefits in accordance with its TransformTO vision, Toronto Hydro and Transportation Services recommend the city-wide LED streetlight conversion project as an immediate focus area.

LED technology for streetlighting has proven and substantial climate change, public safety, financial and operational benefits. A majority of Ontario municipalities have converted to LED streetlights, including those neighbouring Toronto (Mississauga,[39] Vaughan,[40] Brampton,[41] Pickering,[42] and Markham[43]). Further, many large municipalities in the United States have

undertaken comprehensive LED streetlight conversion projects.[44] The City of Toronto and Toronto Hydro can leverage the advances in LED technology to maximise the effectiveness of this project and complete the transformation prior to the obsolescence of conventional lighting technologies. The joint Toronto Hydro-City Staff Streetlighting working group concluded that, in addition to the financial benefits arising from lower energy costs and longer lasting light bulbs, LED streetlight conversion provides community lighting quality improvements and greenhouse gas reductions.[45] From a financial perspective, the City can expect to benefit from energy savings of approximately 60% by approving a city-wide LED streetlight conversion project,[46] as well as cost reductions related to regular maintenance.

The joint working group's proposed LED streetlight conversion plan is also synergistic with encouraging EV uptake and a proposed ultra-low overnight electricity rate,[47] as it would free up roughly 20 MW of capacity that could be reallocated to EV charging.

Given the mandate to pursue this initiative, Toronto Hydro and Transportation Services will develop an implementation plan for submission to City Council in Q2 2023 with specific recommendations regarding technology, timeline and budget, including the enabling investments required.

3.3 Climate Capital Investments action deferred pending further work

Toronto Hydro is well-positioned to implement other climate action projects on behalf of the City of Toronto, on an as-needed basis, through its proposed Climate Capital Investments business. As described above, Toronto Hydro and City Staff recommend that Climate Capital Investments be deferred at this time and be reconsidered in 2023.

This future reconsideration is expected to assess whether there are compelling reasons to develop a portfolio of Toronto Hydro owned, operated and maintained projects in order to accelerate progress against NZ40 Strategy objectives. For example, there may be situations where the cleantech sector via Climate Advisory Services is unwilling or unable to deliver to the City's satisfaction. In these cases, the City may consider Climate Capital Investments as a means to address those hard-to-meet goals. This may be necessary and impactful in scenarios where the outcomes and benefits of the project serve equity-seeking groups and/or vulnerable populations, based on their needs, in communities or neighbourhoods that may otherwise face significant barriers to implementing such projects.

Through this approach, Climate Capital Investments can address cleantech market deficiencies; improve equity; and avoid competing with the private companies it is supporting through Climate Advisory Services.

If operationalized, Climate Capital Investments would require an initial minimum of $25 million in upfront funding for start-up costs and to create a stable environment from which to implement multi-year projects.[48] This is in addition to direct project-by-project funding[49] from the City where funding is not available from other sources.

In terms of anticipated timing of required investments in Climate Capital Investments, project funding must be front-loaded compared to ultimate project delivery, due to the time it takes to develop, procure and implement projects.

As stated in the Climate Action Plan, Climate Capital Investments would be undertaking non-distribution activities to plan and implement climate change projects, and would therefore be required to operate through an unregulated affiliate business separate from Toronto Hydro's electricity distribution business.[50] The Climate Capital Investments business would be prevented by the Ontario Energy Board's Affiliate Relationships Code from using regulated business capabilities in its work, such as access to customer information, employees or system planning information.

3.4 Comparing Climate Advisory Services and Climate Capital Investments

At the request of City Council, Toronto Hydro has assessed two, potentially complementary, project delivery frameworks:

1. climate-related energy project services (Climate Advisory Services) and
2. climate related equipment ownership and operation (Climate Capital Investment).

The summary table below illustrates the comparative advantages and disadvantages associated with pursuing a sample of projects through Climate Advisory Services or Climate Capital Investments. Based on this analysis, for the most part, Climate Advisory Services is expected to be the better approach to achieve large-scale climate action. However, in some cases, Climate Capital Investments provides compelling opportunities to enhance equity and address underserved communities self-identified needs.

The leaf rating system represents the relative impact of a category on a scale of 1 to 3 leaves. More leaves suggest lower barriers to implementation and/or more positive expected potential impact.

Appendix H provides a detailed discussion of considerations for choosing Climate Advisory Services or Climate Capital Investments for these project streams.

Program	Climate Advisory Services					Climate Capital Investments				
	Legal Implications	Regulatory Implications	Greenhouse Gas (GHG) Emission Reductions	Stimulating Local Economy	Equitable Implementation	Legal Implications	Regulatory Implications	GHG Emission Reductions	Stimulating Local Economy	Equitable Implementation
Electric Vehicle Charging Infrastructure	3	2	3	3	2	2	2	2	1	3
Air Source Heat Pumps	3	3	3	3	2	2	2	2	1	3
Solar PV	3	3	3	3	2	2	2	2	1	3
Electric Hot Water Heaters	3	3	3	3	2	2	2	2	1	3
Overall Result	3	3	3			3	3			

3.5 Advancement of Social Equity

Climate change drives more extreme weather, rising temperatures and exposure to air pollution, all of which can both amplify an individual's existing vulnerability and introduce new threats based on their predisposed social determinants of health.

It is widely acknowledged, from United Nations reports, studies in medical journals and even recent Canadian lived experience, that climate change disproportionately impacts vulnerable segments of society. Accordingly, there is inherent and inseparable value in pursuing climate action toward achieving social equity.[51] This includes putting to use subsidies and other financial supports to help those who need it most — to facilitate action by end users in all communities and protect the vulnerable from disproportionately bearing the costs of climate action.

Toronto Hydro recognizes that helping the City decarbonize Toronto's economy means making low-carbon electricity readily available and affordable to all Torontonians. Toronto Hydro intends to apply a social equity lens as it develops its climate action project plans and considers models of service delivery.

Climate Advisory Services programs can be designed with the perspective and interests of low-income, marginalized or otherwise underserved communities top of mind. The ability to secure external funding and partnerships through Climate Advisory Services may be more limited due to cleantech service provider self-interested focus on maximizing financial returns for these emerging technologies. Where Climate Advisory Services' incentives are insufficient to ensure vulnerable communities are adequately served by the private market, Climate Capital Investments could be a key mechanism to advance social equity, as the City could select and fund specific projects supporting underserved groups, and leverage Toronto Hydro's existing relationships with these customers.

Toronto Hydro's planning for investments and areas of service will be informed by regular outreach and engagement with consumers, with particular attention to understanding the needs of underserved communities.

Appendicies

Appendix A – Background

On April 7, 2021, Toronto City Council requested that Toronto Hydro consider opportunities to respond to the climate emergency through climate action. The City requested that Toronto Hydro prepare a report on its current climate action and an action plan for what more it could do to support the objectives of the City's TransformTO vision and forthcoming Net Zero Strategy, including in the following areas:

1. electric vehicle charging infrastructure;
2. modernization of outdoor lighting and streetlighting; and
3. renewable energy and energy storage.

The City also requested that Toronto Hydro explore non-rate sources of funding, revenue, grants and financing. In the course of subsequent discussions, the City confirmed that Toronto Hydro should also report on building electrification and energy efficiency.[52]

In September 2021, Toronto Hydro delivered its Climate Action Plan to the City Manager. The Climate Action Plan sets out three climate action opportunities that Toronto Hydro can pursue to continue to improve Toronto's environment and help the City achieve its net zero objective.

In November 2021, the City Manager issued its report to the Executive Committee on Toronto Hydro's Climate Action Plan.

In December 2021, City Council considered the recommendations of the City Manager and passed several resolutions.[53] The resolutions included that the City Manager report back to City Council by the end of the second quarter of 2022 on recommendations regarding new climate action mandates for Toronto Hydro. Further, City Council requested Toronto Hydro and the City continue to collaborate on the Climate Action Plan and Toronto's net zero targets, and provide recommendations in respect of the three business opportunities outlined in the Climate Action Plan.

Appendix B contains a complete list of the City Council requests, including those set out in a letter from Councillor Mike Layton dated December 6, 2021 and adopted by resolution, along with Toronto Hydro's responses.

In December 2021, the City also adopted a more aggressive 2040 net zero target, which superseded the net zero 2050 target that guided Toronto Hydro's development of the Climate Action Plan.[54]

In January 2022, Toronto Hydro and City Staff resumed collaboration to assess and maximize the alignment of the City's TransformTO NZ40 Strategy and Toronto Hydro's Climate Action Plan. The City and Toronto Hydro formed a joint City-Hydro Steering Committee, with senior representation from Toronto Hydro's dedicated Climate Action Project Team, as well as the City's Environment and Energy and Corporate Services Divisions. The Steering Committee reports to the Deputy City Manager, Corporate Services; Deputy City Manager, Infrastructure and Development Services; City Chief Financial Officer; and to Toronto Hydro's Executive Vice President of Public and Regulatory Affairs and Chief Legal Officer.

The Joint City-Hydro Steering Committee managed a process through which: i) City Staff filed three rounds of written questions and received responses from Toronto Hydro; ii) the City and Toronto Hydro exchanged four outlines and drafts of their respective reports, and iii) topic-specific working groups examined and addressed detailed subjects requiring further discussion to establish the necessary awareness, understanding, and ultimately alignment over 10 hours of meetings.

The collaboration between the City and Toronto Hydro leading up to this Status Report has been ongoing and substantial, with 39 meetings over the course of six months. These and other enhancements to the City-Hydro relationship and mechanisms for collaboration are expected to continue and support aligned climate action implementation.

Appendix B – Responses to City Council Requests

City Council Resolution

1. City Council as shareholder request Toronto Hydro Corporation, the Deputy City Manager, Infrastructure and Development Services and the Deputy City Manager, Corporate Services, to continue a collaborative analysis of the Toronto Hydro Climate Action Plan and relevant City strategies and programs to determine specific goals, outcomes, actions and timelines for enabling Toronto's net zero climate targets including consideration of the recommendations contained in the letter (December 6, 2021) from Councillor Mike Layton and provide recommendations to both new business opportunities as outlined in the Plan; Climate Advisory Services and Climate Capital Investment.

Response

Toronto Hydro and City Staff collaborated to assess and maximize the alignment of the City's TransformTO Net Zero 2040 Strategy and Toronto Hydro's Climate Action Plan.

Climate Advisory Services and Climate Capital Investment business streams offer complimentary programs to support Toronto's net zero climate targets. Toronto Hydro and City Staff collaborated to determine recommendations for the timing and scope of these new business streams.

Please refer to the following Status Report sections for further details on the following:

- Collaboration between City of Toronto and Toronto Hydro: 1.2
- Alignment between the City's Net Zero 2040 Strategy and Toronto Hydro's Climate Action Plan: 2.1
- Recommendations on Climate Advisory Services: 3.1
- Recommendations on Climate Capital Investments: 3.3
- Climate Advisory Services/Climate Capital Investments Comparison tables: Appendix H

2. City Council request the Deputy City Manager, Infrastructure and Development Services and the Deputy City Manager, Corporate Services, and relevant divisions, agencies and stakeholders, in collaboration with Toronto Hydro, to refine the TransformTO spatial and temporal study of climate actions to include probabilistic adoption scenarios (for example, electric vehicles and heat pumps), resulting in corresponding electricity consumption and demand profiles.

Response

Toronto Hydro is currently evaluating its long-term system capacity needs (up to 2040) and is taking a granular approach to forecasting electricity demand across the grid to inform the prioritization of specific localized upgrades. The goal of these forecasts is to develop a range of scenarios that consider different futures with varying levels of decentralized electricity generation; climate policies; and decarbonization target achievement.

Please refer to the following Status Report sections for further details on the impact of the shift to NZ40: 2.4, Appendix C

3. City Council direct the City Manager to report to City Council by the end of the second quarter of 2022 with respect to the analysis referred to in Part 1 above and the consultation and climate adoption scenarios referred to in Part 2 above, including possible implementation plans starting as early as 2022, and any recommendations regarding new climate action mandates such as a shareholder direction for Toronto Hydro.

Response

Toronto Hydro is requesting new mandates for Climate Advisory Services and Streetlighting. Toronto Hydro is recommending a mandate for Climate Capital Investments be deferred until 2023.

Please refer to the following Status Report sections for further details on Toronto Hydro's proposed climate action mandates: 1.2, 1.3

Information regarding Toronto Hydro's implementation plans, including program overviews, cost estimates and prospective partnerships, can be found in Appendices D, E, F, respectively.

4. City Council direct that Confidential Attachment 3 to the report (November 23, 2021) from the City Manager remain confidential in its entirety, in accordance with Section 4.4 of the Toronto Hydro Shareholder Direction, as it contains technical, commercial, financial or labour relations information of Toronto Hydro Corporation.

Response

No response required.

5. City Council request the Director, Environment and Energy to report on the current City programs, through Live Green TO, that already engage residents in climate action activities and what possibilities there are to increase public engagement.

Response

No response required of Toronto Hydro.

6. City Council request Toronto Hydro to report on the feasibility of providing On-Demand water heaters or other similar energy efficient climate friendly products to Toronto Hydro customers, through an affordable program that could include grants and interest free loans, that would ensure that low and modest income residents of Toronto are able to afford these energy saving water heating products.

Response

As discussed in Appendices D and F, opportunities exist to make converting to electric water heaters more affordable. If pursued through Climate Advisory Services, Toronto Hydro will work to enhance contractor partnerships to educate, collaborate, incentivize and influence customer purchases of new electric water heaters. This can be done through relationships with funding bodies; bulk procurement; or establishing a list of reputable service providers. While Toronto Hydro is not currently requesting a mandate for Climate Capital Investments, future program inceptions could see Toronto Hydro owning, operating and leasing these assets through an unregulated subsidiary.

It is important to note that electricity price increases are not the only impact to household expenses. Customers will also see household energy bill savings through reduced natural gas and gasoline bills. The average household may experience a net increase in monthly energy consumption cost ranging between 32-42% due to the impact of total electrification of domestic heating, shifting from natural gas. However, when considering the electrification of personal transport in addition to domestic heating as part of household expenses, an average customer may experience a net decrease of 12-55% in total monthly energy consumption costs, including electricity, natural gas and gasoline. It should be noted that the above net changes include only consumption or commodity costs. Distribution rates as part of customer charges in electricity bills may increase by 8-9%.[55]

Please refer to the following Status Report sections for further details on the following:

- Financials for Climate Advisory Services: 3.1.1, 3.1.2, Appendix E

- Climate Action Plan program overviews: Appendix D

7. City Council request Toronto Hydro to report to City Council by the first quarter of 2022 on Part 6 above given the urgency of the Climate Change Crisis.

Response

Councillor Colle moved the request approved by City Council. Following discussions with City Staff, Toronto Hydro spoke with Councillor Colle's office and requested that the water heating topic return to Council along with the rest of the Status Report. Councillor Colle graciously agreed to the revised timing, which allows for the important topic of fuel switching water heating to be addressed in the broader context of the Climate Action Plan.

Councillor Mike Layton Letter Responses

1. City Council request the Toronto Hydro Corporation to implement the Toronto Hydro Climate Action Plan, with the following additional requests concerning implementation:

a) that in modernizing and expanding the grid to enable electrification, Toronto Hydro maximize the use of distributed energy resources as non-wires alternatives, including in relation to b), c) and d) below;

Response

Toronto Hydro deploys distributed energy resources (DERs) as non-wires alternatives on its distribution system. Toronto Hydro is co-leading an initiative with the Ontario Energy Board, DER companies, ratepayer groups, environmental groups, and other utilities to develop new regulatory models and practical protocols that will expand these opportunities while preserving or improving electricity service affordability, safety, and reliability. Separately, Toronto Hydro has led paradigm-expanding projects involving the use of non-utility owned distributed energy resources to avoid traditional infrastructure investments.

Toronto Hydro is operating a successful local demand response program at Cecil Transformer Station and Basin Transformer Station. This Local Demand Response program utilizes 8 MW near the U of T St. George Campus. Further evaluation is underway in the East Don Lands for an additional 1 MW.

Toronto Hydro is now working with the Independent Electricity System Operator, Ontario Energy Board, and operational partners to implement a larger scale demand response project in Etobicoke to not only utilize distributed energy resource capacity as a non-wires alternative, but to also study the impacts of demand response on the distribution and transmission systems. This project is designed to produce new, practical, on-the-ground, customer-facing knowledge that enables more, large scale deployments in Toronto and beyond.

For distributed energy resources to provide a non-wires alternative to grid expansion, they must clearly provide benefits to the distribution system. Toronto Hydro firmly believes that distributed energy resources and smart grid functionality will be an integral component of distribution grids and services going forward.[56] However, moving into this future state in an affordable and seamless way is still a work in progress across all jurisdictions, with no preceding model to follow. As Toronto Hydro continues to explore this opportunity, closely working with customers, distributed energy resource companies, and other innovators, it needs to continue to invest in the more certain technologies that will enable mass electrification and decarbonization of supply, including local renewable generation and storage used for that purpose.

Non-wires alternatives developed in partnership with the cleantech sector must meet the same standards of safety, reliability and affordability that Toronto Hydro's customers and other stakeholders demand of the power grid. Distributed energy resources that form part of these non-wires alternative solutions must be sufficiently controllable to ensure they provide public benefits (i.e. distribution system benefits) and not only benefits to the DER owner.

Alternatives are focused on making demand match supply (as opposed to the other way around) to reduce distribution system peaks and the associated investments. This will also assist in decarbonizing provincial large-scale generation (less use of natural gas peaking plants, and potentially less renewable curtailment) and will help control rate increases.

b) that Toronto Hydro coordinate closely with the Environment and Energy Division and The Atmospheric Fund in the development and implementation of the proposed Climate Advisory Services, in order to maximize synergy and minimize duplication;

Response

Toronto Hydro has been working in coordination with the City's Environment and Energy Division as well as the Toronto Atmospheric Fund regarding the development of Climate Advisory Services. Achieving the NZ40 targets requires rapid scale up of programs, policies and investments. Mobilizing actors will require partnerships between Toronto Hydro and key organizations such as the City, other levels of government, cleantech providers, financial institutions and customers to quickly deploy effective, scalable programs.

Please refer to the following Status Report sections for further details on the following:

- Climate Advisory Services Mandate: 1.3.1
- Update to Climate Advisory Services to reflect NZ40: 2.4
- Climate Advisory Services next steps: 3.1

c) that Toronto Hydro move forward with the proposed LED streetlighting conversion project, in partnership with the City, and work with the Vision Zero team to prioritize LED conversions in areas with high incidence of traffic-related injuries and fatalities;

Response

Transportation Services supports Toronto Hydro's proposed streetlighting LED conversion plan. City Staff and Toronto Hydro will work together toward developing the implementation plan for delivery in Q2 2023.

Please refer to the following Status Report sections for further details on the following:

- Streetlighting LED Conversion Mandate: 1.3.2
- City-Wide Streetlight LED Conversion next steps: 3.2

d) that Toronto Hydro, as part of its proposed climate investment program, work with the Environment and Energy Division to develop and launch a large-scale solar and storage program that offers turnkey project delivery with no up-front costs to home and building owners;

Response

It is critical to appropriately engage the relevant stakeholders to ensure that projects serve local communities. As Toronto Hydro develops its new service lines, including alternatives to grid expansion, engagement and partnership opportunities will be explored with a diverse range of stakeholders to help design high-impact electrification solutions that are driven by the communities Toronto Hydro serves. Such partnerships with trusted community and non-governmental organizations (NGOs)[57] can play a critical role in helping identify and respond to customer needs. In collaboration with NGO partners and as part of the customer consultation process contained within the rate filing process, Toronto Hydro will solicit feedback from customers on their energy security/affordability needs, and use those insights for program design and to inform its rate application to the Ontario Energy Board. Toronto Hydro can also leverage feedback documented within its customer relationship management systems to further inform customer needs.

Additionally, empowering distributors is key to further alternatives to grid expansion.[58] Toronto Hydro is a leading voice in calling on further provincial empowerment of capable local distributors such that utilities may be able to assess and compensate the value provided by non-utility distributed energy resources, including by deploying them to their best advantage in real-time on a localized basis.

Please refer to the following Status Report sections for further details on the following:

- Climate Advisory Services description: 3.1
- Solar and Storage program: Appendix D (Solar + Storage Table)
- Prospective Partnerships/Stakeholders to Climate Advisory Services: Appendix F

e) that Toronto Hydro, as part of its proposed climate investment program, work with Transportation Services to expand on-street charging building on the success of the pilot completed in 2020; and

Response

Toronto Hydro is working closely with Transportation Services to expand on-street charging. At least 32 Level 2 electric vehicles chargers will be installed on Toronto Hydro poles throughout the City.

Please refer to the following Status Report sections for further details on the following:

- Streetlighting LED Conversion Mandate: 1.3.2
- City-Wide Streetlight LED Conversion next steps: 3.2
- On-street Charging program: Appendix D (On-Street Charger Expansion (Phase 2) Table)

f) that Toronto Hydro provide the Environment and Energy Division with regular updates on the specific areas of the City where grid constraints prevent installation of distributed energy resources, and work with the Environment and Energy Division on resolving those constraints, including joint advocacy to the Provincial Government and the Ontario where necessary.

Response

Toronto Hydro is planning to make grid constraint information available to its customers on October 1, 2022, in accordance with new Ontario Energy Board requirements to streamline distributed energy resource connection processes. As the Toronto Hydro grid is dynamic, the list will be updated at least every three months. At present, fewer than 1% of distributed energy resources are not permitted to connect due to system constraints. The small number of locations where grid constraints impact distributed energy resource deployment will further inform investment planning for the next rate application. Significant grid investments will be required by 2040 for localized upgrades to accommodate the large two-way power flows associated with the high levels of distributed energy resources in the City's Net Zero Strategy.[59]

2. City Council request Toronto Hydro, to consider, as part of removing barriers to uptake of solar, PV and storage the removal of barriers to solar PV, EV, and storage, consider:

a) as part of their online portal, developing a live update on the progress of applications for solar PV or storage through stages of the approval process;

b) a one-time courtesy disconnection fee waiver, and;

c) Offering an annual hourly peak consumption report in excel format for customers applying to install EV chargers.

Response

Toronto Hydro must strike the right balance between distributed energy resource incentives and affordability. Toronto Hydro is committed to reducing the cost and effort required for customers to install their own distributed energy resource projects (predominantly solar and energy storage), but is mindful of shifting costs to other ratepayers, particularly those least able to afford them.

The ideas proposed by City Council to facilitate distributed energy resource deployment such as disconnection fee waivers, online application portals, and giving customers greater control of their energy consumption information are all good ideas worthy of careful consideration. Toronto Hydro will be considering these and other initiatives to facilitate and accelerate distributed energy resource deployment in its upcoming rate application to the Ontario Energy Board. Other ideas under consideration to improve customer experience include the development of a front-end portal for distributed energy resource application intake, triage and management.

Depending on the initiative, it may be more appropriate to offer targeted programs designed to remove barriers for low-income customers such as subsidies on isolation fees or other incentives to enable EV charger installation, solar PV, storage or other climate action related projects. Through an inclusive framework, Toronto Hydro can work collaboratively with marginalized communities to understand their specific needs; empower climate action; and offer co-benefits related to health, safety, reliability and mobility.

Efforts to improve the distributed energy resource connection process are already underway. Toronto Hydro is currently reviewing its distributed energy resource connection processes to determine how to improve the application and processing of DER applications and provide additional transparency. The goal of this project is to improve the overall experience of customers by incorporating features, including:

i. Improved ease of submitting application forms and payments;

ii. Real-time visibility and tracking of in progress projects; and

iii. Access to project documents for customers and Toronto Hydro.

Additionally, customers installing EV chargers or distributed energy resources may benefit from knowing when building demand is highest when planning for:

iv. EV fleet charging;

v. Facility equipment upgrades;

vi. Required grid connection upgrade needs; and

vii. Potential energy costs or savings associated with technology installation based on Time-of-Use pricing.

Individual customers are currently able to access data at various levels of granularity, depending on the type of meter linked to their facility's account.

i. Residential customers can access meter data through their MyTorontoHydro account in Green Button format.

ii. Commercial customers with non-interval meters will have access to their data through their Toronto Hydro web portal in 2022.

iii. The PowerLens Business portal allows customers with interval-based meters to run reports and view data in any available interval length (5min, 15min, 60min and also daily) depending on the meter type. Customers logging into the PowerLens portal can review

kW, kVA and kVAR for the selected timeframe.

3. City Council request that Toronto Hydro, as part of their Q2 2022 report to the City of Toronto, in consultation with the Energy and Environment Division and The Atmospheric Fund:

a) explore options to bulk purchasing heat pumps, net zero hot water heaters, solar panels, renewable energy technologies, and EV chargers, and partner with installers or other agencies or institutions for their deployment, and a strategy for implementation starting in 2022

Response

Toronto Hydro is exploring opportunities to leverage bulk procurement efficiencies across technology types (see Appendix D section 2). Toronto Hydro will work with manufacturers, distributers, services providers and customers to enable broad scale uptake of climate-friendly technology and will continue to engage with the Environment and Energy Division and The Atmospheric Fund to avoid duplication of effort and take advantage of any synergies.

Please refer to the following Status Report section for further details on the following:

- Climate Advisory Services next steps: 3.1
- Climate Action Plan programs overview: Appendix D
- Prospective partners for Climate Advisory Services: Appendix F

b) make recommendations for requests to the provincial government, and their agencies, to support Toronto Hydro and the City of Toronto for implementing the TransformTO strategies and targets.

Response

Toronto Hydro recommends the following requests to the provincial government to support TransformTO implementation:

- Engage in comprehensive integrated energy planning that covers all jurisdictions and energy sources[60]
- Embed greenhouse gas emissions targets as objectives in the next Long Term Energy Plan
- Implement rate structures that favour electrification and fuel switching away from fossil fuels, and develop new CDM programs designed to help customers take advantage of those new rate structures
- Scale innovative energy pilot projects that reduce emissions and achieve other benefits for households and businesses
- Reform or expand energy assistance programs to direct more funds to vulnerable households and businesses to support their transition to net zero
- Pursue climate action at provincially-owned buildings and facilities in Toronto

Appendix C – Expanded Electricity Distributor

Electricity distribution systems are regulated by the Ontario Energy Board. Accordingly, the Expanded Electricity Distributor opportunity is a matter of provincial jurisdiction. By provincial statute, the Ontario Energy Board considers the impact of capital investments (such as those set out in the Expanded Electricity Distributor) on affordability in setting the rates that cover the cost of safe, reliable, electricity service. Recently, the Minister of Energy has instructed the Ontario Energy Board to explicitly consider climate issues, including the need for decarbonization.[61]

Toronto Hydro, the City Environment & Energy Services Division, City Finance and Administration Division, and City Legal Services have held several working group sessions to inform City Staff of the implications for the City as shareholder of expanding the distribution system to support net zero electrification.

Toronto Hydro is currently evaluating its long-term system capacity needs (up to 2040) and is taking a granular approach to forecasting electricity demand across the grid to inform the prioritization of specific localized upgrades. The goal of these forecasts is to develop a range of scenarios that consider different futures with varying levels of decentralized electricity generation; climate policies; and decarbonization target achievement. This work is informed by the additional data recently received from City Staff that underpins the City's Net Zero strategy.

To align with the City's new goals, Toronto Hydro is shifting its investment planning efforts towards achieving net zero by 2040. Accelerating greenhouse gas emissions reductions to achieve net zero by 2040 is not expected to impact the total system peak load (i.e. the maximum amount of electricity required across the system) and climate action grid investments will remain at up to $10 billion. The investment timeframe will need to be accelerated to ensure power is available when required.

Toronto Hydro will use these forecasts to inform its business planning process and refine its prospective capital investment plans. The business plan will be reviewed and approved by the Toronto Hydro Board of Directors and will form the basis of Toronto Hydro's rate application to the Ontario Energy Board to set electricity rates for 2025-2029. This application will propose an annual schedule of expenditures necessary to prepare the distribution system for incremental net zero electrification and local renewable generation. Toronto Hydro will continue to communicate with City Staff in the lead-up to the rate application to the Ontario Energy Board, including with respect to the potential financial considerations for the City as shareholder, preliminary extrapolations of which were set out in the Climate Action Plan and are updated in Appendix I to this Status Report.

While Toronto Hydro's extrapolated capital investment of up to $10 billion to enable the City's Net Zero Strategy will result in significant distribution rate increases for residential customers,[62] these high levels of electricity system investment are not unique to Toronto. Princeton University's Net Zero America study projects that approximately $280 billion USD of additional investment (compared to business as usual) will be required to support the aggressive electrification needed to achieve net zero greenhouse gas emissions.[63]

Appendix D – Climate Action Plan – Program Overviews

Toronto Hydro's Climate Action Plan highlighted four climate action program areas[64] through which to pursue climate action in the City of Toronto: Transportation Electrification, Building Conservation and Energy Efficiency, Renewable Generation and Energy Storage, and Modernization of Outdoor Lighting. Modernization of Outdoor Lighting will be addressed through the Streetlighting LED conversion program. City Council and City Staff requested additional details regarding the scope and type of programs that Toronto Hydro will pursue to deliver climate action in the other program areas.

The following program overviews describe initiatives in various stages of development:

1. Programs ready for scale-up
2. Early Execution Opportunities
3. Case Studies from other jurisdictions

1. Programs ready for scale-up

Early Execution: *On-Street Charger Expansion (Phase 2)*

Description:

- Toronto Hydro is working with the City of Toronto to identity areas in the city that will benefit from a pole-mounted sidewalk charging station while targeting areas that are not currently over-capacity for permit parking
- Users are billed based on time used and are required to set up an online account with the charging station manufacturer

Timeframe: Installed by end of 2022

Scope	Need	Results & Impact
• Minimum 17 L2 EV chargers distributed across the City, located on Toronto Hydro wood poles • Currently on track to install 32 new on-street L2 EV chargers in 2022	• Make owning an electric vehicle easier for residents who don't have garages or dedicated parking spots for their own charging stations	• Provides charging options for EVs in neighbourhoods with mainly on-street permit parking • Supports readiness for large scale deployment • GHG Savings: Existing Downtown and Residential pilots observed an energy consumption in total of 54,774 kWh over the first 12 months. At an average net GHG mitigation factor of 1kgCO2e/kWh, this represents over 55 metric tonnes of CO2e that would otherwise have been emitted from Internal Combustion Engine equivalents[65]

Approach	Project Cost & Funding Sources
• Suitable poles are pre-selected by Toronto Hydro, working in conjunction with Transportation Services • City Councillors are engaged to approve locations • Toronto Hydro communicates to local residents and installs EV chargers and other necessary equipment • Transportation services manages signage and street marking	• Estimated $400k to $690k • $5,000 per charger Natural Resources Canada Zero Emission Vehicle Infrastructure Program/ The Atmospheric Fund incentive applicable • Capital funded by Toronto Hydro with planned ownership conveyance to Toronto Parking Authority in 2023

Early Execution: *Solar + Storage*

Description:

- Toronto Hydro will build upon project learnings from the Waterfront Neighbourhood Centre Solar and Storage for future projects
- Toronto Hydro worked with the City of Toronto to develop and install a combined solar and storage system at the Waterfront Neighbourhood Centre in Toronto
- City of Toronto will own and operate the system to reduce their electricity bill via peak shaving and net metering, while also relying on the system for emergency backup power during a grid outage

Timeframe: In-Service 2021, future project opportunities 2022-2024

Scope	Need	Results & Impact
• 100kW AC solar and storage installation • 222kWh of DC battery energy storage capacity • 300 solar panels • Control system that enables peak shaving and emergency backup functionality	• Pilot project demonstrates the value of a solar and storage system as an alternative to natural gas or diesel for emergency backup power	• Estimated annual production of 130MWh from the solar portion of the system, with the majority of that production occurring during peak times when used in conjunction with the energy storage • Over 10 hours of emergency backup capability provided by the solar and storage system will allow the community centre to be used as a shelter in the case of a grid outage

Approach	Project Cost & Funding Sources
• City of Toronto requested Toronto Hydro to provide development and project management services for the installation • Toronto Hydro prepared an RFP based on the desired scope and selected a suitable vendor • Toronto Hydro is providing project management services during construction through to completion	• Approximately $700k • Funded and owned by the City of Toronto

2. Early Execution Project Opportunities

Early Execution: *Electrification Project Connection Accelerator*

Description:

- Toronto Hydro will provide early assistance to customers and developers submitting a connection application to install medium to large electrification projects
- EV charging stations, air source heat pumps, solar PV systems or other electrification measures (such as electric boiler conversions) may trigger a connection upgrade due to limited connection capacity, and designers can provide an estimate of project connection cost and required construction time
- Early engineering/design help can accelerate projects and avoid surprises that can delay projects
- The project scope and details discussed here use EV charging systems as an example

Timeframe: Spring 2022

Scope	Need	Results & Impact
• Larger commercial behind-the-meter projects	• Customers and consultants are unaware of connection limitations and projects can be negatively impacted by connection cost and schedule, which can also reflect negatively on Toronto Hydro	• Helps customers and developers prioritize projects • Accelerates and streamlines project implementation • GHG Savings: Every kWh of electricity that an EV consumes represents a net reduction of more than 1kg$_{CO2e}$ that would otherwise be emitted by an Internal Combustion Engine equivalents vehicle[66]

Approach	Project Cost & Funding Sources
• Toronto Hydro's Early Developer Engagement team is advised of a potential EV project • Toronto Hydro engineering and design resources are assigned to review existing supply configuration • Estimated costs and connection timeframe are identified • Toronto Hydro assists customer to submit a formal connection application	• Additional engineering and design staff to assist with projects as they develop • Costs will reflect an earlier assignment and accounting of Toronto Hydro resources normally engaged later in a connection application

Early Execution: *Enabling Access to Funding*

Description:

- This project will examine how Toronto Hydro can work with Provincial and Federal departments to increase customer access to electrification and energy efficiency related climate action funding
- Initial engagement with Natural Resources Canada and Environment and Climate Change Canada identified potential opportunities for mutually beneficial collaboration
- By leveraging funding application experience, customer relationships and procurement efficiencies, and/or acting as project lead to aggregate smaller projects, Toronto Hydro may enable customer access to funding for projects where they might otherwise be ineligible or unsuccessful in funding applications

Timeframe: 2023-2024

Scope	Need	Results & Impact
• Work with customers and funding bodies to increase ease of access to available climate action funding	• The process of applying for, winning and subsequently following the process of meeting funding requirements through program delivery can be complicated and challenging for small and medium sized customers • Low application rates from Toronto suggest customer access to funding may be limited by perceived or real challenges around funding applications, knowledge of opportunities or resources available to pursue opportunities • Funding rules stipulating minimum project size or value limit access	• Minimizing customer barriers to accessing funding by helping to simplify the process of identifying funding opportunities appropriate to Toronto, and supporting alignment between project scope and funding opportunities • Enable access to funding by aggregating small to medium sized projects under a single funding application • Bulk procurement may be leveraged to decrease project costs • Local economic benefits (i.e. jobs, contracting) due to increased number of climate action projects within City of Toronto

Approach	Project Cost & Funding Sources
• Enable customer uptake of climate-friendly systems or technology projects that would otherwise be ineligible for funding based on project size, by managing the application process, considering procurement efficiencies and liaising with funding bodies • Work collaboratively with funding bodies to identify barriers to participation in new or existing funding programs • Work directly with customers to offer application drafting support to improve the quality of applications filed by Toronto households and businesses and to reduce that barrier to funding local projects • Connect customers with trusted service providers to support implementation of successful funding requests through an enhanced customer portal	• No project-specific external funding required • Operational cost of program delivery covered by the CAS self-funding model • Discussions regarding future opportunities to fund this work will continue with Federal Government departments

Early Execution: *Local Demand Response*

Description:

- This project will examine how Toronto Hydro can work with the Independent Electricity System Operator (IESO) to better coordinate the use of distributed energy resources
- Through Toronto Hydro's Local Demand Response (LDR) program, the utility will procure demand response capacity as non-wire alternatives to defer or avoid distribution system upgrades at two stations in the Richview south area

Timeframe: 2022-2024

Scope	Need	Results & Impact
• Procure DER in the Manby Transformer Station and Horner Transformer Station service areas (targeting up to 9 MW) for deployment for LDR	• Provide the utility with flexibility in terms of the timing of capital work, and the ability to decide whether upgrades can be deferred • Explore how to coordinate with the IESO to dispatch LDR resources to meet distribution system and bulk system needs	• Enable the deferral of asset upgrades and additional load transfers within the distribution system over this rate-period • Enable potential asset deferral within the transmission system over this rate-period • Lower overall Capacity Acquisition costs at both the distribution-level and the bulk-level, with the goal of driving rate-payer value • Provide LDR participants access to a second capacity payment with minimal administrative cost, resulting in increased DER revenue

Approach	Project Cost & Funding Sources
• Toronto Hydro will utilize a competitive RFP process to procure resources in the Manby TS and Horner TS service areas • Those who are successful in the RFP process, will receive a distribution level capacity payment from Toronto Hydro per the LDR contract, and an IESO capacity payment via the GIF project funding • Toronto Hydro will coordinate with IESO to dispatch the LDR resources to meet both distribution system and bulk system needs	• Estimated $4M • $2M is rate-based funding, as approved by Ontario Energy Board in Toronto Hydro's 2020-2024 CIR • $200K from project partners (in-kind): Power Advisory LLC and Ryerson CUE • $1.9M funding from IESO/GIF partnership

3. Case Studies from other Jurisdictions

Case Study: Bulk Procurement, *Electrify Everything (Portland, Maine)*

Description:

- The goal of the Electrify Everything program is to lower costs of installation for participants through aggregation and bulk procurement of equipment and services, increasing accessibility of electrification in low-income communities
- City of Portland, Maine issued a Request For Proposals ("RFP") for a partner to install rooftop solar, heat pumps and EV charging stations in homes and small businesses in Portland; the first RFP targeted 75 homes
- The program also provided an option for community solar for those participants who did not want or are not able to install solar

Timeframe: RFP issued in September 2021. Program launched in January 2022 and will run through April 2022. Installations will occur between May 2022 and December 2022.

Scope	Need	Results & Impact
• Focus on residential solar, heat pump and EV charging • The vendor provided turnkey pricing for: - 6 kW solar systems (design, racks, panels, inverters, web monitoring, installation, etc.) - 15,0000 BTU/hour air source heat pumps wall unit (foundation brackets, rain cap, 20ft line set, etc.) - 50 gallon tank heat pump hot water heaters including 10 year warranty - Level 2 chargers (cable and connection, etc.)	• Upfront cost of electrification presents a barrier to customer uptake • Address social and economic barriers to efficiency improvements	• ReVision Energy selected as the project partner • $500 off solar installation, $250 off heat pump and EV chargers • Up to $60,000 to help low-income households adopt solar • Increased adoption of solar and increased electrification • Bulk procurement approach reduces costs for customers • City is supported with outreach and turnkey installation (from site visits through to equipment supply), including completion of rebate applications

Approach	Project Cost & Funding Sources
• Procured single vendor to deliver outreach and education, provide installation services (including site visits, assessments, quotes reflective of pricing provided as part of bulk procurement, support rebate applications, project financing, permitting), project management and program reporting • The City coordinates closely with selected vendor • Vendor is obliged to provide services to customers at the quoted price; they are required to contact customers for site visits within 2 business days, support customer education, provide financing options, support rebate applications, meet installation standards, etc.	• Customers pay for costs of installation at discounted rates • Program leverages existing rebates that are available to customers through Efficiency Maine. • Costs to the City related to program administration only (e.g., program management, legal, etc.)

Case Study: Low Income Program, *PEI: Free Heat Pump for Income Qualified Islanders*

Description:

- Prince Edward Island markets and delivers a free heat pump program for low-income eligible customers
- This program helps to address the relatively high cost of heat pump retrofits for low-income households, promoting more equitable access to high-efficiency, low-carbon technologies[67]
- PEI operates this program in conjunction with their contractor Network of Excellence (NOE) to offer assessments and installations

Timeframe: Currently Available in PEI

Scope	Need	Results & Impact
• Free Heat Pump Program for low income eligible customers • Eligibility linked to property value assessment • Landlord authorization may be required for rental properties	• Develop and enhance service and support for low Income customers • Develop relationships with low income customers • Address social and economic barriers to efficiency improvements • Promote early adoption of heat pumps by low-income customers, enabling energy related cost savings • Address the relatively high heating costs for electric resistance and fuel oil users • Utilizing NOE contractors ensures accurate information and quality installations[68]	• Provision of free heat pump to eligible applicants directly addresses social and economic barriers to participation • Accelerate and support heat pump project uptake • Establish customer satisfaction targets for installation work • No out of pocket costs for home owners or renters • Improved comfort and customer satisfaction

Approach	Project Cost & Funding Sources
• Develop and establish contractor program • Respond to heat pump inquiries and direct outreach • Verify eligibility based on tax returns and/or Notice of Assessment • Perform site assessment • Procure and install heat pump • Pay contractor upon completion • Perform follow-up customer survey	• Leverage Provincial and Municipal funding mechanisms to fund a free heat pump program • Funding shortfall covered by financing tools • Partnering with qualified and trained contractors to ensure quality installations and comfort • Successful installations drive participation through word of mouth • No out of pocket costs for home owners/renters

Case Study: Trade Ally Partnership, *Puget Sound Energy*

Description:

- Puget Sound Energy (PSE) hosts a "Trade Ally" partnership model with contractors. This partnership allows the utility to connect customers directly to a "Recommended Energy Professional (REP)" who can assist with a variety of energy efficient upgrades[69]
- The trade ally network acts as a formal conduit for participation and engagement in PSE's Energy Efficiency Programs
- Recommended Energy Professionals are promoted on PSE's website as being: licensed; bonded; insured; and knowledgeable on energy codes, high-efficiency equipment and product applications. They are also noted as being continually trained and educated on the latest tech and having special seasonal offers for energy efficient products
- Participating members benefit from a variety of offerings such as: Customer rebates, information on programs, educational resources and account support

Timeframe: Program currently underway

Scope	Need	Results & Impact
• Available to all Puget Sound Energy customers (approximately 1.2 million electric customers)[70] • Consists of a network of approximately 250 independent contractors • The network is organized into multiple trades across both residential and commercial lines of business	• Approximately 65% of customers purchase water heaters in emergency situations[71] • Approximately 60% of homeowner installations are completed by plumbers[72]	• Partnering with contractors provides another channel to reach customers in emergency situations, and increase knowledge around more energy efficient technologies • PSE examines the energy-efficiency landscape and trends through its trade ally network, including customer preferences, expectations, product innovations, process improvements, and readiness of technologies • Drive customer awareness of PSE's energy efficiency rebates and offers

Approach	Project Cost & Funding Sources
• Contractors can apply to become a Trade Ally partner through PSE's online portal, and are pre-screened by PSE to ensure suitability • Following 6-month review period qualifying members benefit from: customer referrals, having their information published on PSE's website, co-branding marketing materials • Trade Ally members will also receive additional benefits based on meeting performance standards (job completion, continuing education, quality assurance and customer service) • Trade Ally partners with superior performance can apply to become "Recommended Energy Professionals" • The Trade Ally Services team works to engage Trade Ally members. Learning from members as they refine programs and develop tools to engage broader groups	• Limited to no capital costs associated with this project. Funding supports administration of trade ally network and marketing

Appendix E – Climate Advisory Services Business Profile

The table below highlights estimated costs associated with program delivery through Climate Advisory Services. The rate of electrification and associated projects costs are based on the targets outlined in the City's TransformTO Net Zero Strategy. The ultimate pace of climate action in the City of Toronto will be contingent on technological developments, customer preferences and climate policies at the local, provincial and national levels.

	Technology	Program Examples	Operating Costs ($M)[73]				Project Costs ($M)		Program Size			Impact 2040
			2023	2024	2025	2023-2040	2023-2025	2023-2040[74]	2023-2025	2023-2040[75]	Units	
Building Electrification	**Electric Vehicles**	*Connection Accelerator*	4	4.5	5.5	80	60	600	5,500	50,000	Chargers	Serving 1 million+ EVs
		On-Street Charger Expansion										
		Enabling Access to Funding										
		Bulk Procurement										
		Trade Ally Partnership										
	Renewables + Storage	*Connection Accelerator*	1.5	2	2.5	60	4	2,300	13	300	MW of local generation	300,000 projects
		Enabling Access to Funding										
		Solar + Storage										
		Bulk Procurement										
		Trade Ally Partnership										
		Supporting Local DR										
	Air Source Heat Pumps	*Connection Accelerator*	2	3	3.5	100	2	600	80	60,000	Air source heat pumps	15% of all buildings
		Enabling Access to Funding										
		Bulk Procurement										
		Low Income Program										
		Trade Ally Partnership										
	Electric Hot Water	*Enabling Access to Funding*	0.5	0.5	0.5	15	TBD	TBD	TBD	TBD	Domestic hot water heaters	TBD
		Bulk Procurement										
		Low Income Program										
		Trade Ally Partnership										
	Total		8	10	12	255	66	3,500				

This business profile provides a preliminary, high level perspective on Climate Advisory Services' operating profile. Should City Council approve a Climate Advisory Services mandate, Toronto Hydro would hire a dedicated team to quickly operationalize these programs. As one of the first orders of business, this team would develop a detailed budget by refining the business profile above.

Planned funding to support climate-action by 2030

With the requested Climate Advisory Services mandate, Toronto Hydro will re-engage with federal and provincial governments to build on initial funding and subsidy discussions to support the Net Zero 2040 Strategy. A key source of this funding will be the Government of Canada's recently announced 2030 Emissions Reduction Plan,[76] a blueprint of activities and funding programs aimed at reducing greenhouse gas emissions in Canada by 40-45% 2005 levels by 2030.

The following tables summarize funds available in key sectors through the 2030 Emissions Reduction Plan that Toronto Hydro could access to support its Climate Advisory Services program offerings.

Electricity Sector

Opportunity Name	Amount	Availability Date	Fund Details
Smart Renewables and Electrification Pathways Program	$600 million	Over 7 years starting 2022-2023	Support building renewable energy and grid modernization projects.
Regional Strategic Initiatives	$25 million	TBD	Establish Regional Strategic Initiatives to work with provinces, territories and relevant stakeholders to develop regional net zero energy plans.

Transportation Sector

Opportunity Name	Amount	Availability Date	Fund Details
Zero Emission Vehicles Infrastructure Program	$400 million	Over 5 years starting 2022-2023	Fund the deployment of Zero Emissions Vehicle charging infrastructure in suburban and remote communities.
Canada Infrastructure Bank Charging and Refueling Infrastructure	$500 million	TBD	Fund large-scale urban and commercial Zero Emission Vehicle charging and refueling infrastructure.
Incentives for Zero-Emission Vehicles Program	$1.7 billion	Until March 2025	Purchase incentives of up to $5,000 for eligible light-duty vehicles.
Transport Canada Medium- and Heavy-duty ZEV Incentive Program	$547.5 million	Over 4 years starting in 2022-2023	A new purchase incentive program for medium and heavy-duty ZEVs.
Green Freight Program	$199.6 million	Over 5 years starting in 2022-2023	Help companies make data-driven investment decisions to reduce their emissions and fuel costs.

Buildings Sector

Opportunity Name	Amount	Availability Date	Fund Details
Canada Greener Homes Grant	Up to $5,000 per household	Ongoing until 2027	The Canada Greener Homes Grant helps homeowners make their homes more energy-efficient. This program was announced in 2021 and will run through 2027. To date, the program has received over 196,400 applications and provided 4.9 million in funding.
Canada Greener Homes Loan	$458.5 million	Starting in 2022-2023	To provide interest-free loans of up to $40,000 for major home retrofits to low-income households. Eligible retrofits include upgrades to home features like insulation, windows and doors, and renewable energy upgrades like installing solar with battery storage.
Retrofit Accelerator Initiative	$200 million	TBD	Fund to support deep retrofits in large buildings.
Tax Incentives for Clean Energy Equipment	-	TBD	Accelerated tax deductions for business investments in clean energy equipment expanded to include air-source heat pumps.
Greener Neighbourhoods Pilot Program	$33 million	TBD	To support retrofits in six Canadian communities using the "Energiesprong" aggregated building retrofits model. This approach to energy efficiency retrofits, developed in the Netherlands, aims to enable economies of scale for retrofit projects and services by aggregating projects.[77]
Greener Construction in Housing and Buildings	$183 million	TBD	To decarbonize the buildings sector by developing standards and building codes and establishing a climate resilient construction sector through a Centre of Excellence for research and development.

Industrial Sectors

Opportunity Name	Amount	Availability Date	Fund Details
Industrial Energy Management Program	$194 million	TBD	Expand the program to include financial assistance for small-to-moderate facilities to undertake energy management projects.

Appendix F – Prospective Partnerships

The following table lists prospective partners with whom Toronto Hydro will consult and engage through the development of Climate Advisory Services. While this is not an exhaustive list of potential partners, initial engagements with these cleantech companies, facility owners, service providers, manufacturers and distributors indicate interest in programs to accelerate electrification and climate action.

Technology	Potential Partners	MOU Signed
Electric Vehicles	*Flo* • Provider of electric vehicle charging hardware and software systems serving residential, municipal and workplace customer needs	✓
	Plug'n Drive • A non-profit organization committed to accelerating the adoption of electric vehicles to maximize their environmental and economic benefits	✓
	ChargePoint • Global manufacturer and operator of EV charge stations	✓
	Toronto Parking Authority • A City agency that operates municipal on-street metered parking and off-street parking facilities	✓
Renewables & Storage	*RESCo Energy Inc.* • Complete consulting, design, installation and maintenance service provider for non-residential solar PV and battery energy storage systems	✓
	Energy Storage Canada • National association for the energy storage industry in Canada representing the full supply chain of energy storage	✓
	Amp Energy • A global energy company that develops, owns and operates clean energy assets	✓
	Siemens Canada • Provides solutions for sustainable energy, intelligent infrastructure, healthcare, and manufacturing. Supplier of efficient power generation, transmission and infrastructure needs	✓
	NRStor • Builds, owns and operates innovative energy storage projects serving utilities, remote communities, commercial, industrial and residential applications	✓

Building Electrification: Air Source Heat Pumps & Electric Hot Water	*Enercare* • Home and commercial services and energy solutions company that sells, rents, repairs and maintain HVAC products and water heaters throughout Canada and the United States	✓
	HRAI • Non-profit national trade association representing more than 1,150-member companies in the heating, ventilation, air conditioning and refrigeration industry (members include manufacturers, wholesalers and contractors)	✓
Comprehensive Electrification	*Toronto District School Board* • The largest and one of the most diverse school boards in Canada serving approximately 247,000 students in 583 schools throughout Toronto, and more than 130,000 life-long learners in Adult and Continuing Education programs	✓
	Toronto Community Housing • Largest social housing provider in Canada and the second largest in North America, wholly owned by the City of Toronto and operating in a non-profit manner	✓

Appendix G – Climate Action Targets

Federal and municipal energy-related climate targets

	Canada[78]	Toronto[79]
Economy-wide Greenhouse Gas (GHG) reduction target	• 20% below 2005 levels by 2026 • 40 to 45% below 2005 levels by 2030 (470 $MtCO_2e$) • Net Zero by 2050 • Carbon pricing to reach $170/tonne by 2030	• 65% below 1990 levels by 2030 (8.8 $MtCO_2e$) • Net Zero by 2040
Buildings	• 29% reduction below 2005 levels by 2030 • Net Zero by 2050	• 100% of new buildings are designed and built to be near zero GHG emissions by 2030 • GHGs from existing buildings reduced by 50% from 2008 levels by 2030 • Retrofit all existing residential, commercial, and institutional buildings to be net-zero by 2040
Electricity	• 87% reduction below 2005 levels by 2030 • Coal phase-out by 2030 • 90% from clean sources by 2030 • Net Zero by 2035 • Clean Electricity Standard draft regulation to be released in 2022	-
Heavy industry	• 38% reduction below 2005 levels by 2030 • Net-zero by 2050	-
Energy	-	• 50% of community-wide energy comes from renewable or low-carbon sources in 2030 • 25% of commercial and industrial floor area is connected to low carbon thermal energy sources in 2030
Transportation	• 7% reduction below 2005 levels by 2030 • Light Duty Vehicle sales targets: 20% by 2026, 60% by 2030, 100% by 2035 • Medium-Heavy Duty Vehicle sales targets: 35% by 2030, 100% by 2040	• 75% of school/work trips under 5km are walked, biked or by transit in 2030 • 30% of registered vehicles in Toronto are electric by 2030 • Install 220 Level 3 chargers and 3,000 Level 2 chargers in public locations by 2025 • Install 650 Level 3 chargers and 10,000 Level 2 chargers in public locations by 2030 • 35% of commercial vehicles in Toronto are electric by 2030

The Government of Canada will review progress under the 2030 Emissions Reduction Plan through progress reports produced in 2023, 2025, and 2027. Additional targets and plans will be developed for 2035 through to 2050.

Appendix H – Climate Advisory Services/Climate Capital Investments Comparison tables

At the request of City Council, Toronto Hydro has assessed two, potentially complementary, project delivery frameworks:

1. climate-related energy project services (Climate Advisory Services) and
2. climate related equipment ownership and operation (Climate Capital Investment).

Depending on the approach to delivering climate action, a given technology could be offered to customers through either Climate Advisory Services or Climate Capital Investments. The choice of project structure, funding, and ownership has implications for how Toronto Hydro is able to deliver the project as well as the customer experience. The following tables provide commentary on some implications of organizational design. These are examples of hypothetical project design or delivery options and therefore represent only a sample of program designs under consideration. Actual program design and delivery will depend on a number of factors, including customer interest; grants and incentives; cleantech companies' interest and offerings; and the climate mitigation programs offered by other entities.

The leaf rating system represents the relative impact of a category on a scale of 1 to 3 leaves. The more leaves, the more positive the expected impact.

1. Electric Vehicle Charging Infrastructure

On-road transportation accounts for approximately 35% of Toronto's total emissions, with passenger cars and trucks responsible for 26%.[80] The City has committed to supporting the transition to electric vehicles (EVs), including supporting EV charging in homes and workplaces and the development of a robust public EV charging network. Toronto Hydro can support the City's goals in this regard by facilitating supply and implementation of EV charging infrastructure.

An assessment of program delivery for EV infrastructure under Climate Advisory Services or Climate Capital Investments follows.

	Climate Advisory Services (CAS)	Climate Capital Investments (CCI)
Implementation	Toronto Hydro pre-qualifies EV Supply Equipment (EVSE) suppliers, Charge Point Operators (CPO) and installers for ultimate short-list recommendation to interested customers. Toronto Hydro also offers to submit funding applications on the customer's behalf to encourage investment. The selected vendor supplies participating customers with connection assessments, EV charging equipment, installation and maintenance. The vendor may also offer financing solutions to customers, including loans or other performance-based contracts. In cases where new or upgraded grid connections are required, Toronto Hydro provides cost and connection-time estimates in advance of a formal connection application to assist interested customers in developing the business case for electrification.	Toronto Hydro issues an RFP to bulk purchase EV charging equipment and services for participating Toronto Hydro residential and commercial customers, as well as public parking sites. Toronto Hydro owns and operates the EV chargers installed at these buildings and parking sites. Toronto Hydro enters into a rental agreement with site hosts to the provision of equipment and maintenance services in cases where EVSE do not collect revenue or in cases where the site host wants to retain revenues. For other cases, a different agreement structure can allow Toronto Hydro to recover capital and operating costs directly from EVSE revenues.
Financial responsibility	Projects undertaken through CAS are financed by end customers; namely EV owners (residential), building owners & operators (commercial & multi-unit residential), fleet managers and commercial parking lot owners.	Projects undertaken through CCI are owned, operated and funded by Toronto Hydro (less any applicable grants, rebates, etc.) Because the project would reside within Toronto Hydro, there is greater operational and financial risk assumed by both the utility and the City.
Funding sources	• Government grants, incentives & rebates • Low-interest loans via government or private sector • Fuel savings	• Debt • City equity • Government grants, incentives & rebates

Legal implications	 Toronto Hydro can introduce a non-rate regulated operation stream within its existing regulated business to facilitate connections between cleantech firms and Toronto Hydro customers. Toronto Hydro is seeking a mandate from the City to enable it to pursue CAS in this manner.	 Owning, operating and leasing EV charging infrastructure does not fall within the exemptions for permitted non-distribution activities by licensed distributors. Accordingly, a new unregulated subsidiary would need to be created to pursue this project and Toronto Hydro would require a mandate from the City to enable it to create such a company.
Regulatory implications	 Because Toronto Hydro would be acting as a facilitator only, and would not directly own, operate or lease the EV charging infrastructure, there are minimal regulatory implications.	 As noted above, owning, operating and leasing EV charging infrastructure could not be undertaken by Toronto Hydro through its regulated business or existing non-rate regulated subsidiary.
Implications for taxpayers	None	Equity injection from the City for CCI projects will be recovered through tax revenues
GHG emissions reduction	 As a non-rate regulated operation stream within Toronto Hydro's regulated business, CAS will have access to the utility's customer information, system planning data, and highly skilled and experienced employees. This will enable the quick ramp-up of EV charging infrastructure actions and support the highest impact in terms of timeliness and magnitude of GHG emission reductions.	 The emissions reduction impact of EV charging infrastructure pursued through CCI is dependent on timing and availability of project funding from the City, and scalability of Toronto Hydro resources. Because this activity would need to be undertaken at arm's length from Toronto Hydro's regulated electricity distribution business, it would not have full and transparent access to customer and system planning information.
Stimulating Toronto's economy	 EV charging technology is mature and readily available to deliver to the Toronto market. Cleantech and related firms can tap into Toronto Hydro's customer relationships and government program support to provide leasing arrangements to customers, thereby mitigating customer concerns about up-front capital requirements, system compatibility, and ongoing maintenance. Toronto Hydro customer relationships amplify the marketing impact.	 Toronto Hydro will own, operate and lease EV charging equipment, and will therefore be directly competing with private market for customers and government funding of climate action projects. Toronto Hydro customer outreach may cannibalize marketshare from existing marketplace.

Equitable implementation	 Through connections with cleantech parties, funders and customers, Toronto Hydro can facilitate programs to provide lower-income communities with fair and equitable access to EV charging in multi-unit residential buildings. However, this equitable access will depend on funding sources to incent service providers to level the playing field.	 The CCI option enables the City to direct Toronto Hydro to implement EV charging infrastructure in neighbourhoods that otherwise may face barriers to adoption due to high up-front costs and lack of garage and/or driveway in many Toronto neighbourhoods.

Recommendation

Based on the evaluation above, enabling EV charging infrastructure primarily through Climate Advisory Services is most advantageous to the City, its residents, the local cleantech sector, Toronto Hydro, and its customers. Climate Advisory Services can facilitate adoption of EV chargers to residential customers, as well as multi-unit buildings, commercial buildings and commercial parking lot owners.

While Climate Advisory Services programs will consider the perspective and interests of low-income customers and underserved communities in program design and delivery, available incentives may be insufficient to ensure that these communities are adequately served by the private market. In the event this occurs, the City may opt to supplement these efforts with targeted Climate Capital Investment projects to deliver EV charging projects to underserved segments of the community. Under this approach, competition with private cleantech providers is not likely to be an issue.

2. Air Source Heat Pumps

Buildings account for approximately 57% of Toronto's total emissions. While a number of strategies will be necessary to reduce emissions from buildings to net zero, switching from fossil fuel heating systems to electric air source heat pumps (ASHPs) presents opportunities for significant reductions. Toronto Hydro can support the City's goals in this regard through facilitating the supply of air source heat pumps to its residential and commercial customers, both for new construction and retrofits of existing buildings.

An assessment of ASHP program delivery through Climate Advisory Services or Climate Capital Investments follows.

	Climate Advisory Services (CAS)	Climate Capital Investments (CCI)
Implementation	Toronto Hydro issues an RFP to bulk purchase ASHP equipment and services for participating Toronto Hydro residential and commercial customers. The selected vendor supplies participating customers with site assessments, ASHP equipment, installation and maintenance. The vendor may also offer financing solutions to customers, including loans or other performance-based contracts.	Toronto Hydro issues an RFP to bulk purchase ASHP equipment and services for participating Toronto Hydro residential and commercial customers. Toronto Hydro owns and operates the ASHPs installed at the customer's building. Toronto Hydro enters into an agreement (e.g. a monthly equipment lease) with the participating customer, who benefits from thermal energy provided and reduced fossil fuel-based energy costs.
Financial responsibility	Projects undertaken through CAS are financed by end customers; namely homeowners (residential) and building owners (commercial & multi-unit residential)	Projects undertaken through CCI are owned, operated and funded by Toronto Hydro (less any applicable grants, rebates, etc.) Because the project would reside within Toronto Hydro, there is greater operational and financial risk assumed by both the utility and the City.
Funding sources	• Government grants, incentives & rebates • Low-interest loans • Fuel savings	• City equity • Government grants, incentives & rebates
Legal implications	Toronto Hydro can introduce a non-rate regulated operation stream within its existing regulated business to facilitate connections between cleantech firms and Toronto Hydro customers. Toronto Hydro is seeking a mandate from the City to enable it to pursue CAS in this manner.	Owning, operating and leasing ASHPs does not fall within the exemptions for permitted non-distribution activities by licensed distributors. Accordingly, a new unregulated affiliate subsidiary company would need to be created through which to pursue this project, and Toronto Hydro would require a mandate from the City to enable it to create such a company.

Regulatory implications	 Because Toronto Hydro would be acting as a facilitator only, and would not directly own, operate or lease the ASHPs, there are minimal regulatory implications	 As noted above, owning, operating and leasing ASHPs could not be undertaken by Toronto Hydro through its regulated business or existing non-rate-regulated subsidiary.
Implications for taxpayers	None	City funding for CCI projects will be recovered through tax revenues
GHG emissions reduction	 As a non-rate-regulated operation stream within Toronto Hydro's regulated business, CAS will have access to the utility's customer information, system planning data, and highly skilled and experienced employees. This will enable the quick ramp-up of ASHP actions and support the highest impact in terms of timeliness and magnitude of GHG emission reductions.	 The emissions reduction impact of ASHPs pursued through CCI is dependent on timing and availability of project funding from the City, and scalability of Toronto Hydro resources. Because this activity would need to be undertaken at arm's length from Toronto Hydro's regulated electricity distribution business, it would not have full and transparent access to customer and system planning information.
Stimulating Toronto's economy	 ASHP technology is mature and readily available to deliver to the Toronto market. Cleantech and related firms can tap into Toronto Hydro's customer relationships and government program support to provide leasing arrangements to customers, thereby mitigating customer concerns about up-front capital requirements, system change-out hassles, and ongoing maintenance. Toronto Hydro customer relationships amplify the marketing impact.	 Toronto Hydro will own, operate and lease ASHP equipment, and will therefore be directly competing with private market for customers and government funding of climate action projects. Toronto Hydro customer outreach may cannibalize marketshare from existing marketplace.
Equitable implementation	 As noted above, owning, operating and leasing ASHPs could not be undertaken by Toronto Hydro through its regulated business or existing non-rate-regulated subsidiary.	 The CCI option enables the City to direct Toronto Hydro to implement ASHPs in neighbourhoods that otherwise may face barriers to adoption due to high up-front costs.

Recommendation

Based on the evaluation above, pursuing ASHPs primarily through Climate Advisory Services is most advantageous to the City, its residents, private companies in Toronto's growing cleantech sector, Toronto Hydro and its customers.

While Climate Advisory Services programs will consider the perspective and interests of low-income customers and underserved communities in program design and delivery, available incentives may be insufficient to ensure that these communities are adequately served by the private market. In the event this occurs, the City may opt to supplement these efforts with targeted Climate Capital Investment projects to deliver air source heat pump projects to underserved segments of the community. Under this approach, competition with private cleantech providers is not likely to be an issue.

3. Electric Water Heaters

Electrification of space and water heating systems is essential to achieving the deepest GHG emissions reductions possible. According to NRCan, water heating accounts for 19% of energy used in the average Canadian home.[81] In terms of customer demand, Energy Star identified two primary drivers for customer purchases of water heaters: i) 65% of all water heater sales are completed in response to a unit failure, and ii) 43% of water heater purchases are completed through a contractor.[82] Toronto Hydro can support the City's goal to reduce building emissions by addressing barriers to uptake and facilitating the supply of electric water heaters for new construction and retrofits of existing buildings.

An assessment of electric water heater program delivery in Climate Advisory Services or Climate Capital Investments follows.

	Climate Advisory Services (CAS)	Climate Capital Investments (CCI)
Implementation	Toronto Hydro enhances contractor partnerships to educate, collaborate, incentivize and influence customer purchases of new electric water heater (EWH) units. Toronto Hydro can monitor contractor quality and adherence to EWH program and service standards through a number of tools, including customer feedback surveys. Toronto Hydro can make the process of finding an appropriate EWH model and a knowledgeable, pre-screened contractor seamless and intuitive for customers by leveraging the existing Toronto Hydro customer portal.	Toronto Hydro issues an RFP to bulk purchase EWH equipment and services for participating Toronto Hydro residential and commercial customers. Toronto Hydro owns the EWH units installed at the customer's building. Toronto Hydro enters into an agreement (e.g. a monthly equipment lease) with the participating customer, who benefits from reduced energy costs from fossil fuel-based energy sources. Customers are billed through an "on-bill tariff" model, whereby customer pays for the EWH unit through a monthly charge on their electricity bill.
Financial responsibility	Projects undertaken through CAS are financed by customers; namely EWH owners (residential), and building owners and operators (commercial & multi-unit residential).	Projects undertaken through CCI are owned, operated and funded by Toronto Hydro (less any applicable grants, rebates, etc.) Because the project would reside within Toronto Hydro, there is greater operational and financial risk assumed by both the utility and the City.
Funding sources	• Government grants, incentives & rebates • Monthly rental arrangement • Fuel savings	• City equity • Government grants, incentives & rebates

Legal implications	 Toronto Hydro can introduce a non-rate regulated operation stream within its existing regulated business to facilitate connections between cleantech firms and Toronto Hydro customers. Toronto Hydro is seeking a mandate from the City to enable it to pursue CAS in this manner.	 Owning, operating and leasing EWH equipment does not fall within the exemptions for permitted non-distribution activities by licensed distributors. Accordingly, a new unregulated affiliate subsidiary company would need to be created through which to pursue this project, and Toronto Hydro would require a mandate from the City to enable it to create such a company.
Regulatory implications	 Because Toronto Hydro would be acting as a facilitator only, and would not directly own, operate or lease the EWH equipment, there are minimal regulatory implications.	 As noted above, owning and leasing EWH equipment could not be undertaken by Toronto Hydro through its regulated business or existing non-rate regulated subsidiary.
Implications for taxpayers	None	City funding for CCI projects will be recovered through tax revenues
GHG emissions reduction	 As a non-rate regulated operation stream within Toronto Hydro's regulated business, CAS will have access to the utility's customer information, system planning data, and highly skilled and experienced employees. This will enable the quick ramp-up of EWH program actions and support the highest impact in terms of timeliness and magnitude of GHG emission reductions.	 The emissions reduction impact of EWH program action through CCI is dependent on timing and availability of project funding from the City, and scalability of Toronto Hydro resources. Because this activity would need to be undertaken at arm's length from Toronto Hydro's regulated electricity distribution business, it would not have full and transparent access to customer and system planning information.
Stimulating Toronto's economy	 EWH technology is mature and readily available to deliver to the Toronto market. Contractors and cleantech firms can tap into Toronto Hydro's customer relationships and government program support to provide financing arrangements to customers, thereby mitigating customer concerns about up-front capital requirements, installation, and ongoing maintenance.	 Toronto Hydro will own and lease EWH equipment, and will therefore be directly competing with private market for customers and government funding of climate action projects. Further, Toronto Hydro may be less effective in meeting market demand on a timely basis, as there are pre-existing contractor relationships that customers will likely rely on for timely resolution of water heater failures, and those contractors may not be recommending high efficiency electric heaters to their customers. Toronto Hydro customer outreach may cannibalize marketshare from existing marketplace.

Equitable implementation	 Through relationships with contractors, cleantech parties, funders and customers, Toronto Hydro can facilitate programs to provide lower-income communities with fair and equitable access to EWH equipment in residential and multi-unit residential buildings, with limited up-front capital costs	 The CCI option enables the City to direct Toronto Hydro to focus efforts on implementing EWH units in neighbourhoods that otherwise may face barriers to adoption due to high up-front costs and entrenched natural gas in many Toronto neighbourhoods.

Recommendation

Based on the evaluation above, pursuing EWH primarily through Climate Advisory Services is most advantageous to the City, its residents, Toronto's local cleantech sector, Toronto Hydro and its customers. Climate Advisory Services can add value by matching customers' immediate needs with knowledgeable and trustworthy contractors, who are well-informed about the benefits of implementing highly efficient EWH equipment.

While Climate Advisory Services programs will consider the perspective and interests of low-income customers and underserved communities in program design and delivery, available incentives may be insufficient to ensure that these communities are adequately served by the private market. In the event this occurs, the City may opt to supplement these efforts with targeted Climate Capital Investment projects to deliver electric water heater projects to underserved segments of the community. Under this approach, competition with private cleantech providers is not likely to be an issue.

4. Solar-plus-storage

As electrification projects are undertaken to reduce greenhouse gas emissions from transportation and buildings, demand for electricity will rapidly increase. With power supplied by the provincial grid expected to become more carbon-intensive by 2040 due to upcoming nuclear retirements and refurbishments,[83] meeting this increased demand with local renewable generation, such as the power supplied by solar photovoltaic panels, is one of the best ways to augment supply and reduce emissions. To enhance reliability and smooth demand, solar power systems can be paired with battery storage ("solar-plus-storage") to provide power regardless of weather or time of day, and reduce reliance on expensive and carbon intensive natural gas peaker power plants.

Toronto Hydro has a strong track record of supporting solar projects, including joint investments with the City in designing, building and operating, solar projects on City-owned facilities across Toronto. Further, Toronto Hydro has enabled the growth of solar generation in the city by providing support such as pre-assessments, connection impact assessments, and commissioning and engineering service for thousands of customer-owned and sited solar projects.

An assessment of solar-plus-storage project delivery through Climate Advisory Services or Climate Capital Investments follows:

	Climate Advisory Services (CAS)	Climate Capital Investments (CCI)
Implementation	Toronto Hydro works with leading cleantech equipment suppliers and design/construction firms to help deliver behind-the-meter solar-plus-storage systems for the residential market in Toronto. Toronto Hydro will look to drive economies of scale in purchasing, which can bring prices down for all customers. Projects would be owned by developers. Power Purchase Agreements (PPA) would be entered into by customers and developers (facilitated by Toronto Hydro). These projects could also complement the electricity grid, providing added climate resilience in the face of extreme weather events.	Toronto Hydro, with leading cleantech equipment suppliers and design/construction firms, develops, implements and owns solar-plus-storage projects. The City would provide initial equity for capital expenditures, as Toronto Hydro's sole shareholder. Long-term financing with customers would take the form of a PPA, similar to the CAS model. Toronto Hydro collects PPA revenues and, in turn, repays the City's capital funding.
Financial responsibility	Projects undertaken through CAS are financed, owned and managed by third-party cleantech firms and customers; namely homeowners (residential) and building owners and operators (government, institutional, commercial & multi-unit residential). Toronto Hydro could facilitate the relationship between cleantech firms and customers to seek out innovative financing arrangements and mitigate the high up-front costs that are often a barrier to pursuing solar-plus-storage projects. This may include, for example, educating customers about solar PPAs.	Projects undertaken through CCI are owned, operated and funded by Toronto Hydro (less any applicable grants, rebates, etc.). Because the project would reside within Toronto Hydro, there is greater operational and financial risk assumed by both the utility and the City.

Funding sources	• Government grants, incentives & rebates • Low-interest loans • Power purchase agreements	• City equity for initial capex • Government grants, incentives & rebates • Power purchase agreements
Legal implications	 Toronto Hydro can introduce a non-rate regulated operation stream within its existing regulated business to facilitate connections between cleantech firms and Toronto Hydro customers. Toronto Hydro is seeking a mandate from the City to enable it to pursue CAS in this manner.	 Toronto Hydro can enter into a lease agreement, development/operations agreement(s) and power purchase agreement directly with customers. This approach may introduce greater risk to Toronto Hydro as party to the contract.
Regulatory implications	 Acting as a facilitator-only of solar-plus-storage projects under the CAS model is aligned with the permitted non-distribution business activities for distributors including the promotion of conservation, efficiency, load management and the promotion of cleaner energy sources, including renewable energy sources, and may be undertaken as a new division within THESL. As part of THESL, this new division would be able to access customer information, system planning data and Toronto Hydro's skilled and experienced employees to support this work. Although this is a permitted business activity, the provincial regulatory framework provides that this business function cannot be funded through electricity distribution rates.	 There are no restrictions on the type of business that an affiliate may undertake. Regulatory limitations around the sharing of customer data, system planning information and employees will make program delivery through this unregulated subsidiary more challenging.
Implications for taxpayers	None	City funding for CCI projects will be recovered through PPA revenues and tax revenues

GHG emissions reduction	 Toronto Hydro will leverage its direct experience assisting customers with renewable energy projects. Other parties (cleantech firms, design/construction firms and customers) will bring their targeted expertise for the benefit of the project as well. This will enable the quick ramp-up of solar-plus-storage actions and support the highest impact in terms of timeliness and magnitude of renewable power generation.	 The increase in renewable power generation arising from solar-plus-storage projects pursued through CCI is dependent on timing and availability of project funding from the City, and scalability of Toronto Hydro resources. By operating as an affiliate, the CCI option would not have full and transparent access to customer and system planning information.
Stimulating Toronto's economy	 Under the CAS approach, Toronto Hydro would enable project initiation, procurement and management services. The solar-plus-storage project would be developed and owned by third-party cleantech firms that work with Toronto Hydro and its customers to build projects on customer sites.	 Toronto Hydro will own and operate solar-plus-storage projects on customer sites, and will therefore be directly competing with the private market for customers and government funding of climate action projects.
Equitable implementation	 Deployment of solar-plus-storage projects require high up-front investment. The capital cost is a barrier to uptake for low-income customers. As part of the CAS business, Toronto Hydro would work with cleantech firms, governments, customers and other stakeholders to increase social equity through both policy and business models. In order to meet the scale and urgency of renewable power generation, solar-plus-storage projects pursued through CAS are likely to focus first on working with partners who have the requisite resources to implement and finance these projects.	 The CCI option enables the City to direct Toronto Hydro to implement solar-plus-storage projects in neighbourhoods that otherwise may face barriers to adoption due to high up-front costs.

Recommendation

Based on the evaluation above, pursuing solar-plus-storage primarily through Climate Advisory Services is most advantageous to the City, its residents, private companies in Toronto's growing cleantech sector, Toronto Hydro and its customers. The Climate Advisory Services approach leverages the expertise and resources of a broad group of stakeholders to mobilize solar-plus-storage projects on a scale and timeline that more closely addresses the expected increase in demand for clean electricity.

While Climate Advisory Services programs will consider the perspective and interests of low-income customers and underserved communities in program design and delivery, available incentives may be insufficient to ensure that these communities are adequately served by the private market. In the event this occurs, the City may opt to supplement these efforts with targeted Climate Capital Investment projects to deliver solar-plus-storage projects to underserved segments of the community. Under this approach, competition with private cleantech providers is not likely to be an issue.

Appendix I – Confidential Appendix – Corporate Finance

Provided separately on a confidential basis.

Endnotes

[1] City of Toronto, *TransformTO - Critical Steps for Net Zero by 2040*, City Council Decision IE26.16 (December 15, 2021), available at: http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2021.IE26.16

[2] In Toronto Hydro's Climate Action Plan (2021), Streetlight LED conversion was presented as part of Climate Capital Investments. Based on discussions with City Staff city-wide LED streetlight conversion has been separated from the program stream.

[3] Toronto Hydro's net zero commitment.

[4] Toronto Hydro, *Climate Action Plan* (2021), at page 24, available at: https://www.torontohydro.com/documents/20143/74105431/climate-action-plan.pdf/8fe4406c-7675-76a7-00c9-c0c4e58ae6df?t=1638298942821

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[6] The timing and regulated process through which this work will be considered by the Ontario Energy Board is discussed in Appendix C.

[7] Details of the implications of the Expanded Electricity Distributor are further discussed in the Confidential Appendix of Toronto Hydro's *Climate Action Plan* (2021) and this report.

[8] Toronto Hydro, *Climate Action Plan* (2021), available at: https://www.torontohydro.com/documents/20143/74105431/climate-action-plan.pdf/8fe4406c-7675-76a7-00c9-c0c4e58ae6df?t=1638298942821

[9] For an overview of the history of this file at Council, as well as a summary of the work carried out by City Staff and Toronto Hydro since the December 2021 meeting of City Council, please see Appendix A.

[10] The first two rounds of question and answer occurred in Q4 2021.

[11] Including City Staff from Environment & Energy Division, Finance, Legal, and Transportation Services, as well as City Staff from the offices of the City Manager and Deputy City Managers.

[12] Intergovernmental Panel on Climate Change, *Climate Change 2022, Impacts, Adaptation and Vulnerability: Summary for Policymakers* [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)], available at: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf

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[14] Article 2.2 of the Shareholder Direction.

[15] In the event that City Council approves a mandate for Climate Advisory Services, permanent staffing arrangements will be made. In the event that City Council does not approve a mandate for Climate Advisory Services, the seconded staff will return to their prior positions.

[16] This does not include costs associated with the infrastructure required to bring the underlying streetlight assets to a state of good repair.

[17] Toronto Hydro, *Climate Action Plan* (2021), at page 5, available at: https://www.torontohydro.com/documents/20143/74105431/climate-action-plan.pdf/8fe4406c-7675-76a7-00c9-c0c4e58ae6df?t=1638298942821

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[19] City of Toronto, *The City of Toronto's Net Zero Existing Buildings Strategy* (2021), available at: https://www.toronto.ca/legdocs/mmis/2021/ie/bgrd/backgroundfile-168402.pdf

[20] Toronto Region Board of Trade, *Re-Imagining Trades: Building our Clean Economy from the Ground Up* (2022), available at: https://bot.com/EventDetails.aspx?meetingid=%7b7192F5EC-A777-EC11-80FC-000D3A0EE828%7d

[21] City of Toronto, *TransformTO Net Zero Strategy Technical Report* (2021), at page 17, available at: TransformTO Technical Scenario Modelling — City of Toronto

[22] Canadian Climate Institute, *The Big Switch: Powering Canada's Net Zero Future* (2022), available at: https://climateinstitute.ca/reports/big-switch/

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[24] Natural Resources Canada, *Ministers Wilkinson and O'Regan Host a Roundtable to Formally Launch the Next Round of Consultations on Ensuring a Just Transition Through the Creation of Sustainable Jobs* (2022), available at: https://www.canada.ca/en/natural-resources-canada/news/2022/03/ministers-wilkinson-and-oregan-host-a-roundtable-to-formally-launch-the-next-round-of-consultations-on-ensuring-a-just-transition-through-the-creat.html

[25] Environment and Climate Change Canada, *Canada launches consultations on a Clean Electricity Standard to achieve a net-zero emissions grid by 2035*, available at: https://www.canada.ca/en/environment-climate-change/news/2022/03/canada-launches-consultations-on-a-clean-electricity-standard-to-achieve-a-net-zero-emissions-grid-by-2035.html

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[65] While EV efficiencies vary among makes and models, the estimated average for popular EVs is 18.7kWh/100km. The average efficiency for comparable Internal Combustion Engine ("ICE") vehicles is 8.5L/100km. This means that, for every kWh consumed by an EV, a similar ICE vehicle would consume 0.45L of gasoline. At a factor of 2.3kgCO2e/L of gasoline, every kWh represents 1.05kgCO2e of avoided greenhouse gases ("GHGs") from gasoline combustion. However, since Ontario's electricity grid has an average annual emissions factor of 0.031kgCO2e/kWh, on a net basis, every kWh of electricity consumed by EVs represents 1.012kgCO2e of total avoided GHGs.

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