Innovation and Sustainability Strategy

2024 – 2028

September 2024

Contents

Land Acknowledgment and Indigenous Place-Making Efforts

The TTC acknowledges the land we now call Toronto is the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. We also acknowledge that Toronto is covered by Treaty 13 signed with the Mississaugas of the Credit River, and the Williams Treaties signed with multiple Mississaugas and Chippewa bands.

We acknowledge and recognize the efforts of Indigenous Peoples across Turtle Island for their climate leadership long before the TTC's Innovation and Sustainability Strategy.

The TTC affirms our commitment to the City of Toronto's Reconciliation Action Plan. This includes continuous learning and awareness building to increase capacity for land-based Indigenous engagement. The result of which is a consistent, authentic, and meaningful approach to consultation on place-making projects, and greater cultural competency in TTC staff.

Recognizing that Indigenous peoples have been the stewards of these lands and waters since time immemorial, the TTC is committed to working with Indigenous community members, including through the TTC's Diversity Group and City of Toronto's Indigenous Affairs Office, to identify opportunities to implement actions within the City's Reconciliation Action Plan and the Indigenous Place-Making Framework.

We will collectively engage in actions, both traditional and innovative, that will contribute significantly to the revitalization of this land through our corporate innovation and environmental sustainability efforts, and we will seek opportunities to acknowledge and honour Indigenous peoples, histories, and cultures.

Letter from the Board Chair

A vibrant and well-used local public transit service supports people living and working in urban areas in many ways. We also know as we look to the future, that many of our customers are increasingly aware of reducing their environmental impact.

The TTC has committed to reaching net zero emissions by 2040 or sooner. We know that reducing our environmental impact and our greenhouse gas emissions has a positive ripple effect. Beyond just being better global citizens, it also reduces costs associated with hospitalizations and even prevents premature deaths.

Establishing a dedicated, organization-wide, Innovation and Sustainability Program (ISP) is one more way the Toronto Transit Commission (TTC) is taking its role seriously. The mandate for ISP is to advance planning, integration, delivery, and reporting of innovation initiatives while incorporating a climate and resiliency lens.

The ISP team will seek out what we need now in order to best prepare for the future. That means more creative solutions available sooner to better serve our customers, reduce our environmental impact, and make our operations more resilient to the effects of climate change.

The establishment of ISP is not a standalone piece of work, as ISP helps us deliver on our commitments under TTC's Corporate Plan and the City's TransformTO Climate Action Plan, which targets Net Zero by 2040.

The ISP will build on all that we have done and will help us continue to take steps to keep innovating and ensuring there is an environmental sustainability and climate change lens on everything we do.

Jamaal Myers
Chair, TTC Board

Letter from the Interim CEO

With the approaching net zero-emissions deadlines and the TTC's increasing state-of-good-repair and operating needs, the organization has made a few changes to support these exciting times and prepare for the future. Innovation and environmental sustainability are key priorities for our Board and the TTC executive. Now more than ever, we need to make sure these considerations are top of mind. That's why the Innovation and Sustainability Program (ISP) was created.

The ISP will build on the tremendous work done to date and help us continue to take steps to further embed innovation, environmental sustainability and climate change resilience into everything we do. This new program will allow the TTC to capture, prioritize, and explore new ideas and emerging technologies from employees, customers, academics, transit peers, and others in the industry.

The TTC's ISP is led by Bem Case, the inaugural Executive Director of the Innovation and Sustainability Program. ISP's mandate is to facilitate innovation, evaluate capital investment decisions from a sustainability perspective, and help us deliver on our commitments under TTC's Corporate Plan.

To guide the ISP, the Innovation and Sustainability Strategy details actions, roles and responsibilities which have been developed through engagement with key stakeholders and reflect a shared commitment to a greener future.

It is important for the TTC to maintain its leadership in the industry, and as such the organization much continue to innovate for the future. The ISP will help the TTC grow as an organization and better reflect the communities and climate where we live and work.

Please join me in supporting Bem and his team's new mandate.

Gregory W. Percy
Interim Chief Executive Officer,
Toronto Transit Commission

Letter from the Executive Director

I am pleased to introduce the Toronto Transit Commission's Innovation and Sustainability Strategy. This strategy builds on the foundation laid by the TTC's 5-Year Corporate Plan, which identifies both corporate innovation and environmental sustainability as Key Principles essential to meeting the evolving needs of our customers, stakeholders, and the environment.

Corporate Innovation Strategy

Innovation is key to mitigating risks and maximizing the mobility and socio-economic benefits of investment in public transit. We achieve this by evaluating emerging technologies and engaging innovators from across management, labour, customers, the general public, and both private and not-for-profit sectors. Collaboration with academia and industry will also play a pivotal role in our efforts.

The TTC's Innovation Pipeline will provide a structured and transparent process for advancing the best ideas, ensuring they are screened, evaluated, prototyped, implemented, and validated to deliver their intended benefits.

Environmental Sustainability Strategy

In response to the climate emergency, the City of Toronto's TransformTO Net Zero Strategy targets net zero emissions community-wide by 2040. Public transit plays a crucial role, driving the shift away from personal automobiles toward low carbon modes of transportation.

With North America's largest battery-electric bus fleet, the TTC is leading the reduction of transit emissions. Since diesel buses account for 97% of our direct emissions, this one climate action must remain our top priority.

That said, we are also committed to eliminating other sources of emission, reducing our consumption and waste, protecting and enhancing the natural environment, and building resilience to the ever-increasing risk of extreme weather events.

This strategy reflects our ongoing commitments to innovation and sustainability. I want to express my gratitude to the TTC Board, Executives, employees, our valued customers, and all others who provided their input to shaping this strategy.

Together, we will enhance mobility, improve public health and social-economic outcomes for those who need it most, and maximize our environmental performance.

Bem Case
Executive Director, Innovation & Sustainability

Our Strategy builds upon the foundation set by the **TTC's 2024-2028 Corporate Plan**, including our Vision, Mission and the Key Principles through which we'll view all of our decisions.

Vision

Moving Toronto towards a more equitable, sustainable and prosperous future.

Mission

To serve the needs of transit riders by providing a safe, reliable, efficient and accessible mass public transit service through a seamless integrated network to create access to opportunity for everyone.

Key Principles

- **Safety and Security as a Cornerstone**
- **Diversity, Equity, Inclusion and Accessibility (EDIA)**
- **Environmental Sustainability**
- **Innovation**

The Future of Our City and the Planet

We envision a future where people choose to take the TTC because it is safe, inclusive, affordable, efficient, convenient and accessible – and because it is the environmentally conscious choice to get around our city.

This is a future in which people are happier and healthier because mobility is more active and efficient, there is less congestion, and the air quality has improved. This in turn has also improved access to education, work, housing, healthcare, sports and the arts leading to an overall higher quality of life for everyone. In addition, actions taken by individuals, corporations and governments around the world will have put a stop to the climate crisis.

This future is not so distant. We at the TTC will endeavour to do our part in enabling and driving the implementation of innovations that improve the health, social, economic and environmental benefits of transit. In the year 2040, the TTC will have transitioned to using only zero-emissions vehicles, old buildings will have undergone energy and sustainable retrofits, and all new buildings will have been constructed using sustainable materials and methods. Where possible, renewable energy sources will be used for the production of electricity and the heating of buildings.

The pursuit of this future will bring us closer to it.

The Role of the TTC

The TTC plays a critical role in the daily life of residents in the city of Toronto. TTC buses, streetcars and subways are part of Toronto's circulatory system, essential to getting residents, workers, students and tourists to where they need to go. There are many inherent benefits of public transit, a few of which are detailed below:

Improves Public Safety

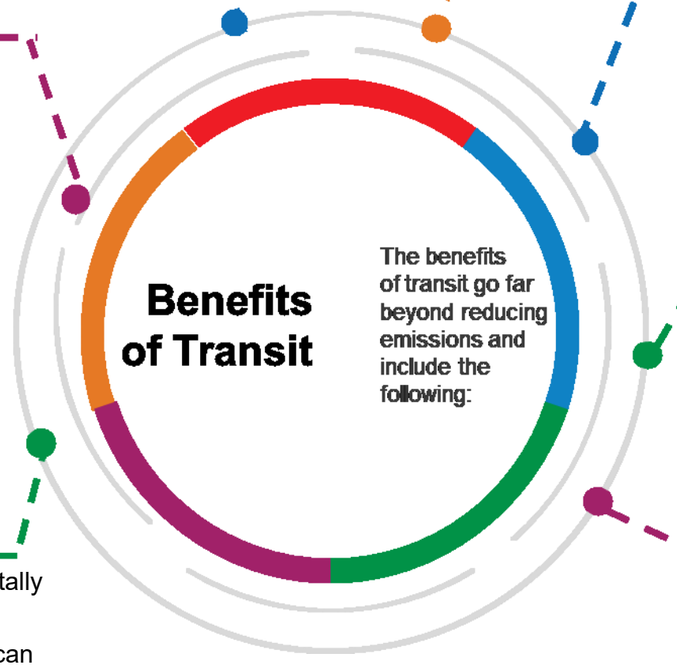
- Vulnerable road users like pedestrians and cyclists are at greatest risk from cars.[1]
- People are more likely to get into serious collisions when driving a car than when taking transit.[2]

Increases Economic Returns

- Public transit reduces road traffic and traffic congestion, which leads to greater economic productively and prosperity.[3]
- Every capital dollar invested in public transit generates one dollar of ongoing GDP.[4]
- Every capital dollar invested in public transit generates $2.40 of economic activity.[4]
- Every $1M invested in public transit there generate 15 new jobs.
- Investments in state of good repair yield a benefit/cost ratio of 3:1, same as expansion.[4]
- Every $1 invested in public transit generates a return of approximately $7 to the economy.[4]

Benefits the Global Environment

- When paired with active transportation, there is no better environmentally responsible choice.[5]
- A person switching from a car (internal combustion engine) to transit can reduce annual greenhouse gas (GHG) emissions by 2 metric tons per year.



Saves People Time

- Transit passengers have more free time to rest or increase their productivity with someone else driving.[6]
- Fully separated public transit rights-of-way are the fastest travel option during rush hours.

Improves Mobility and Social Equity

- Provides equitable transportation, and increases personal mobility, no matter where they live or work in Toronto, and no matter if they own a personal vehicle.[6]
- Line 1 carries the equivalent of 26 lanes of highway traffic during peak periods.[4]

Improves Health Outcomes

- Public transit emits less noise and air pollution than personal automobiles.[7]
- People who take public transit are 44% less likely to be overweight and 34% less likely to have diabetes.[8]
- With a zero emission bus fleet Torontonians will see an annual reduction of respiratory related deaths, hospitalizations, and hospital costs.[9]

Saves People Money

- Modal shift from personal vehicles can create significant cost savings for riders/drivers.[4]

To maximize each of these benefits, the TTC needs to continuously push the boundaries to innovate and build a more sustainable future.

Board Leadership

The TTC Board has led the way in prioritizing innovation and sustainability.

The following are the key decisions and endorsements that significantly advanced our innovation and sustainability efforts and ultimately led to the creation of the ISP.

February 2017

The Board requested the TTC evaluate the merits of electric buses and develop a strategy for the TTC.

November 2017

The Board approved the TTC's Green Bus Technology Plan and set targets for procurement of only zero-emissions buses starting in 2025 and fully eBuses by 2040.

Further, the Board approved the introduction of low-emissions hybrid-electric buses, Toronto's first 30 eBuses, and the recommendation to discontinue diesel bus procurements.

January 2018

The Board approved the TTC's 5-Year Corporate Plan (2018-2022). The plan highlighted that innovation and environmental sustainability is a critical priority for the TTC over the long-term. The Board committed to getting ahead of the climate crisis and innovating for the future, including continued fleet electrification and investment in climate resiliency.

June 2018

The Board approved the procurement of an additional 30 eBuses.

June 2019

The Board requested staff institutionalize resilience into decision making.

October 2020

The Board received the TTC's 15-Year Fleet Procurement Strategy and Plan and directed the TTC to continue to work with Toronto Hydro and Ontario Power Generation (OPG) on the draft agreement(s) for the delivery of the required fleet electrification infrastructure. The Board also endorsed the procurement of an additional sixty zero-emissions fully-accessible streetcars.

February 2021

The Board endorsed a framework for agreement between the TTC, Toronto Hydro and OPG. This decision ultimately led to innovative agreements between the TTC, Toronto Hydro and PowerON (OPG's subsidiary) to work together to decarbonize Canada's largest transit system.

July 2021

The Board requested the establishment of an organization-wide Innovation and Sustainability Program at the TTC, with a mandate to advance planning, delivery, integration and reporting of innovation initiatives while incorporating a climate and resiliency lens.

December 2023

The Board received a presentation from the University of Toronto's Mobility Network quantifying the preliminary key benefits that result from investment in the TTC.

Further, the Board received the Update on the TTC's 5-Year Corporate Plan (2024-2028). The update identified the TTC's commitment to viewing our practices and operations through innovation and environmental sustainability areas of focus along with safety and security, and diversity, equity, inclusion and accessibility.

0 Introduction

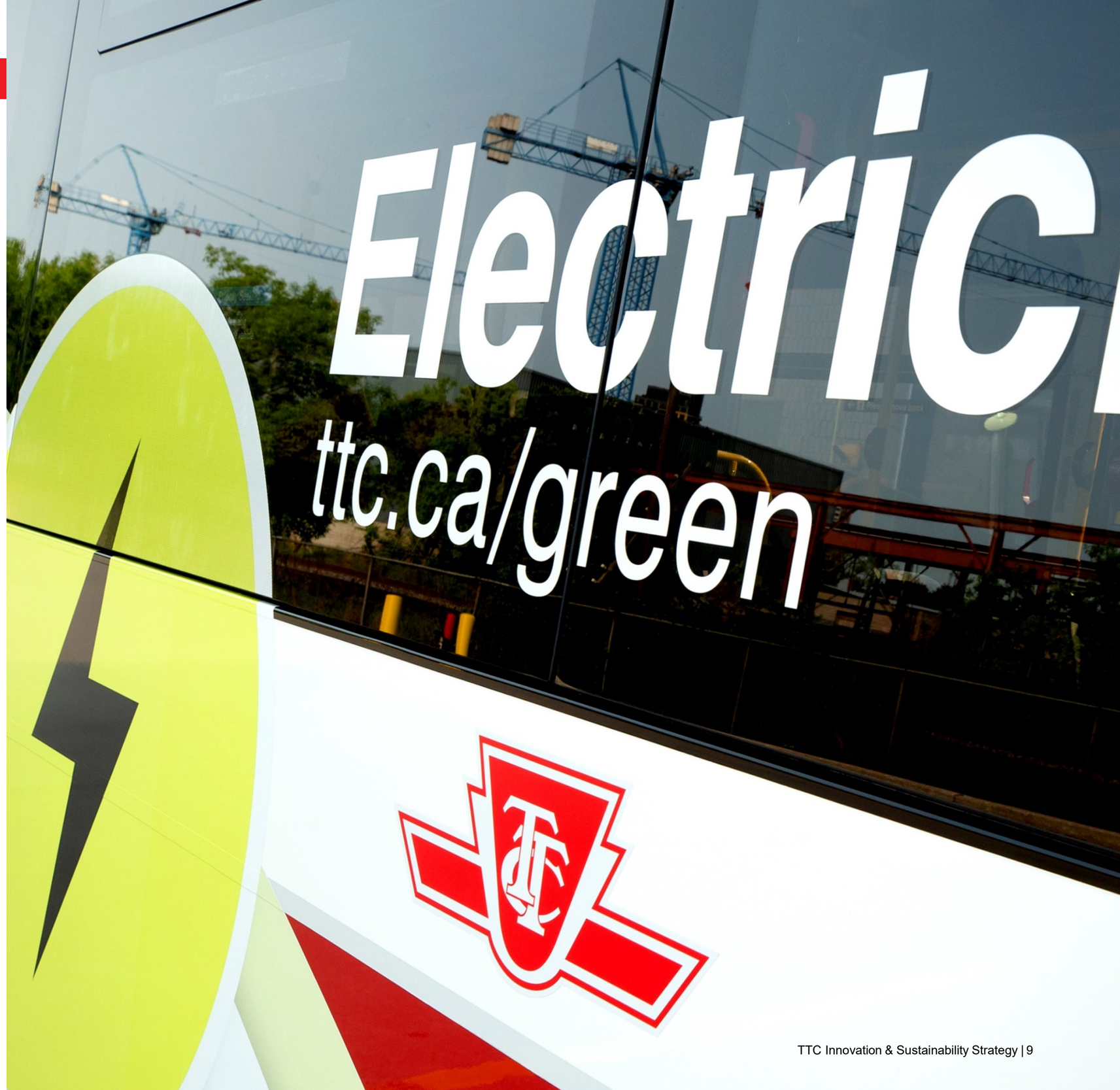
TTC's Innovation and Sustainability Program

Today, the TTC operates one of the largest fleets of battery-electric buses (eBuses) in North America, putting us at the leading edge of transit innovation and environmental sustainability. Building on this momentum, the TTC's Board of Commissioners initiated the Innovation and Sustainability Program to advance the planning, delivery, integration and reporting of innovation initiatives, while incorporating a climate and resiliency lens organization-wide.

This document outlines the TTC's first five-year Innovation and Sustainability Strategy which will guide the Innovation and Sustainability Program. The Strategy was developed through consultation with TTC employees, staff from various divisions of the City of Toronto, as well as other experts in corporate innovation and environmental sustainability found in industry and academia.

The actions described here will inevitably mature as new circumstances and emerging technologies evolve. At a minimum, however, the Strategy will be refreshed and resubmitted for TTC Board approval on a five-year cycle in step with the TTC's Corporate Plan, and progress will be reported annually. This Strategy aligns with the TTC's Corporate Plan, TTC's 5-Year Service and Customer Experience Action Plan, Sustainable City of Toronto Fleets Plan, City's Resiliency Strategy, and TransformTO.

This Strategy has been developed in support of achieving the Vision and Mission of the TTC as identified in the 2024-2028 Corporate Plan. The Strategy aligns with the Strategic Directions and supports the implementation of several objectives and actions listed in the Corporate Plan.



1 Corporate Innovation

Our commitment is to build a more equitable, sustainable and prosperous future through innovation that empowers our organization and others.

We are further committed to remain a driving force in the public transit industry, pioneering disruptive solutions that improve the quality of transit services, reduce costs, improve health outcomes for Torontonians, reduce greenhouse gas emissions, and increase operational resiliency.

To achieve this, we must anticipate shifts in the ever-changing landscape in which we operate. We must actively seek ideas from customers, employees, Indigenous groups, academia, private and non-profit organizations, the next generation and others that solve the problems of today, and tomorrow. We must also be open to ideas that are unsolicited, but that might address a need or problem that we did not even know existed.

Chapter Content

- Strategic Context
- Approach
- Strategy and Work Streams
- Action Roadmap

The Purpose of Innovation

Innovation at the TTC will mitigate the risks to our corporate priorities and maximize the benefits of transit for our customers, the public, and the global environment.

Based on TTC's 2024-2028 Corporate Plan and 2024 Audit, Risk and Compliance – Enterprise Risk Management Update, there are five areas where a focus on innovative solutions will mitigate risks to our corporate priorities.

Corporate Plan Strategic Direction

Build a Future Ready Workforce

Worker Safety

Examples of Innovative Solutions to Mitigate Corporate Risk

- Scouting for solutions to remotely monitor and predictively maintain assets and tracks
- Prototyping and testing new barrier design to enhance operator safety

Attract New Riders, Retain Customer Loyalty

Rider Experience

- Collaborating with academia to research and develop solutions aimed at rider safety and mitigating overcrowding
- Peer benchmarking and scouting for emerging technologies for accessible wayfinding

Place Transit at the Centre of Toronto's Future Mobility

Climate Resilience and Sustainability

- Exploring second life battery solutions to optimize energy conservation and management
- Collaborating with Toronto's startup ecosystem to scout for emerging clean tech and climate tech solutions
- Collaborating with SME's to conduct commission-wide circular economy workshops to identify opportunity areas

Transform and Modernize for a Changing Environment

Public Safety and Transit Security

- Exploring driver assist technologies to enhance collision risk and protect vulnerable road users
- Investigating cutting edge technology solutions to enhance operational efficiency and worker safety for Transit Control Center and emergency responders

Address the Structural Fiscal Imbalance

Financial Sustainability

- Collaborating with academia to solve for fare evasion
- Explore new revenue channels, boost revenue protection to reduce farebox ratio

The 5Ws of Corporate Innovation at the TTC

An innovative organization fosters a culture of openness, values fresh perspectives and diversity of thought, solves problems rooted in empathy for customers and employees, embraces uncertainty, and ambitiously plans for the future, all while effectively serving current needs.

What is 'innovation' at the TTC?

Innovation at the TTC is the pursuit of customer-centric solutions, powered by agile lean methodologies, strategic ecosystem partnerships, an unwavering commitment to achieving net zero emissions by 2040, data driven decision making and considering accessibility, equity across communities, and diversity in every initiative we undertake.

Why innovate at the TTC?

Innovation is imperative to mitigate the risk of our corporate priorities, enhance customer experience, design for future customers, maintain competitive edge, and be a leader in shaping our city's sustainable future. We will evaluate the innovation programs and initiatives to ensure they yield net positive benefit when compared to the cost of administering.

Where and When does the TTC need to innovate?

This commitment to corporate innovation permeates every facet of the TTC. It's not restricted to specific departments; rather, it's integrated across all levels and functions. Innovation is an ongoing endeavour, adapting to changing urban dynamics and transit challenges. Whether it's improving efficiency, enhancing customer experience, or adopting sustainable practices, innovation is a constant pursuit.

Who is responsible for innovation at the TTC?

Corporate innovation involves everyone. From frontline staff to leadership, customers to the general public, and industry peers to academia and vendors, everyone is encouraged to contribute their insights. Cross-functional collaboration brings diverse expertise to the table, enriching idea generation and driving change.

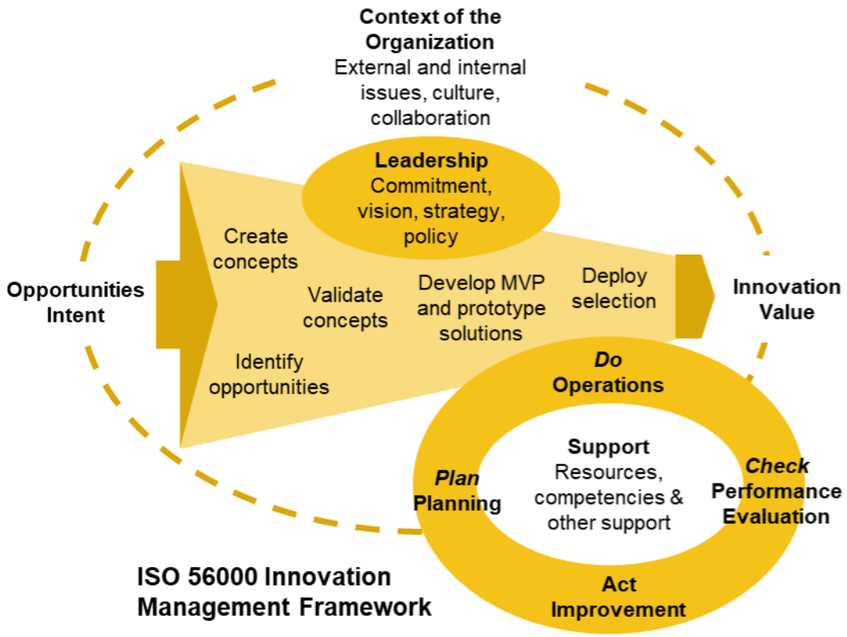
The Science and Practice of Innovation

At its core, innovation is the process of introducing novel ideas, methods, products or services that create value. It could look as simple as improving a process, automating a manual function, or as complex as running a full-fledged pilot or exploring an emerging technology.

Advancing technology pushes us to pursue emerging and potentially disruptive solutions, while our organizational strategic priorities and rising expectations pulls us to further innovate. This push and pull is the basis of our innovation work streams.

Our approach to innovation will be rooted in science and best practices enabling us to mitigate the risks to our corporate priorities and maximize the benefits of transit.

As an example, **ISO 56000 Innovation Management Framework**[10] provides a framework to align innovative solutions with broader business goals, ensuring that innovation is not merely about novelty but about creating substantial value. **Lean Innovation**[11] provides the basis for rapid experimentation, iterative development, and validated learning to swiftly bring ideas to market, which minimizes waste, maximizes efficiency, and encourages continuous improvement through feedback loops.



Innovation Process

A Communicate the purpose

Actively engage all innovators in a transparent effort to solicit, evaluate, and adopt new ideas that **mitigate risks** to our corporate priorities and **maximize the benefits of transit** for our customers, the public, and the global environment.

B Engage innovators

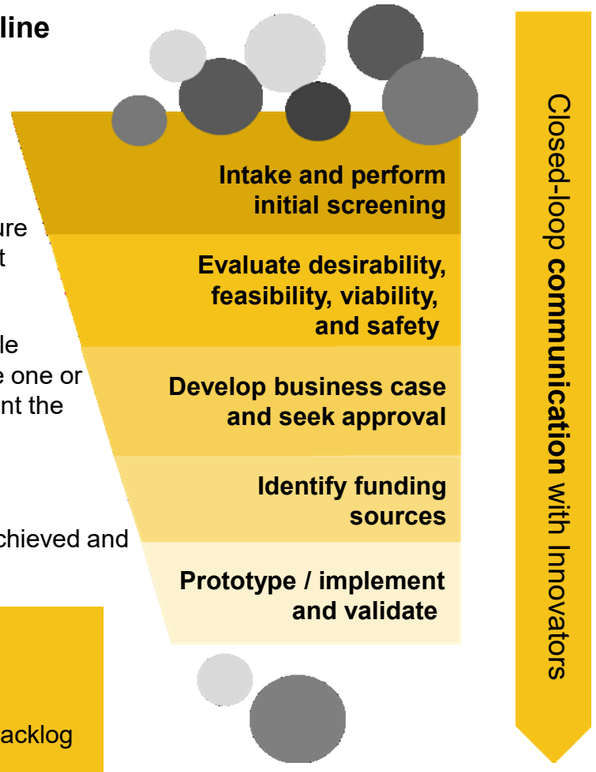
- Employees
- Customers and Public
- Private and Nonprofit
- Academia and Industry Leaders

C Generate ideas

- Identify and solve problems through **Innovation Challenges**
- Scout for **Emerging Technology and Solutions**
- Build an **Open Intake Process**

D Capture and evaluate ideas through the Innovation Pipeline

- Does the idea solve a problem or present an opportunity that will increase the benefits of transit?
- Is the idea technically feasible, is it mature enough and, if applicable, are the risks it introduces manageable?
- What are the costs of a trial and full-scale implementation? Does the idea increase one or more benefits of transit enough to warrant the costs?
- Can a funding source be identified?
- Once implemented, were the benefits achieved and what were the lessons learned?



Agile decisions at any stage of the Innovation Pipeline:

- Pivot Concept
- Move to Pilot
- Add to Future Backlog
- Terminate

Innovation Work Streams

The Corporate Innovation work streams address the push of advancing technology and the pull of increasing expectations.

The Strategy is built on three work streams. Each work stream operationalizes the process through which we generate, capture, and evaluate new ideas.

Work Streams	Goals	Benefits
Identify and Solve Problems Through Innovation Challenges 1.1	To identify and solve specific problems by tapping into the collective knowledge of innovators who know best.	Efficient use of resources to target specific problems and generate novel and effective solutions by cross-pollinating ideas with thought leaders across boundaries.
Scout for Emerging Technologies and Solutions 1.2	Stay abreast of emerging technologies and trends to maintain a competitive edge. Shape the future of transit and build strategic partnerships.	Enables the TTC to adopt, build long term viability, have enhanced efficiency, thrive in a dynamic environment and shape our brand as a future-ready organization.
Build an Open Intake Process 1.3	Formalize the intake of unsolicited ideas from innovators, screen, evaluate, prototype, and implement through a transparent innovation process.	Empower employees to take ownership of innovation at the TTC, enhance creativity, and build an ecosystem of partnerships with local and global partners.

1 Corporate Innovation

1.1

Identify and Solve Problems through Innovation Challenges

Innovation challenges are a powerful way to generate value enhancing solutions to barriers that limit our ability to maximize the benefits of transit, such as customer pain points. Business leaders will be consulted through workshops and roundtable discussions with subject matter experts to align on themes for the innovation challenge.

These challenges aim to enable internal collaboration through co-creation activities, such as challenges, pitch competitions, innovation jams, and hackathons, thus democratizing innovation to not be only an activity for senior leadership. We will run innovation challenges internally with TTC employees as well as externally with students, researchers, Indigenous communities, and industry leaders.

1.1.1 Internal Innovation Challenges

We will run internal innovations challenges using the following process:

I. **Initiation and Submission Phase**: A problem case and challenge statement is published (e.g. end of life battery use, smart cities, reimagining transit experience for newcomers). Any individual employees or team can brainstorm and submit a solution.

II. **Open Voting Phase**: We will develop a process to collect votes from all employees.

III. **Evaluate and Score**: TTC judging panel assess all ideas against the problem specific evaluation criteria. This is then combined with the voting results to receive an overall impact score and the winners are shortlisted for the incubation phase.

IV. **Incubation**: Finalists in this stage are assigned a mentor to help guide their process, remove roadblocks, and provide professional development (for those who aren't sure how to pitch or build a business case for example). The aim is to mature the idea for an upcoming pitch day.

V. **Final Pitch Day:** Teams pitch to the judges panel to seek approval for funding and implementation.

1.1.2 External Innovation Challenges

Collaborating externally fosters a dynamic exchange of ideas, promoting cross pollination that enriches innovation. These partnerships cultivate diverse perspectives from students, researchers, Indigenous communities, industry leaders and start-ups, customers, and next-gen riders, elevating the quality of ideas by infusing fresh insights and multidisciplinary approaches.

1.1.2.i. Innovation Challenges with students and researchers

Students and researchers can contribute new ideas that they can apply from their knowledge, experience, and skills to solve real world problems. We collectively benefit from strengthened ties, showcasing our joint commitment to experiential learning. The spectrum of innovation challenges will range from simple brainstorming exercises to hackathons, research projects, and capstone projects through problem focused challenges. These co-creation opportunities, not only enrich our Innovation Pipeline, but also foster a broader culture of continual ideation and experimentation.

1.1.2.ii. Innovation Challenges with industry leaders and start-ups

Private and non-for-profits organizations in the transit and transportation industry have a unique understanding of specific problems. By conducting call-for-proposals through problem focused challenges there is potential for both parties to co-benefit from a solution.

1.1

Identify and Solve Problems through Innovation Challenges

1.1.2.iii. Innovation Challenges with customers

The TTC proactively engages customers and the public on what is working, what is not working, and constantly seeks innovative ideas for improvement.

This work is carried out continuously, including on project-specific consultations, the 5-Year Service and Customer Experience Action Plan, Annual Service Plans, and through regular customer and public engagement.

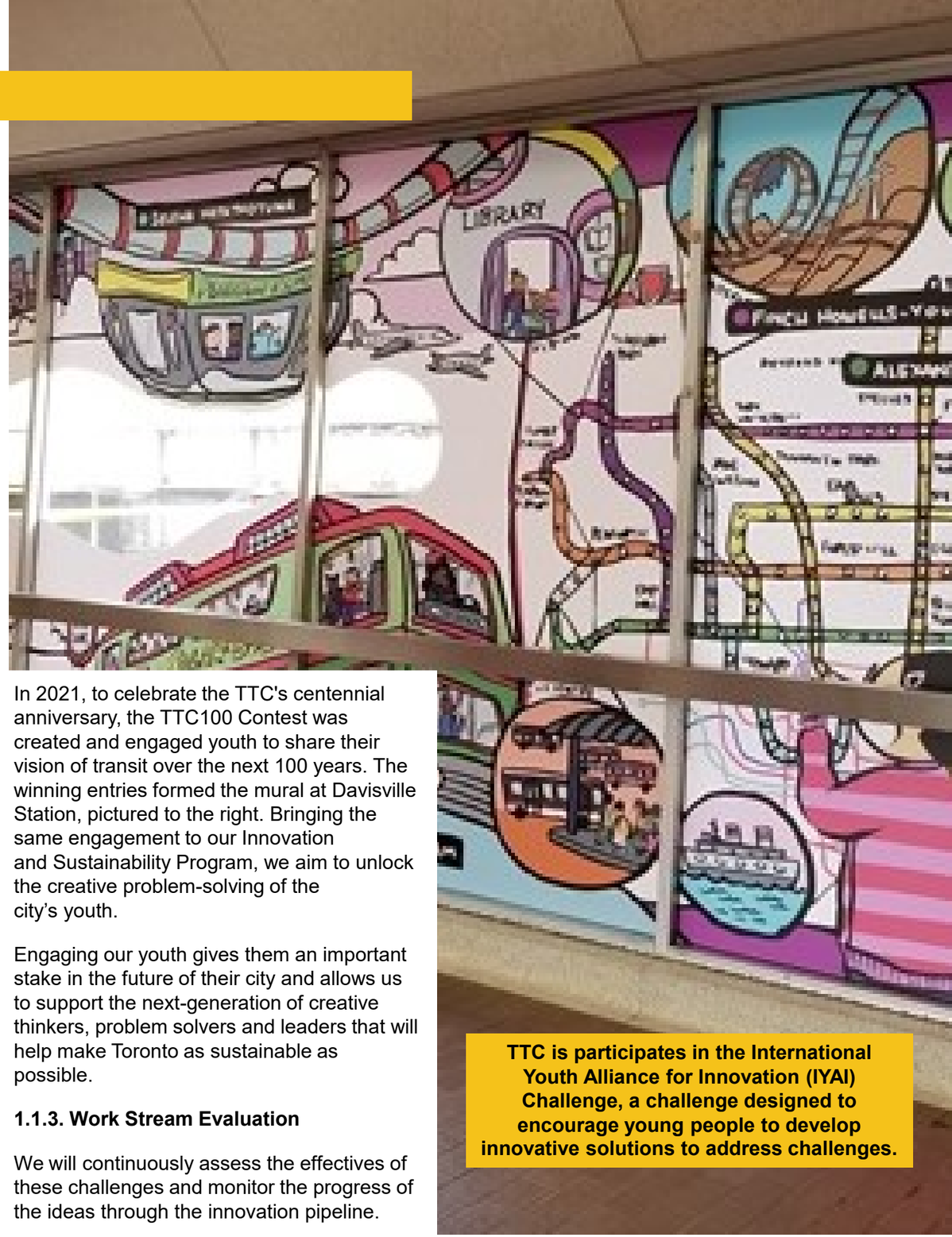
We will seek customer pain points and potential innovative solutions through the channels of customer feedback below:

1. Customer focus groups and panels. We continuously speak with our customers about their experiences, in structured and other settings.
2. Customer surveys. We carry out regular surveys of our customers and probe for their insights and opinions regarding our service and our performance.
3. Customer compliments, complaints and suggestions. Our riders write to us! We will use the data from these communications to better focus our efforts.
4. Working with others. We partner with the City and its agencies, local academia, and our transit partners to research, survey and investigate ways of better meeting our customers' transit needs.

1.1.2.iv. Innovation Challenges with Next Gen Riders

Toronto's children and youth have an important role to play at the TTC. To ensure transit use continues to grow, we will engage young people in planning the TTC's future and encouraging them to choose the TTC as their preferred mode of transportation.

Since the development of our 2021 Annual Service Plan (ASP), the TTC has been deliberately engaging youth aged 18 to 25, a demographic often underrepresented in city-building discussions.



In 2021, to celebrate the TTC's centennial anniversary, the TTC100 Contest was created and engaged youth to share their vision of transit over the next 100 years. The winning entries formed the mural at Davisville Station, pictured to the right. Bringing the same engagement to our Innovation and Sustainability Program, we aim to unlock the creative problem-solving of the city's youth.

Engaging our youth gives them an important stake in the future of their city and allows us to support the next-generation of creative thinkers, problem solvers and leaders that will help make Toronto as sustainable as possible.

TTC is participates in the International Youth Alliance for Innovation (IYAI) Challenge, a challenge designed to encourage young people to develop innovative solutions to address challenges.

1.1.3. Work Stream Evaluation

We will continuously assess the effectives of these challenges and monitor the progress of the ideas through the innovation pipeline.

1.2

Scout for Emerging Technologies and Solutions

The discovery and exploration of cutting-edge technologies that have the potential to improve the performance and efficiency of the TTC's operations. This involves us understanding paradigm shifts, emerging trends, and technologies. We will host tech demo days with accelerator partners and conduct use case workshops on emerging technologies to find the best real-world applications for current and future needs. We will achieve this by focusing on the following two areas:

1.2.1. Exploring and adopting new technologies.

We commit to explore and adopt new technologies. Currently, the emerging technologies we are exploring or adopting include:

- Big Data and Data Analytics
- Artificial Intelligence and Machine Learning
- Electric Vehicles
- Renewable Energy Generation and Storage
- Autonomous Vehicles
- Robotics
- Track/overhead and signal asset real-time monitoring

As new technologies emerge this list will grow.

1.2.2. Jurisdictional Scans and Peer Benchmarking

We will not look to reinvent the wheel – we will build off the great solutions already in use by our peers around the world.

It is most effective and efficient to find practical and well-proven innovative solutions among industry and our peers.

On an ongoing basis, the TTC will continue to benchmark our own operational performance against leading transit agencies worldwide. Through industry benchmarking organizations, such as APTA, COMET, CUTA, OPTA, ZEBRA, and others, we contribute our own operational performance data and learnings, and we benefit from others.

Best practice reviews of peer agencies provide an opportunity to understand in greater depth the innovative ways in which high organizational performance is achieved across all areas of the business.

Under this workstream, the TTC will expand its outreach both within North America and beyond with the aim of identifying creative solutions to the challenges we face in maximizing the benefits of transit.

1.3

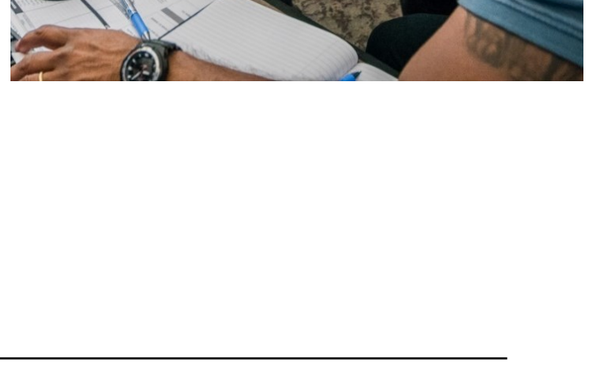
Build an Open Intake Process

Our employees know the business and the private and non-for-profit sectors explore innovations that can improve how we do business. To take full advantage, we will leverage their perspectives and pursue innovations that align with the TTC's Corporate Plan.

1.3.1. Internal Intake Process - Employees

Employees, from contract and part-time to full-time employees, perform a range of tasks across the organization and know the ongoing challenges and on-the-ground realities inside and out. Therefore, we will build an open intake process that encourages our employees to actively contribute their insights and ideas on an ongoing basis. It is an open call where employees are invited to freely share innovative ideas, provide valuable feedback, suggest improvements, identify pressing business challenges that need solutions, and offer insightful observations.

This approach promotes a culture of innovation where employees are seen and heard. Leveraging their deep understanding of our business, we will tap into their valuable insights. It also aims to empower employees to take ownership of innovation and build a growing network of internal innovation champions. Ideas will be screened to ensure they align with the TTC's Corporate Plan. This will help contribute to ongoing employee engagement and business process improvement, highlighted as key priorities in the Corporate Plan.



1.3.2. External Intake Process - Private and Non-for-Profits

We are committed to exploring innovations from business partners to make our organization more efficient and sustainable.

We will develop an external intake process for potential partners to share their proposals in a structured and streamlined way so we can vet them through our Innovation Pipeline.

The TTC receives a large number of unsolicited proposals from potential partners. Through this work stream, we will establish a formal and transparent process through which unsolicited proposals are captured and screened. The following considerations will be applied:

- The proposal does not circumvent the TTC's regular procurement process.
- The proposal is aligned with achieving progress on TTC priorities identified in the Corporate Plan.
- The proposal's scale and scope aligns with the requirements and funding ability of the TTC.
- The proposer's capabilities and the product or service is sufficiently mature.

Action Roadmap

The corporate innovation action roadmap summarizes key actions the TTC will undertake over the next five years. Generally, the first year will be used to develop and launch innovation programs and processes, ramping up our capacity to innovate in future years.

Report annually on the progress of each work stream and an assessment of return on investment for the program.

1.1 Identify and Solve Problems with Innovation Challenges

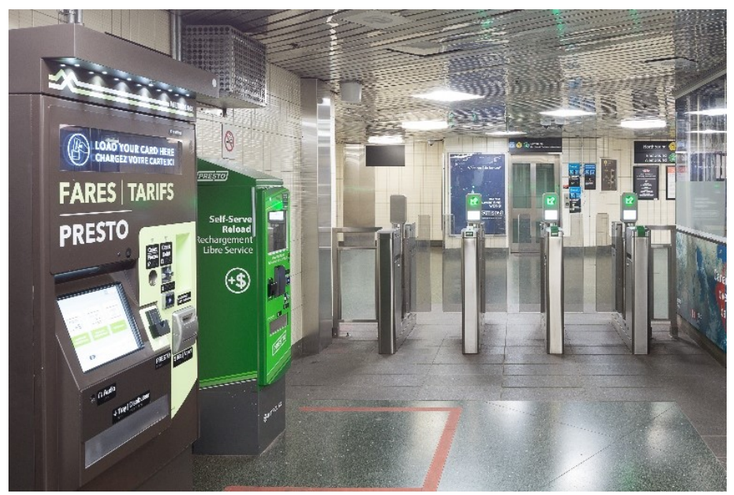
Initiative	Action
1.1.1 Internal Innovation Challenges	***1.1.1.i:*** Conduct problem framing, design thinking, and systems thinking workshops with business units to define problems statements to prioritize and solve ***Lead: Executive Director of Innovation and Sustainability*** ***1.1.1.ii:*** Conduct internal innovation challenges to generate ideas and evaluate them through the Innovation Pipeline ***Lead: Executive Director of Innovation and Sustainability***
1.1.2 External Innovation Challenges	***1.1.2.i:*** Conduct idea challenges or capstone projects with private organizations, non-profit organizations, customers, next-gen youth, and academic partners ***Lead: Executive Director of Innovation and Sustainability*** ***1.1.2.ii:*** Survey and interview youth, next-generation, and customers to understand their expectations, needs, and pain points ***Co-Leads: Executive Director of Innovation and Sustainability and Chief Strategy and Customer Experience Officer*** ***1.1.2.iii:*** Utilize the Customer Panel to seek insights on a continual basis ***Lead: Chief Strategy and Customer Experience Officer*** ***1.1.2.iv:*** Evaluate ideas from challenges through Innovation Pipeline ***Lead: Executive Director of Innovation and Sustainability***
1.1.3 Workstream Evaluation	***1.1.3.i:*** Assess the effectiveness of this work stream and its ability to identify problems, generate ideas, and progress ideas through the Innovation Pipeline ***Lead: Executive Director of Innovation and Sustainability*** ***1.1.3.ii:*** Optimize the process and determine frequency of future internal and external innovation challenges ***Lead: Executive Director of Innovation and Sustainability***
Key Performance Measures	• Quantified increase in benefits of transit • Number of participants • Number of quality ideas • Number of ideas turned into pilots or future backlog ideas after evaluating feasibility, desirability, viability, safety, and business cases

1.2 Scout for Emerging Technologies and Solutions

Initiative	Action
1.2.1 Exploring and Adopting New Technologies in an Active, Responsible, and Transparent Approach	***1.2.1.i:*** Develop a standard and transparent approach to evaluating opportunities, piloting, testing, and evaluating the benefits of new technologies ***Lead: Executive Director of Innovation and Sustainability*** ***1.2.1.ii:*** Host use case workshops for cutting-edge technologies across different business units ***Lead: Executive Director of Innovation and Sustainability*** ***1.2.1.iii:*** Develop and implement strategic plans for known emerging technologies ***Co-Leads: Executive Director of Innovation and Sustainability, Chief Strategy and Customer Experience Officer, and Head of Information Technology Services*** ***1.2.1.iv:*** Successfully scope and implement the Bus Design Innovation Program that aims to reimagine bus design for operator safety and to enhance customer experience ***Lead: Executive Director of Innovation and Sustainability***
1.2.2 Jurisdictional Scans and Peer Benchmarking	***1.2.2.i:*** Conduct jurisdictional scans to explore new technologies being explored by transit agencies and adjacent industries globally ***Lead: Executive Director of Innovation and Sustainability*** ***1.2.2.ii:*** Host technology demo days to showcase innovative solutions across different business divisions ***Lead: Executive Director of Innovation and Sustainability*** ***1.2.2.iii:*** Enhance our collaboration with transit industry associations ***Lead: Executive Director of Innovation and Sustainability*** ***1.2.2.iv:*** Attend local and global conferences to scout leading and disruptive technologies and solutions ***Lead: Executive Director of Innovation and Sustainability***
Key Performance Indicators	• Number of strategies developed and implemented • Number of emerging technologies or solutions being explored and adopted • Number of Proof of Concepts in flight • Leadership participation at demo day showcases

1.3 Build an Open Intake Process

Initiative	Action
1.3.1 Internal Intake – Employees	***1.3.1.i:*** Create and implement an intake process with defined criteria for idea management through the Innovation Pipeline ***Lead: Executive Director of Innovation and Sustainability*** ***1.3.1.ii:*** Evaluate ideas through the Innovation Pipeline and shortlist solutions to implement ***Lead: Executive Director of Innovation and Sustainability***
1.3.2 External Intake – Private and Non-profit Organizations	***1.3.2.i:*** Create and implement an intake process for unsolicited proposals with defined criteria for idea management ***Lead: Executive Director of Innovation and Sustainability*** ***1.3.2.ii:*** Leverage industry tradeshows to identify innovative solutions to be evaluated through the Innovation Pipeline ***Lead: Executive Director of Innovation and Sustainability***
Key Performance Indicators	• Number of quality ideas vetted through Innovation Pipeline • Number of Partner proposals received through new intake process • Number of ideas that resulted in pilot projects • Qualitative Survey to evaluate customers' brand perception



2 Environmental Sustainability

Our commitment to environmental sustainability at the TTC is to do our part to address the global climate emergency, with a focus on eliminating TTC's direct emissions, growing our ridership to avoid community emissions, and ensuring our operations are resilient to extreme weather events.

Chapter Content

- Strategic Context
- Approach
- Strategy and Workstreams
- Action Roadmap

Strategy & Context

Global, Federal, Provincial…

The climate crisis is the greatest threat facing humanity today. The dangers of the climate crisis and our need for immediate action have been recognized globally and at every level of our government. The scientific community has warned that we have a limited timeframe to keep global warming below 1.5°C.[12]

This is not just some risk to avoid in the future, we feel the effects of the climate crisis today. Canada's average temperatures are rising at twice the global average and three times in the North.[13]

At the global level, in 2015, the United Nations adopted its 17 Sustainable Development Goals as a part of its 2030 Agenda for Sustainable Development, followed months later by the Paris Agreement.

While the UN brought global nations together, the C40 Cities brought 100+ city mayors together to pledge to halve their emissions within a decade, aiming to drive the global imperative on a local stage.

Closer to home, in 2022, Canada introduced its Emissions Reduction Plan with a GHG emissions reduction target of 40-to-45 percent below 2005 levels by 2030 and put us on a path to achieve net zero GHG emissions by 2050.

Further, the Made-in-Ontario Environmental Plan includes a GHG emissions target of 30 percent below 2005 levels by 2030.

Polluting less and taking steps to remove excess carbon from the air will ensure that we reach our GHG emissions reduction targets.

United Nations

Sustainable Development Goal #13:

Take Urgent Action to Combat Climate Change and its Impacts

C40 Cities

Mission:

Halve the emissions of its member cities within a decade

Canada

Emissions Reduction Plan:

40-45% emissions reductions below 2005 levels by 2030, net-zero by 2050

Ontario

Made-in-Ontario Environmental Plan

What you can do #1:

Choose cleaner travel choices, such as public transit or bicycle

…and Local.

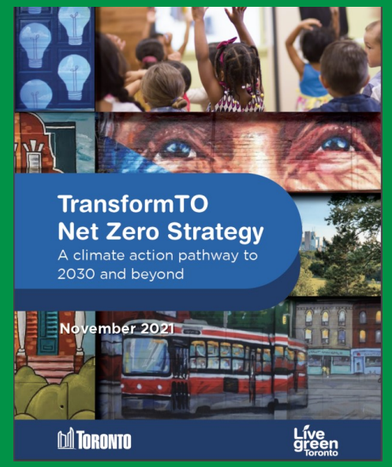
On October 2, 2019, City Council voted unanimously to declare a climate emergency and to adopt stricter GHG emissions reduction targets to achieve net zero GHG emissions for Toronto. Today, more than 2,000 jurisdictions and 40 countries have declared a climate emergency.[14]

The City prepared an action plan to reach net zero by 2040, also known as the TransformTO Net Zero Strategy. TransformTO was unanimously approved by City Council in 2017, demonstrating Toronto's commitment to a global call for action to limit global temperature rise in line with international goals.

The TransformTO Net Zero Strategy responds to the climate emergency by focusing on a new target of net zero GHG emissions community-wide by 2040.

Since transportation and buildings are a significant source of Toronto's carbon footprint, many of the actions necessary to reach net zero by 2040 directly relate to the TTC.

This Strategy describes how the TTC will contribute to the reduction of city-wide GHG emissions to achieve net zero by 2040. Further, our Strategy aligns with the City of Toronto's First Resilience Strategy (FRS) and Sustainable City of Toronto Fleets Plan. Specifically, the FRS states that we must continue to prioritize service and capital improvements to the TTC that make the system more resilient to the effects of the climate crisis.



The 5Ws of Environmental Sustainability at the TTC

A sustainable organization will support reduction of GHG emissions, increase resilience to extreme climate events, improve community health and well-being, improve social equity, and grow our economy.

What is 'sustainability' at the TTC?

Sustainability at the TTC is the pursuit of impactful action to reduce GHG emissions, increase operational resiliency, responsibly consume limited resources improve community health and wellbeing, while maximizing service reliability for our customers.

Why practice sustainability at the TTC?

Over the next 20-30 years, Toronto is expected to see a tripling of high temperature days, from an average of 12 in the years 1976-2005 to an annual average of 66 days per year above 30°C by 2050. These changes place a significant burden on local residents and critical infrastructure. Toronto has already experienced extreme weather events, such as major flooding, snow and ice storms, heatwaves, wildfire smoke and windstorms.

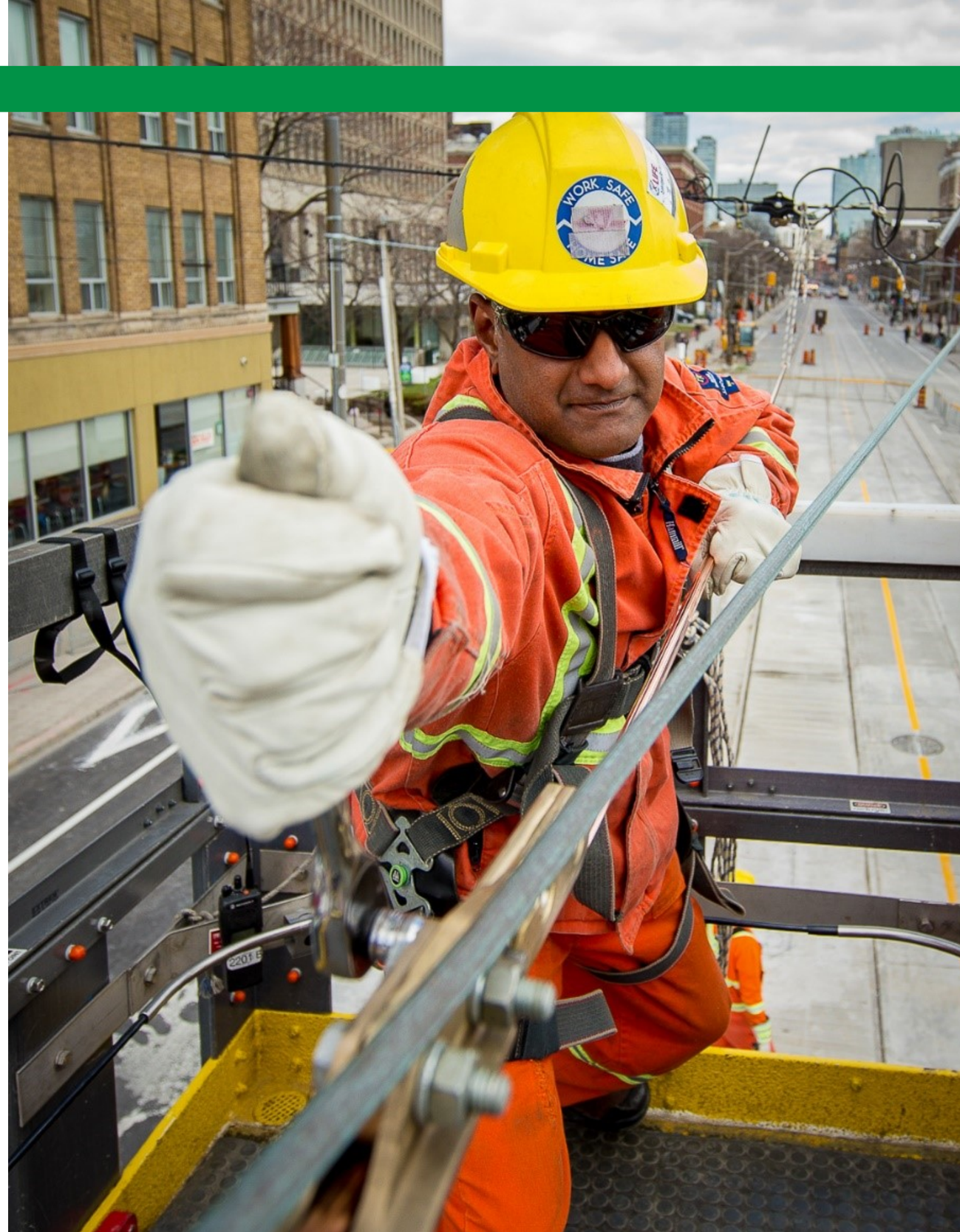
Delaying action will only exacerbate the climate situation and increase the cost and difficulty of dealing with the consequences both locally and globally, while affecting our ability to deliver reliable and safe transit services. It is important for the TTC to reduce its environmental impact while increasing its resilience to the climate.

Where and When should sustainability be a focus?

Taking public transit today is a sustainable option to travel. Furthering our sustainability in the future, our commitment will permeate every facet of the TTC. To achieve our net zero by 2040 target, we must act immediately. Achieving our targets cannot be simply solved with technological solutions alone. The TTC must work to adopt progressive designs and operational measures into all physical assets, while collaborating with local entities, such as the City of Toronto and Toronto Hydro, to increase the efficiencies of our interdependent public services. To start this process, the TTC will work to embed sustainability throughout its culture.

Who is responsible for sustainability at the TTC?

Environmental sustainability involves everyone. From frontline staff to leadership, customers to the general public, and industry peers to academia and vendors, everyone has a responsibility to engage and move us towards a sustainable future.



TTC's Role in Reducing Emissions that Contribute to the Climate Crisis

The emissions associated with the transportation sector as a whole were the second largest source of emissions in Toronto, totaling 33% of community wide emissions.[15]

TTC's GHG emissions impact can be divided into two categories:

1. **Direct and Indirect:** In accordance with the Greenhouse Gas Protocol, our organization's emissions are to be categorized as direct emissions (Scope 1) and indirect emissions (Scope 2 and Scope 3). City divisions, agencies and corporations have a responsibility to manage both.

2. **Avoided:** Public transit systems are in the unique position to displace GHG emissions through mode shift from higher emitting modes such as personal vehicles, congestion reduction, and efficient land use. We have defined these as avoided emissions (Scope 4) to communicate how the TTC contributes to the reduction of GHG emission throughout the City of Toronto and beyond.

	Scope 1	Scope 2	Scope 3
GHG Protocol Definition[16]	Direct GHG emissions occurring from sources that are controlled or owned by the organization	Indirect GHG emissions from purchased energy generated offsite but consumed by the organization	All other indirect emissions that occur in an organization's value chain
TTC's Primary Sources of GHG Emissions	• Diesel and gasoline-powered conventional buses, Wheel-Trans buses and non-revenue vehicle fleets • Natural gas and steam-powered heating of buildings • Diesel and natural gas from backup generators • Fugitive emissions from air conditioning, fire suppression, and electrical transmission equipment	• Electricity purchased to power electric buses, streetcars and subway trains • Electricity purchased for supplying electricity to stations and buildings, and lighting of parking lots	• Purchased goods and services • Construction • Employee and customer commuting • Business travel • Waste

TTC's GHG Emissions Inventory (2022)

A 2022 snapshot of TTC's known and quantifiable sources of GHG emissions in metric tonnes of CO2 equivalent.

Conventional Bus Fleet
186,000 T
CO2e / Year

Wheel-Trans Bus Fleet
6,000 T
CO2e / Year

Operational Support Fleet
5,100 T
CO2e / Year

Facilities
45,000 T
CO2e / Year

Avoided Emissions
TBD
CO2e / Year

The release of the TTC's **2024 Environmental Sustainability Report** will begin our annual reporting on not just our progress in reducing our GHG emissions, but on our environmental sustainability progress overall.

Facilities, Subways, Streetcar
12,500 T
CO2e / Year

Value Chain
TBD
CO2e / Year

TTC's Carbon Management Hierarchy

To maximize the impact of our carbon reduction efforts, TTC will use the following carbon hierarchy:

Most Favoured

1. Eliminate Fossil Fuel Energy Sources

Prioritize the phase out of fossil fuels for electricity by:

- Replacing internal combustion engine vehicles with battery powered and electric vehicles.
- Displacing natural gas HVAC equipment in buildings with electric alternatives such as air source and ground source heat pumps.

2. Reduce Energy Demand

Reduce the total energy required to meet demand by:

- Adopting energy monitoring technology.
- Building a culture where operations and maintenance staff adopt operational energy conservation measures.
- Utilize energy efficient materials and equipment.
- Shifting energy intensive activities to off-peak hours to reduce peak demand where feasible.

3. Utilize Renewable Energy Sources

Increase energy resiliency by:

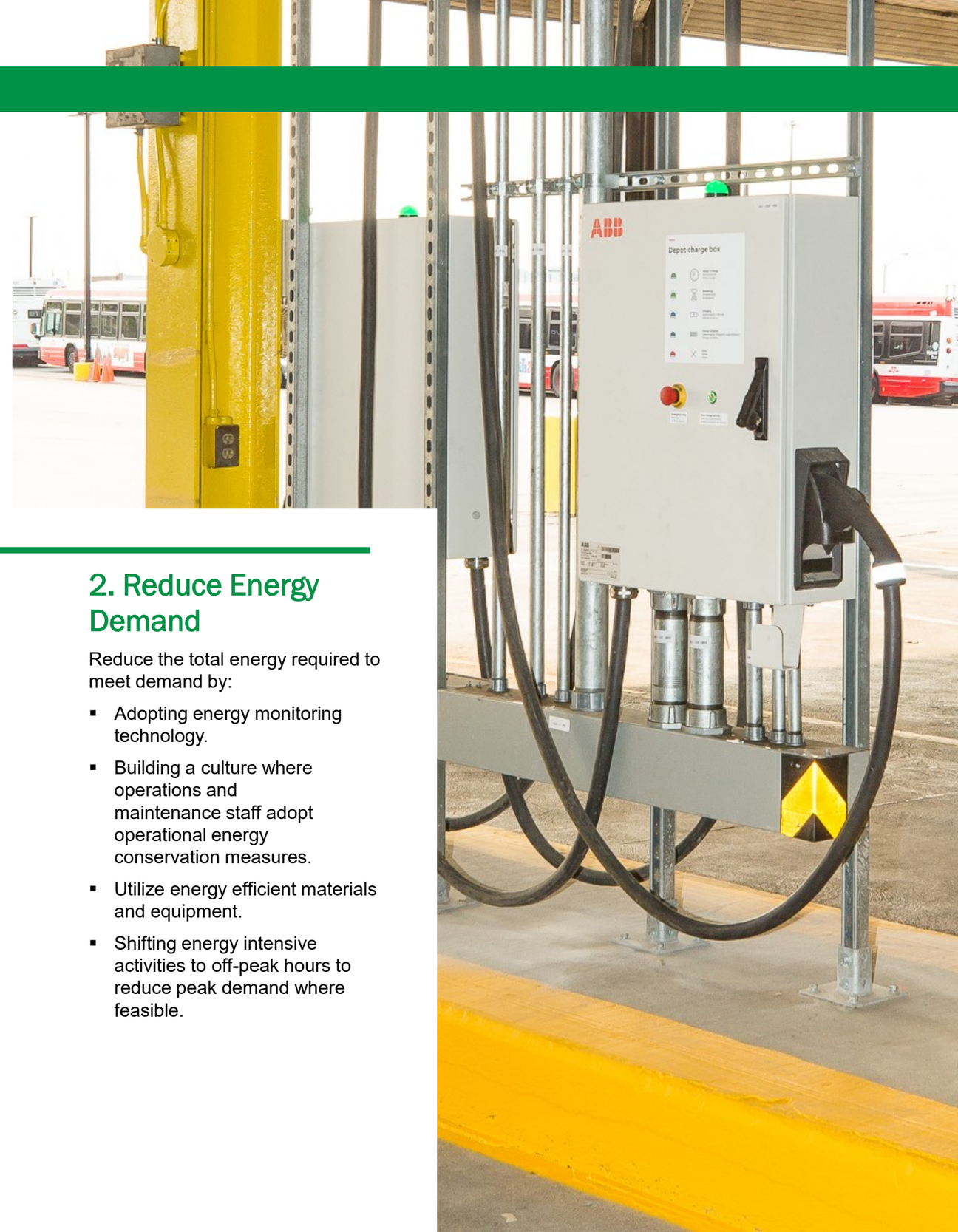
- Installing on-site photovoltaic energy systems.
- Investing in energy storage solutions to store excess renewable energy.
- Exploring the use of solar thermal, ground source heat pumps, and wind.

4. Offset Residual Emissions

Reach net zero emissions by:

- Quantifying residual emissions.
- Participating in carbon off-set programs to purchase carbon credits that meet the City of Toronto's Offset Credits Policy.

Least Favoured



Sustainability Approach

1. Take immediate action
2. Conduct portfolio-wide studies
3. Prioritize opportunities
4. Set environmental targets and develop actions to meet targets

Take immediate action by continuing our transition to a zero-emissions revenue and non-revenue fleets, deploying fossil-fuel-free assets through our capital programs, and fostering an employee culture driven to environmental action.

We will conduct a series of high-level, portfolio-wide studies to assess baseline environmental performance across all asset types and major operational processes.

Through these studies, we will identify and prioritize all opportunities to eliminate GHG emissions, reduce consumption, protect our natural ecosystem, build climate resilience and maximize economic return.

Environmental targets will be set for major asset types and guidelines will be developed to inform asset-specific feasibility studies that capture the unique characteristics, detailed performance and opportunities of each asset. We will prioritize actions by degree of impact, asset age and lifespan, and opportunities to integrate with broader capital programs for renewal and replacement.

In compliance with international environmental, social and governance reporting standards, such as the Global Reporting Initiative, the TTC Environmental Sustainability Report will include reporting on the progress of immediate climate change actions, systematic reviews, and our ever-improving environmental performance. Further, we will initiate routine and transparent performance reporting through an annual TTC Environmental Sustainability Report.

Sustainability Work Streams

The Strategy is built on five workstreams. Each action encompasses an important part of the overall sustainability strategy for the TTC, ensuring the TTC employees, the community and the overall environment in which we operate are included in our purview.

Work Streams	Goals	Benefits
Eliminate GHG Emissions 2.1	Support continued transit ridership growth to maximize city-wide avoided emissions and decarbonize TTC assets to minimize direct and indirect emissions.	Improve air and noise quality, reduce environmental impact and meet GHG emission reduction targets.
Reduce Consumption 2.2	Reduce water usage, minimize waste to landfill, increase recycled materials, and move towards a more circular economy to minimize indirect GHG emissions.	Protect the environment, maximize the value of our investments and resources, while providing new opportunities for employment in a circular economy.
Protect our Natural Ecosystem 2.3	Integrate natural ecosystems into the plans, designs and development of our assets.	Protect and restore local natural habitats, functions and biodiversity.
Build Climate Resilience 2.4	Identify assets vulnerable to extreme weather events, adopt mitigation measures to increase resilience against extreme weather events and increase energy resiliency.	Reduce frequency, duration and severity of service interruptions and associated economic impacts.
Climate and Fiscal Responsibility 2.5	Maximize net operating savings, cost avoidance, and the potential revenue from capital investments made to decarbonize our operations.	Apply savings and revenue to generate capital funding toward the TTC's Innovation and Sustainability Program to 2040. Apply savings, cost avoidance and revenue to reduce fares post-2040.

2.1

Eliminate GHG Emissions

Transportation is the second largest source of GHG emissions in the city. To combat this issue, we need to grow ridership to maximize avoided (Scope 4) GHG emissions and work in parallel to reduce our own direct and indirect (Scope 1, 2 and 3) GHG emissions.

2.1.1. Maximize Avoided GHG Emissions (Scope 4) by Ensuring Transit Ridership Grows Faster than Toronto's Population

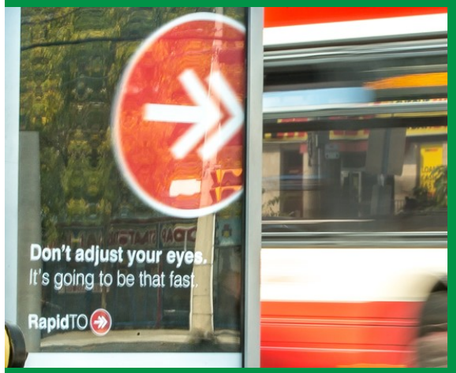
Public transit plays a critical role in reducing city-wide GHG emissions by providing a low-emission mode of transportation compared to a personal automobile.

Making public transit an attractive mode of choice involves ensuring our service is efficient, reliable, frequent, fast, accessible and seamless from one end of the journey to the other.

We have initiatives underway to improve the speed and reliability of transit, such as working with the City of Toronto to implement the RapidTO program, install more queue jump lanes, implement transit signal priority as well as work with Metrolinx and municipal transit partners to deliver rapid transit projects.

To ensure transit remains an attractive mode of choice, we will deliver a new 5-Year Service and Customer Experience Action Plan in 2024, informed by the latest information in ridership travel demand patterns, customer research and engagement with transit riders. We will also continue to work with Metrolinx and municipal transit partners to deliver rapid transit projects and implement service integration.

The two most impactful things that the TTC can do to incentivize a modal shift away from personal automobiles is to lower fares and make the bus and streetcar network more frequent, reliable, and faster.



RapidTO

The TTC and the City are working on the RapidTO bus and streetcar plan that will guide the study, evaluation, and delivery of bus and streetcar improvement projects in Toronto that will improve the speed and reliability of transit.

RapidTO Eglinton East priority bus lanes are already demonstrating the following benefits:

10% increase in transit reliability

Accelerate ridership growth

2-6 minute reduced morning commute

5 minute reduced evening commute

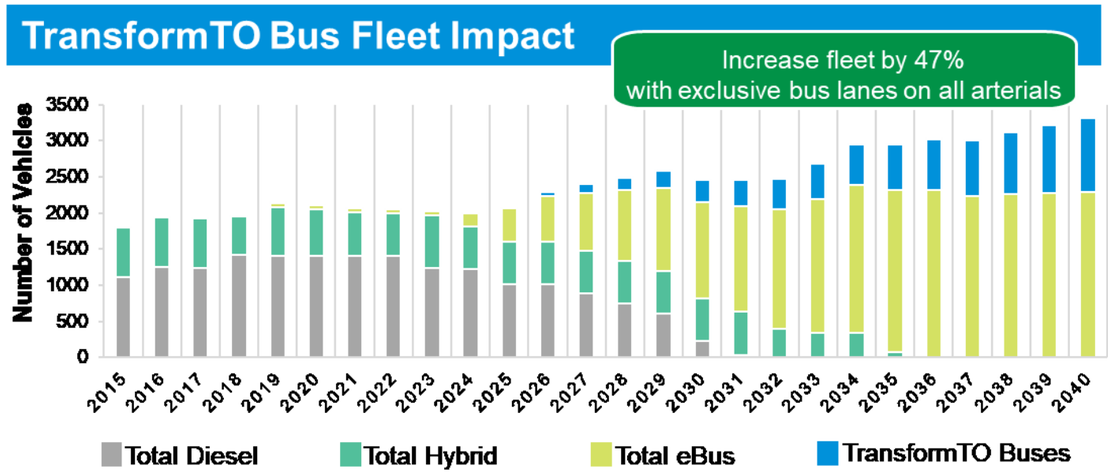
The TransformTO Net Zero Strategy, Toronto's ambitious climate action plan, sets long-term, low-carbon goals and strategies to reduce local greenhouse gas emissions and improve our health, grow our economy and improve social equity.

As part of the technical work, one scenario was modelled for the transportation network to illustrate a pathway to achieving community-wide, net zero GHG emissions. This included service frequency of bus, streetcar and subway by 70%, 50% and a maximum three minutes headway off-peak, respectively, along with a number of other policy and behavioural changes. These service increases are beyond our current capital and operating plans.

The graph below illustrates our current bus fleet plan with the additional buses that would be required to for the TransformTO bus frequency improvement, captured in the 2024-2038 CIP. As this is one of the possible pathways to net zero, we will continue to work with the City on additional scenarios to understand the most cost effective and achievable option for the transportation network as a whole.

In parallel, we will mature and report the order of magnitude costs to achieve the current TransformTO's scenario of net zero community-wide GHG emissions by 2040.

As part of our strategy to reduce GHG emissions, we will also explore the innovative use of smaller vehicle sizes to maintain access to transit in lower-demand periods.



2.1

Eliminate GHG Emissions

2.1.2. Eliminate Direct GHG Emissions by Decarbonizing Our Fleets (Scope 1).

The TTC's city bus fleet generates more than 79.5% of our Scope 1 and 2 GHG emissions.

As such, the single most impactful action that we can take is to implement the TTC's Green Bus Program, as the TTC's streetcar and subway fleets are already electric.

In 2018, just one year after the Board's direction, we received our last diesel bus and began procuring only lower-emissions, hybrid-electric buses as a transition technology and our first 60 zero-emissions battery-electric buses.

As a result of this direction, in 2020, we had the largest operating electric bus fleet in North America. Following the TTC's two-year eBus evaluation, we are now procuring the last hybrid-electric buses and have initiated procurement of only eBuses, starting in 2024.

Greening the revenue and non-revenue fleets benefits the city in more ways than one, including continuous collaboration with the City of Toronto. An electric propulsion reduces GHG emissions, but also includes the promise of higher vehicle performance for our customers, improved local air quality resulting in better health outcomes for our employees, customers and the public, and substantial operating savings and revenue.

TTC's Green Fleet Targets

2024
- Pilot electric non-revenue vehicles

2025
- Transition 50% of city bus fleet to hybrid and zero-emission
- Procure only fossil-fuel-free zero-emissions city buses
- Pilot electric Wheel-Trans buses

2030
- Transition 50% of city bus fleet to zero-emissions

2040
- Transition all city buses, wheel-trans buses, and non-revenue vehicles to 100% zero-emissions by 2040

Aligned with Sustainable City of Toronto Fleets Plan

TTC's Green Fleet Targets

We are already making significant progress in reducing direct GHG emissions as we phase out fossil fuels through the TTC's Green Bus Program.

Transition to Electric Buses

In 2019, we changed our fuel source for all buses from diesel to biodiesel where the emissions per litre of biodiesel fuel are 7% lower than for diesel.

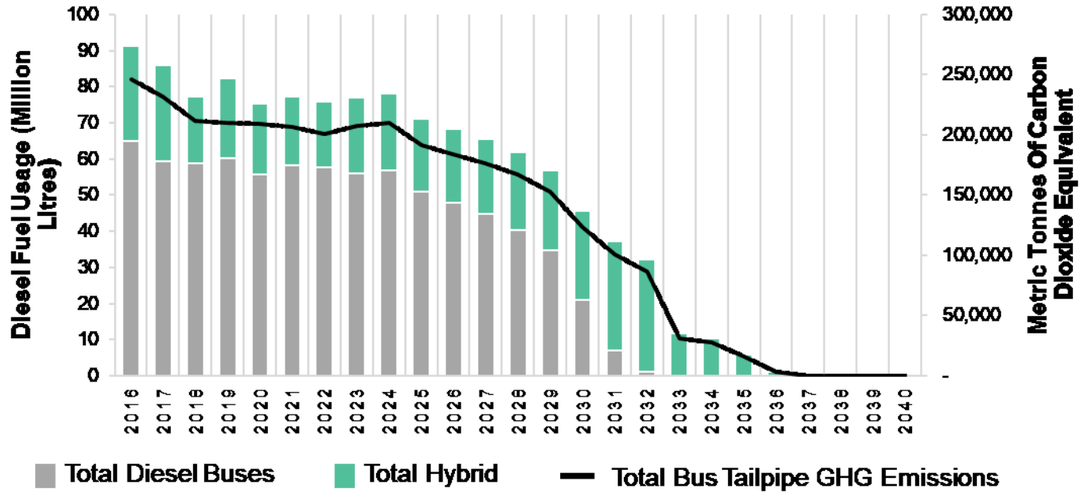
While our year-over-year fuel usage between 2018 and 2019 went up slightly, to 85 million litres from 83 million litres, our bus GHG emissions went down by 7,000 metric tonnes of carbon dioxide equivalent by introducing biodiesel.

In 2018, we introduced low-emissions hybrid-electric buses, and in 2019 we began the adoption of zero-emissions, battery-electric buses.

By the end of 2030, when our fleet is 50% electric, we will have reduced our emissions by more than 60% over the TransformTO baseline year of 2016, all while increasing our fleet size by 6.3% to match increasing customer demand.

The graph below projects decreasing diesel fuel usage and GHG emissions as our fleet fully transitions to hybrid and then zero-emissions buses.

TTC's Green Bus Program's Impact on Projected Diesel Fuel Usage and GHG Emissions



2.1

Eliminate GHG Emissions

2.1.3. Minimize Direct and Indirect GHG Emissions by Decarbonizing Our Facilities (Scope 1 and 2).

In 2019, the TTC's existing facilities accounted for 16% of our Scope 1 GHG emissions. The largest source of facility emissions is from the use of natural gas to heat buildings.

To reduce facility-related emissions, we will develop zero-carbon transition plans for each facility in the TTC portfolio by the end of 2027 as required by Toronto's Municipal By-law.

Actions coming out of zero-carbon transition plans will incorporate:

- Energy efficiency programs to reduce energy consumption.
- Fuel switching for heating of buildings.
- Integrated design processes and deep retrofits to maximize efficiencies while improving the overall building's performance.
- A refrigerant inventory and processes for leak management and responsible disposal.

TTC's Green Facility Targets 2040

Achieve net zero GHG emissions by:

- Eliminating 90% of direct emissions through conservation programs, and fuel switching from natural gas heating to electric mechanical systems.
- Maximizing use of zero-emission on-site generation, including utilizing solar PV systems on 100% of available roofs and parking lots.
- Deploying battery energy storage systems to shift the time-of-day use of electricity to the evening when the electricity supply is low-emissions.

2.1.4. Reduce indirect GHG emissions from our value chain (Scope 3).

The total scale of the TTC's Scope 3 emissions is currently unknown. However, there is work we can do today to both improve our understanding of value chain emissions and reduce them.

2.1.4.i. Gain a better understanding of value chain emissions.

We will expand our GHG Inventory by conducting a Scope 3 assessment that identifies and quantifies value chain emissions. This assessment will also include a prioritized plan to systematically reduce value chain emissions.

2.1.4.ii. Address known sources of value chain emissions.

Embodied carbon emissions

Embodied carbon emissions, associated with the upstream and downstream emissions from materials used for construction and repair of vehicles and facilities, are a significant source of Scope 3.

To address indirect emissions from our supply chain, we will take action to have suppliers provide environmental product declarations, where applicable.

These declarations will include the quantified carbon impacts from material sourcing and production of products. The environmental product declarations will provide us with visibility to our own Scope 3 emissions.

In addition, vendors will be required, where applicable, to demonstrate that embodied carbon emissions of significant materials, such as concrete, are below the industry norms or, as market standards mature, they comply with specified maximum global potential thresholds.

Emissions from commuting to TTC

Scope 3 also accounts for transportation emissions from customers commuting to the TTC network, and from employees travelling to TTC work locations.

To address indirect emissions from commuting, we will increase our efforts to incentivize customers and employees to use lower carbon methods of transportation to access the TTC network and work locations.

Primary efforts to achieve this will be applied to the encourage active transportation, eMobility, and the use of electric vehicles through enabling infrastructure, such as the deployment of customer and workplace EV charging.

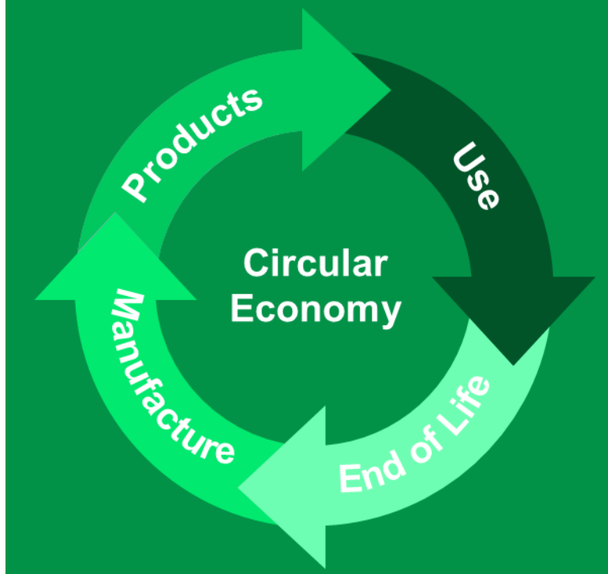
2.2

Reduce Consumption

The TTC's environmental impact is multifaceted and goes beyond climate mitigation and adaptation. Our consumption habits drive embodied carbon and play a critical role in determining the availability of limited natural resources, such as water and materials, while simultaneously contributing to waste.

By taking a holistic approach to environmental sustainability, we work towards reducing our impact on the planet and preserving natural resources for future generations. This involves moving towards a more circular economy by promoting sustainable consumption, reducing water consumption and improving waste management practices.

In a current linear economy, resources are mined and processed into useful materials, after usage, those materials are thrown away as waste.



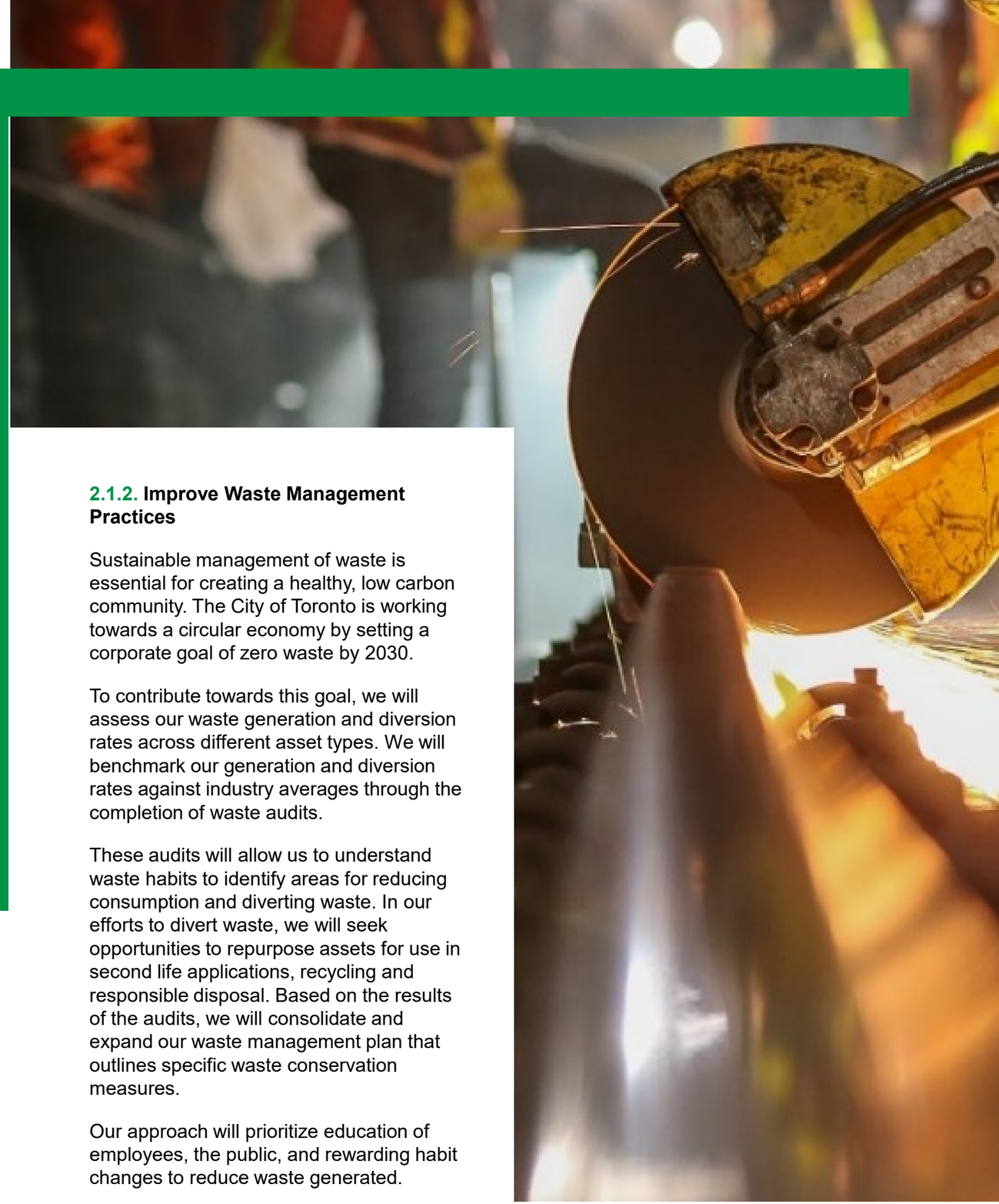
In a circular economy, this process is transformed where resources are renewed and waste is eliminated.

2.2.1. Use Sustainable Materials

By prioritizing sustainable material procurement, we can play a significant role in driving positive change in supply chains throughout industry.

As a large public agency that consumes significant quantities of materials for construction of new assets and ongoing maintenance of existing assets, we will leverage our purchasing power to increase transparency and accountability from suppliers. We will signal the transition to materials that were mined, manufactured, and transported in a more environmentally conscious and ethical manner.

To achieve this, we will develop transit industry best practices for sustainable material selection into procurements and standar specifications and design criteria, where applicable.



2.1.2. Improve Waste Management Practices

Sustainable management of waste is essential for creating a healthy, low carbon community. The City of Toronto is working towards a circular economy by setting a corporate goal of zero waste by 2030.

To contribute towards this goal, we will assess our waste generation and diversion rates across different asset types. We will benchmark our generation and diversion rates against industry averages through the completion of waste audits.

These audits will allow us to understand waste habits to identify areas for reducing consumption and diverting waste. In our efforts to divert waste, we will seek opportunities to repurpose assets for use in second life applications, recycling and responsible disposal. Based on the results of the audits, we will consolidate and expand our waste management plan that outlines specific waste conservation measures.

Our approach will prioritize education of employees, the public, and rewarding habit changes to reduce waste generated.

2.2 Reduce Consumption

2.2.3 Reduce Water Consumption

Fresh water is becoming increasingly scarce in many parts of the world. The TTC is taking a proactive approach to water management to reduce water consumption and explore opportunities to reuse water.

First, we will conduct a portfolio water assessment to map our water consumption and benchmark our usage against industry averages. This will allow us to better understand our baseline water usage and drive continuous improvement.

Our approach will be to implement best practices, pilot innovative technologies, and prioritize efficiency to reduce water usage.

2.3 Protect our Natural Ecosystem

The TTC's operations interact with all elements of the local ecosystems and thus hold the potential to improve the benefits provided by healthy ecosystems. This includes, but is not limited to, improved air and water quality, water retention, erosion and sedimentation control, restored habitat functions, and global and local climate regulation.

2.3.1. Restore Ecological Performance

The TTC will aim to undo as much damage as possible by enhancing the urban forest, increasing biodiversity and minimizing urban heat islands.

We will assess our current landscaping through mapping and incorporate Indigenous practices in development of the guideline for integrating sustainable best practices that seek to return land to its original state. These will include measures to increase the tree canopy, support biodiversity, such as the use of native species and pollinator-friendly species, bird-friendly glazing, light pollution reduction, promote Indigenous practices, as well as measures to minimize our impacts on the water cycle.

Further, we will continue to review our construction practices and update our procedures to align with best practices in green construction.

Ecology & Climate Action

By integrating nature-based climate solutions to establish ecologically high-performing areas, we will be taking meaningful action to mitigate the climate crisis, improve resilience, and be better stewards of the land we occupy.

Even relatively low-cost efforts can offer solutions that improve storm water management while increasing community resilience to flooding. Similarly, vegetation can offer shading, lowering local temperatures resulting in increased thermal comfort and decreased cooling demand while sequestering carbon.

2.4

Build Climate Resilience

We are already seeing the impacts of the climate emergency on our daily lives.

Extreme weather events are becoming more frequent and more severe.

Is our system ready for it?

2.4.1. Identify Climate Crisis Risks, Vulnerabilities, and Implement Adaptive Measures

The TTC is committed to ensuring the resilience of our transit assets in the face of the climate crisis. To achieve this, we will conduct a comprehensive assessment to identify vulnerabilities and risks to critical transit assets. This work will start with high-level portfolio assessments to identify order of magnitude risks and adaptation costs, followed by asset/site specific assessments.

Based on the results, we will develop and implement climate resilience measures in our design standards and operational plans, where applicable. We will also prioritize major climate resilience adaptations based on their potential to improve safety and operational resiliency during extreme weather events. We will incorporate these plans into our ongoing state-of-good-repair capital program through the TTC's 15-Year Capital Investment Plan.

Through these efforts, we will proactively, systematically and continuously address climate crisis risks and safeguard the public, our customers, employees, operations and assets.

2.4.2. Increase Energy Resiliency

Electrical resilience is crucial in ensuring the safety and resilience of TTC customers and employees, particularly in the face of weather events that are becoming more intense and frequent.

As the TTC and others throughout the city of Toronto transition away from fossil fuels, the demand for electricity and our use of electricity will increase.

To reduce peak demand and increase redundancy, the TTC will deploy emergency back-up generation, on-site renewable energy sources, and battery energy storage systems at facilities to improve resiliency.

By maximizing renewable energy sources and using battery energy storage systems, the TTC can increase energy resiliency during peak energy usage and provide some limited backup power capability to our essential assets, fortifying the safety and comfort of our employees and customers.

2.5 $

Climate and Fiscal Responsibility

2.5.1. Maximize Economic Returns

The TTC will actively seek ‘Green' grant funding from all levels of government. Over the next two years, we will mature our estimates of what net new capital funding is required to implement the climate and resiliency actions described in this document. We will also identify projects from within the existing TTC's Capital Investment Plan that serve to advance our sustainability goals and work with our government partners to identify grant funding.

In addition to government funding, where total capital costs of going green are not fully sourced, we will seek to temporarily leverage operating savings and revenue that result from green initiatives to self-fund implementation of the TTC’s Innovation and Sustainability Strategy. We will maximize permanent operating budget savings post-2040 when the TTC and City of Toronto are net zero.

The savings, cost avoidance, and potential revenue from the Green Bus Program will be updated annually. The updates will include changes to assumptions as the TTC learns more about the new fleet’s operations, maintenance, and performance as the fleet ages.

Current funding partners for sustainability projects include:

Canada
- Infrastructure Canada
- Transport Canada
- Natural Resources Canada

Ontario
- Independent Electricity System Operator
- Ontario Energy Board

Toronto
- City of Toronto Green Bonds
- Sustainable Energy Plan Financing

Action Roadmap

The Sustainability Action Roadmap summarizes the actions and initiatives that the TTC will undertake in the next five years. A five-year outlook was considered in alignment with the corporate plan. However, the roadmap considers an outlook to 2040 to achieve net zero by 2040.

Action Roadmap

2.1 Eliminate GHG Emissions

Initiative	Action
2.1.1 Maximize Avoided GHG Emissions (Scope 4)	***2.1.1.i:*** Deliver a new 5-Year Service and Customer Experience Action Plan and implement its actions ***Lead: Chief Strategy and Customer Experience Officer*** ***2.1.1.ii:*** Work with the City of Toronto on additional net-zero scenarios ***Co-Leads: Executive Director of Innovation and Chief Strategy and Customer Experience Officer*** ***2.1.1.iii:*** Investigate use of smaller vehicles on fixed routes during periods of low ridership demand ***Lead: Chief Strategy and Customer Experience Officer*** ***2.1.1.iv:*** In partnership with Metrolinx, deliver rapid transit projects ***Lead: Chief Strategy and Customer Experience Officer*** ***2.1.1.v:*** In partnership with Metrolinx and municipal transit partners, implement fare and service integration ***Lead: Chief Strategy and Customer Experience Officer*** ***2.1.1.vi:*** Mature the draft budget that reflects the order of magnitude to implement the current TransformTO Net Zero scenario to achieve community-wide net-zero emissions by 2040 ***Co-Leads: Chief Executive Officer and Chief Financial Officer***
2.1.2 Minimize Direct GHG Emissions (Scope 1) through Decarbonization of our Fleets	***2.1.2.i:*** Continue to build and implement the TTC's Green Fleet Plan, targeting: 20% zero-emissions vehicles by 2025, 50% by 2030 and 100% by 2040 ***Lead: Executive Director of Innovation and Sustainability*** ***2.1.2.ii:*** Implement electric charging infrastructure to support zero emissions vehicles ***Lead: Executive Director of Innovation and Sustainability***
2.1.3 Minimize Direct and Indirect GHG Emissions (Scope 1 & 2) through Decarbonization of our Facilities	***2.1.3.i:*** Develop a portfolio-level net-zero facility transition plan ***Lead: Executive Director of Innovation and Sustainability*** ***2.1.3.ii:*** Complete site-specific net-zero transition plans for all facilities, starting with high-impact sites ***Lead: Executive Director of Innovation and Sustainability*** ***2.1.3.iii:*** Develop a net-zero guideline for building retrofits ***Lead: Executive Director of Innovation and Sustainability*** ***2.1.3.iv:*** Develop a net-zero carbon database to track progress ***Lead: Executive Director of Innovation and Sustainability*** ***2.1.3.v:*** Develop a refrigerant management plan establishing a refrigerant inventory and adopting a process to minimize emissions through leak management and responsible disposal ***Lead: Executive Director of Innovation and Sustainability***
2.1.4 Reduce indirect GHG Emissions (Scope 3) from our value chain	***2.1.4.i:*** Conduct upfront embodied carbon assessments for all new buildings in alignment with the Toronto Green Standard ***Lead: Executive Director of Innovation and Sustainability*** ***2.1.4.ii:*** Develop a Scope 3 inventory and reduction plan ***Co-Leads: Executive Director of Innovation and Sustainability, Chief Capital Officer, and Chief of Operations and Infrastructure***
Key Performance Indicators	• Percentage of GHG emissions reduced compared to the 2019 baseline • Energy consumption and greenhouse gas intensity per facility

Legend:

- Actions tagged as a TransformTO City Council directive
- Actions tagged as a Toronto's Climate Change Readiness City Council directive
- Actions tagged as a Sustainable City of Toronto Fleets Plan City Council directive
- Actions tagged as a Toronto Municipal Code Chapter 669 regulation
- Actions tagged as a Toronto Green Building Standard regulation

2.2 Reduce Consumption

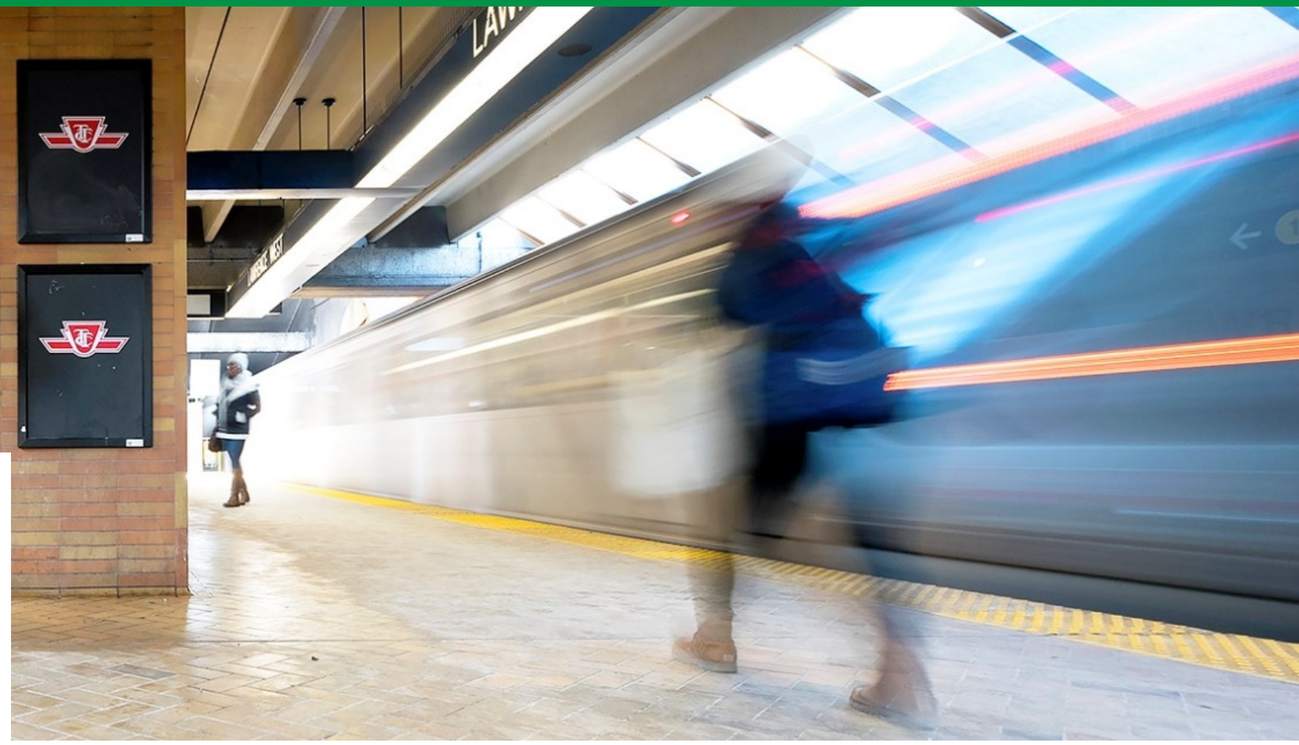
Initiative	Action
2.2.1 Use Sustainable Materials	***2.2.1.i:*** Embed material selection criteria into applicable procurements and ensure transparency and accountability from suppliers ***Co-Leads: Executive Director of Innovation and Sustainability and Chief Financial Officer*** ***2.2.1.ii:*** Develop a sustainable materials guideline for inclusion of measures into new construction, retrofit projects, and operational plans ***Co-Leads: Executive Director of Innovation and Sustainability and Chief Financial Officer***
2.2.2 Improve Waste Management Practices	***2.2.2.i:*** Conduct site-specific waste audits at high-waste consuming sites ***Lead: Executive Director of Innovation and Sustainability*** ***2.2.2.ii:*** Conduct a portfolio waste assessment ***2.2.2.iii:*** Develop a waste reduction guideline for inclusion of measures into new construction, retrofit projects, and operational plans ***Co-Leads: Executive Director of Innovation and Sustainability and Chief Financial Officer***
2.2.3 Reduce Water Consumption	***2.2.3.i:*** Conduct site-specific water audits at high-water consuming sites ***Lead: Executive Director of Innovation and Sustainability*** ***2.2.3.ii:*** Conduct a portfolio water assessment ***Lead: Executive Director of Innovation and Sustainability*** ***2.2.3.iii:*** Develop a water reduction guideline for inclusion of measures into new construction, retrofit projects and operational plans ***Lead: Executive Director of Innovation and Sustainability*** ***2.2.3.iv:*** Develop a water reduction database to track implementation measures and to monitor effectiveness and lessons learned ***Lead: Executive Director of Innovation and Sustainability***
Key Performance Indicators	• Percentage of water reduced compared to the baseline • Water use intensity per facility • Percentage of waste generated and diverted • Waste use intensity per facility • Percentage of assets that meet the sustainable materials guideline

2.3 Protect our Natural Ecosystem

Initiative	Action
2.3.1 Restore Ecological Performance	***2.3.1.i:*** Conduct a portfolio landscape assessment ***Lead: Executive Director of Innovation and Sustainability*** ***2.3.1.ii:*** Develop an ecological restoration guideline prioritizing implementation of nature-based climate solutions ***Lead: Executive Director of Innovation and Sustainability*** ***2.3.1.iii:*** Conduct a portfolio exterior lighting audit and implementation plan ***Lead: Executive Director of Innovation and Sustainability***
Key Performance Indicators	• Percentage of landscaping with native trees, plants, and shrubs • Percentage of exterior lighting fixtures that are fully cut off • Percentage of windows with bird-friendly glazing

Legend:

- Actions tagged as a TransformTO City Council directive
- Actions tagged as a Biodiversity Strategy City Council directive



2.4 Build Climate Resilience

Initiative	Action
2.4.1 Identify Climate Crisis Risks and Vulnerabilities and Implement Adaptive Measures	***2.4.1.i:*** Conduct a portfolio climate risk assessment ***Lead: Executive Director of Innovation and Sustainability***
	2.4.1.ii: Conduct asset or site-specific resilience assessments ***Lead: Executive Director of Innovation and Sustainability***
	2.4.1.iii: Monitor and document the impacts of regional extreme weather events on the TTC's assets and operations ***Lead: Executive Director of Innovation and Sustainability***
	2.4.1.iv: Develop a resilience database to track implementation measures and monitor effectiveness and lessons learned ***Lead: Executive Director of Innovation and Sustainability***
	2.4.1.v: Develop a resilience guideline for inclusion of adaptation measures into new construction, retrofit projects, and operational plans ***Lead: Executive Director of Innovation and Sustainability***
2.4.2 Increase Energy Resiliency	***2.4.2.i:*** Implement on-site renewable energy sources ***Lead: Executive Director of Innovation and Sustainability***
	2.4.2.ii: Continue advancing the use of energy storage across facilities ***Lead: Executive Director of Innovation and Sustainability***
Key Performance Indicators	• Percentage assets with a very high-climate crisis risk rating • Amount of energy generated from distributed renewable sources • Energy storage capacity

2.5 Climate and Fiscal Responsibility

Initiative	Action
2.5.1 Maximize Economic Returns	***2.5.1.i:*** Actively seek 'Green' grant funding from all levels of government ***Co-Leads: Executive Director of Innovation and Sustainability and Executive Director of Corporate Initiatives***
	2.5.1.ii: Capture the operating savings and revenue that result from green initiatives to self-fund implementation of the TTC's Innovation and Sustainability Strategy ***Co-Leads: Executive Director of Innovation and Sustainability and Executive Director of Corporate Initiatives***
Key Performance Indicators	• Number of Innovation and Sustainability strategy actions supported by grants or incentives • Percentage of the total ISS funded, inclusive of City share

Legend:

- Actions tagged as a Toronto's Climate Change Readiness City Council directive
- Actions tagged as a First Resilience Strategy City Council directive

3 Culture of Innovation & Sustainability

To be successful in our Innovation and Sustainability goals set out in this Strategy, we must commit to a focus on:

Culture,

Accountability, and

Transparency.

Chapter Content

- **Strategy and Actions**
- **Action Roadmap**

Culture

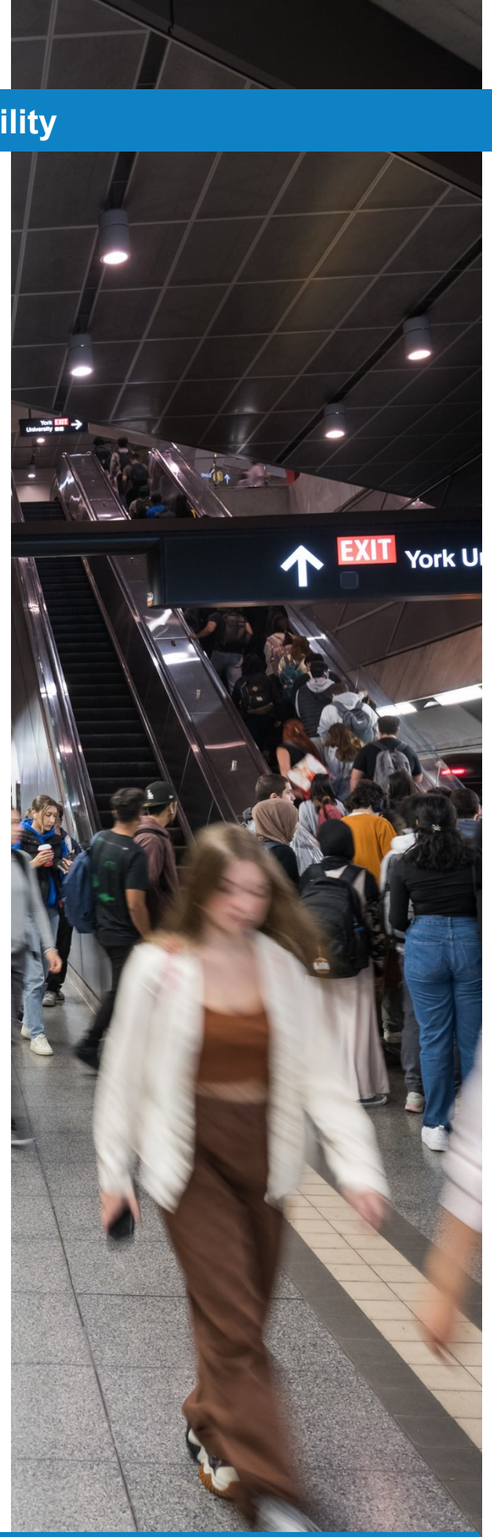
One of our primary roles is to embed innovative and sustainable thinking into the TTC's culture. We aim to always recognize our important role in protecting the environment and to empower our employees to problem solve for a sustainable future.

Accountability

To make sure we are successful, we also need to hold ourselves and each other accountable. That means detailing our plans, highlighting the resource needs, and committing to success.

Transparency

Accountability also requires us to be transparent about our progress, including our successes and challenges. To that end, the Innovation and Sustainability Program will provide annual reports on the status of our Action Plan and publish annual Sustainability Performance Reports.



Culture of Innovation & Sustainability Work Streams

Fostering a TTC culture of innovation and sustainability is critical to this Strategy. Progress will require all employees to take accountability for their part in corporate innovation and environmental sustainability.

Work Streams	Goals	Benefits
Foster a Culture of Innovation 3.1	Build a corporate innovation process where innovators from across the organization and beyond feel seen and heard. Build a sandbox-like environment where we can test ideas with speed and agility. Training, incentivizing, recognizing, and rewarding employees for their innovative ideas and tangible contributions.	Equitable and aligned innovation embedded across all levels of the Commission, promoting diversity of thought and collaboration.
Foster a Culture of Sustainability 3.2	Accelerate internal and external communications to deepen awareness of the TTC's role in fighting the climate crisis and motivating people to action.	Improve awareness of the work underway inside and outside of the organization, and integrate climate action into everyday responsibilities.
Commit to Ongoing Consultation 3.3	Perform traditional and innovative engagement to understand customer pain points and potential solutions, barriers of transit, and the revitalization of this land.	Create meaningful and impactful results for our diverse range of customers.
Drive Performance, Transparency and Accountability 3.4	Make TTC's sustainability commitments and ongoing environmental performance visible to the public by providing an annual TTC Environmental Sustainability Performance report that measures progress against the strategy. This commitment to transparency to the TTC Board, the public, and TTC's funding partners will drive accountability.	Drive accountability of the actions outlined in this strategy and encourage sustainable transportation choices.

3.1

Fostering a Culture of Innovation

Unlocking the human capital currently employed at the TTC is a critical step to maximizing the efficiency and effectiveness of our operations and fostering a lasting culture of innovation. Opportunities to connect the implementation of innovation with employees' annual objectives and performance ratings will be explored.

In 2023, a new Employee Innovation and Sustainability Award was added to the TTC's Rewards and Recognition Program. Coupled with support to implement their ideas, this will encourage employees to put forward creative and practical ideas that lead to tangible savings, efficiencies and improvements to transit services.

This program is an open call to employees to share the innovations they have devised and implemented, highlighting numerous improvements our employees contribute every year. A committee will evaluate the impact of the change and determine reward recipients twice a year.

3.1.1. Supporting Employee Innovation

Communications

We will provide regular communication to employees to encourage the adoption of new technologies and methods through various internal communication channels, including weekly newsletters and employee TVs and apps.

Training

We will introduce and expand innovation-oriented training content to provide employees with the tools and knowledge to identify opportunities and implement improved processes leading to a cycle of innovation. This training will build from existing initiatives, such as the continuous improvement training implemented in Materials Management.

We will host innovation masterclasses to share agile innovation methodologies, such as systems thinking, design thinking, and lean innovation to empower teams to move with speed and move the needle on innovation in their respective areas.

Rewards and Recognition

The TTC employs approximately 16,000 people, all of whom are experts in their own area of transit planning, capital asset delivery and maintenance, through to service delivery.

The TTC's existing Employee Rewards and Recognition Program honours employees who are exemplary. This program both promotes and rewards innovation in the areas of Leadership, Teamwork, Safety, Customer Service and Diversity. The existing program also has an innovation and creativity award, which will now be expanded to include both Innovation and Sustainability.

TEAMWORK AWARD

Recognizes groups of employees who have demonstrated successful project work that advances departmental goals or the TTC mission.

INNOVATION & SUSTAINABILITY AWARD

Recognizes employees who have implemented ideas that have improved the TTC's internal systems and processes, operations or customer service.

New Recognizes employees who have implemented ideas that reduce GHG emissions and/or improve climate resiliency.

CUSTOMER SERVICE AWARD

Recognizes employees who demonstrate successful project work that advances departmental goals or the TTC mission.

SAFETY AWARD

Recognizes employees who exemplify an extraordinary commitment to the TTC's goal of delivering a safe public transit service to its customers, while maintaining a safe work environment for its employees.

LEADERSHIP AWARD

Recognizes TTC employees who model and exhibit outstanding leadership.

DIVERSITY AWARD

Recognizes employees who have demonstrated an exceptional commitment to diversity, inclusion, equity and belonging.

3.2

Foster a Culture of Sustainability

3.2.1 Make Every TTC Job a Sustainable Job

TTC employees are instrumental for keeping the TTC operational and meeting the transportation needs of over half-a-billion customer rides (pre-pandemic). With their expertise in transit planning, capital asset delivery and maintenance, through to service delivery, they hold the key to navigating uncertainties and driving positive change.

Considering that the climate crisis stands as one of the most pressing challenges in human history, we recognize the need to engage our workforce and tap into their unique perspectives and subject matter knowledge. We understand that addressing this challenge requires a collaborative approach, with every individual contributing their insights and expertise.

Our goal is to implement tangible, collaborative strategies that harness the profound knowledge and experience of our diverse and multidisciplinary workforce. We aim to empower every employee to identify sustainable solutions and integrate climate considerations into their respective roles. By doing so, we can leverage the full potential of our collective knowledge and capabilities to do our part to help address the climate crisis.

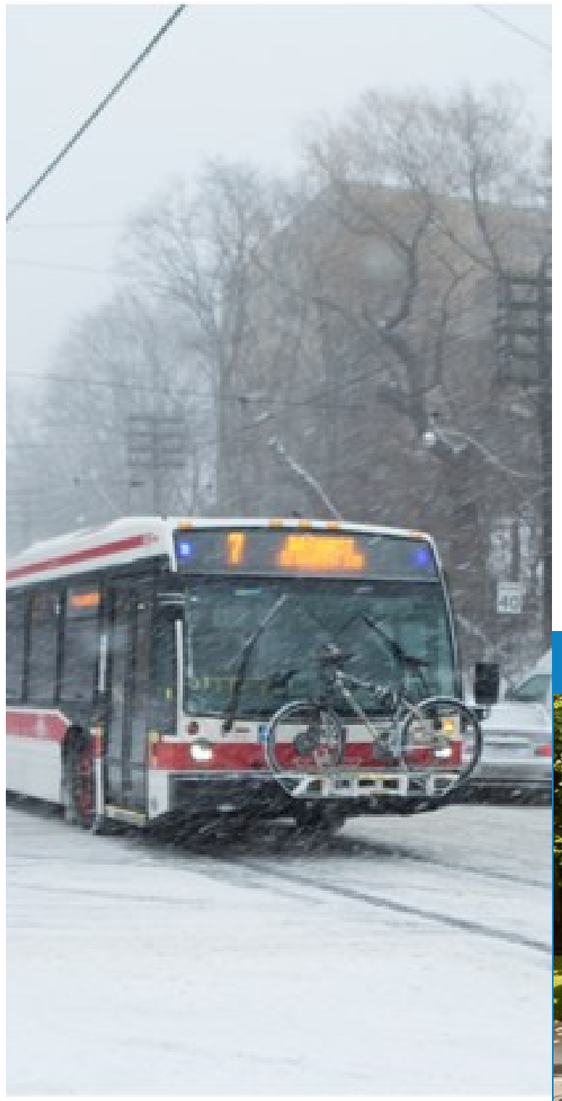
Embedding Sustainability Across All Aspects of Our Operations

3.2

Foster a Culture of Sustainability

3.2.2 Integrate Climate Action into the Organization

Systematically integrating climate action into the TTC's decision-making and our organization's culture is vital. Addressing the climate crisis and the impacts of extreme weather events will require collective contributions from multiple disciplines; thus, we will engage employee to take climate action across the Commission.



Through the internal corporate governance structure, we will:

- Guide embedding feasible energy conservation, efficiency, and low carbon considerations.
- Collaborate to identify potential risks and vulnerabilities associated with the climate crisis.
- Learn from historical extreme weather events.
- Keep informed on emerging trends and best practices related to increasing our decarbonization, reducing our consumption, protecting our natural ecosystem, and improving our climate resilience.
- Participate in regular training and professional development opportunities.
- Develop actionable solutions to address our environmental impact and climate resiliency.

In addition, we will work closely with the City of Toronto and interdependent agencies to understand how vulnerabilities in their infrastructure could impact our operations and vice-versa. This will involve regular communication and information-sharing to encourage the adoption of new technologies and methods to further operational and sustainability goals.

3.3

Commit to Ongoing Consultation

3.3.1 Ensure the work of Innovation and Sustainability at the TTC is informed by customers and through accessibility, diversity, equity and inclusion considerations

The Innovation and Sustainability Strategy aims to create meaningful and impactful results for the TTC, the community it serves, and the environment. To ensure our corporate innovation and environmental sustainability is informed by accessibility, diversity, equity and inclusion, we will use various forums, such as the TTC's Customer Panel, Advisory Committee on Accessible Transit, and Indigenous Consultant to gather feedback at the early stages for the actions outlined in this Strategy.

Representation from the TTC's Customer Panel will ensure we seek and understand customer pain points and potential innovative solutions from a wide range of diverse customers.

Representation from TTC's Advisory Committee on Accessible Transit will ensure we continue to gather accessibility advice and guidance around changes to customer experience as a result of the corporate innovation and environmental sustainability efforts.

Representation from TTC's Indigenous Consultant will ensure we are working towards meaningful engagement, both traditional and innovative, with Indigenous communities that will contribute to the revitalization of this land through our corporate innovation and environmental sustainability efforts.

3.4

Drive Performance, Transparency and Accountability

3.4.1 Annual Progress Reporting

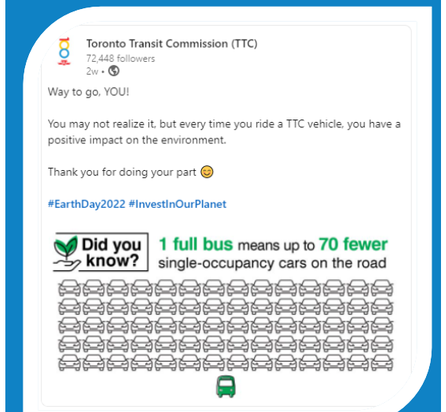
We will make our innovation and sustainability successes and challenges visible to the public. Beginning in 2024, we will provide an annual report to communicate our progress toward the actions outlined in this strategy. This commitment to transparency to our Board, the public and our funders will drive accountability. In addition, these annual reports will provide an opportunity to refresh and resubmit actions and the resulting financial impacts as circumstances and technologies evolve and mature. We will also develop relevant innovation and environmental sustainability policies and frameworks to drive performance, transparency, and accountability.

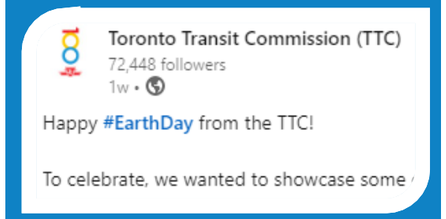
3.4.2 Disclose Sustainability Performance

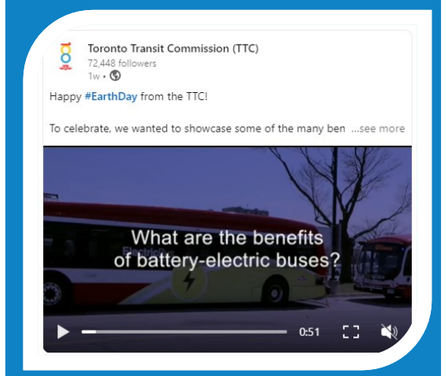
We will disclose annual sustainability performance. This will begin with a third-party verification of the TTC's Scope 1 and 2 GHG emissions inventory.

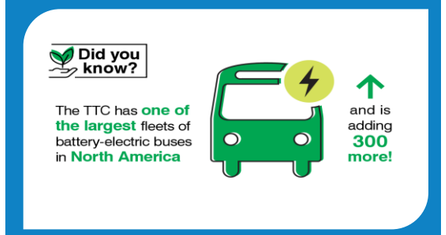
Transparent disclosure of our sustainability performance will provide customers with the information necessary to make informed transportation decisions. By highlighting the positive impact of their choices, we hope to culture a sense of ridership pride. This can be achieved through several strategies, such as:

- Highlighting the benefits of using public transit in reducing emissions and information that encourages sustainable mobility decisions though various communication channels (i.e. social media, blogs, videos, and articles).
- Encouraging two-way communication, where customers share their thoughts and experiences on innovation and sustainability, can also help in creating awareness and promoting sustainable transportation.









Action Roadmap

3.1

Foster a Culture of Innovation

Initiative	Action
3.1.1 Foster a Culture of Innovation and Crowdsource Customer Ideas	***3.1.1.i:*** Present an Innovation and Sustainability award as part of the TTC's Rewards and Recognition Program ***Co-Leads: Executive Director Innovation and Sustainability, Chief People Officer, and Chief Corporate Affairs Officer*** ***3.1.1.ii:*** Introduce and expand innovation-oriented training content ***Co-Leads: Executive Director Innovation and Sustainability, Chief People Officer, and Chief Corporate Affairs Officer*** ***3.1.1.iii:*** Release periodic internal innovation newsletters ***Co-Leads: Executive Director Innovation and Sustainability, Chief People Officer, and Chief Corporate Affairs Officer***
Key Performance Indicators	• Number of Innovation and Sustainability Award submissions • Percent of employees that complete innovation-oriented training

3.2 Foster a Culture of Sustainability

Initiative	Action ID: Action
3.2.1 Make Every TTC Job a Sustainable Job	***3.2.1.i:*** Release periodic internal sustainability communications ***Co-Leads: Executive Director Innovation and Sustainability, Chief People Officer, and Chief Corporate Affairs Officer*** ***3.2.1.ii:*** Host collaborative workshops with departmental groups ***Co-Leads: Executive Director Innovation and Sustainability, Chief People Officer, and Chief Corporate Affairs Officer*** ***3.2.1.iii:*** Develop and provide sustainability awareness and training for all TTC employees ***Co-Leads: Executive Director Innovation and Sustainability, Chief People Officer, and Chief Corporate Affairs Officer***
3.2.2 Integrate Climate Action into the Organization	***3.2.2.i:*** Incorporate a resiliency lens into capital projects (where applicable) ***Lead: Executive Director Innovation and Sustainability*** ***3.2.2.ii:*** Embed climate action into the corporate governance structure ***Co-Leads: Executive Director Innovation and Sustainability and Executive Director of Corporate Initiatives*** ***3.2.2.iii:*** Create a framework to standardize site-specific climate risk assessments ***Lead: Executive Director Innovation and Sustainability*** ***3.2.2.iv:*** Continue collaborating with interdependent organizations and peers by sharing knowledge and insights on the climate crisis impacts, adaptation measures, and resiliency planning ***Lead: Executive Director Innovation and Sustainability*** ***3.2.2.v:*** Provide interdepartmental support in the integration of resiliency in projects and delivery ***Lead: Executive Director Innovation and Sustainability***
Key Performance Indicators	• Percent of employees that complete sustainability awareness and training

3.3 Commit to Ongoing Consultation

Initiative	Action
3.3.1 Ensure the work of Innovation and sustainability at the TTC is informed by customers and through lenses that consider accessibility, diversity, equity, and inclusion	***3.3.1.i:*** Utilize the Customer Panel, Advisory Committee on Accessible Transit, and Indigenous Consultant to seek advice and guidance on corporate innovation and environmental sustainability efforts ***Co-Leads: Executive Director Innovation and Sustainability, and Executive Director of Diversity and Culture, and Chief Strategy and Customer Experience Officer*** ***3.3.1.ii:*** Incorporate accessibility, diversity, equity and inclusion considerations at the early stages for the actions outlined in this Strategy ***Co-Leads: Executive Director Innovation and Sustainability and Executive Director of Diversity and Culture***
Key Performance Indicators	• Percent of Innovation and Sustainability Strategy's actions that incorporate accessibility, diversity, equity, and inclusion considerations

3.4 Drive Performance, Transparency, and Accountability

Initiative	Action ID: Action
3.4.1 Annual Progress Reporting	***3.4.1.i:*** Release an annual innovation and sustainability progress report ***Lead: Executive Director Innovation and Sustainability*** ***3.4.1.i:*** Develop relevant innovation and environmental sustainability policies and frameworks to drive performance, transparency, and accountability ***Lead: Executive Director Innovation and Sustainability***
3.4.2 Disclose Sustainability Performance	***3.4.2.ii:*** Release annual sustainability performance ***Lead: Executive Director Innovation and Sustainability*** ***3.4.2.ii:*** Complete a third-party verification of the TTC's Scope 1 and 2 GHG emissions inventory ***Lead: Executive Director Innovation and Sustainability***
Key Performance Indicators	• Release annual innovation and sustainability progress report • Release annual sustainability performance

4 Appendices

A. Consultation Process

B. Environmental, Social, and Governance

C. Environmental Sustainability Focus

D. Glossary

E. References

A. Innovation and Sustainability Strategy Consultation Process

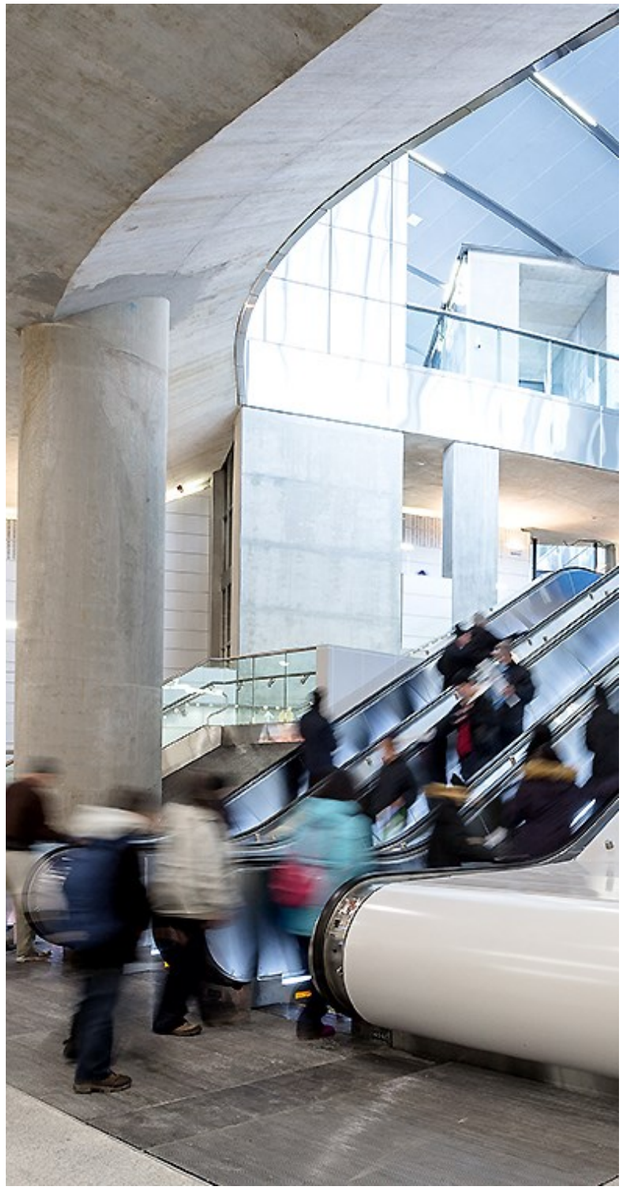
To help shape the Innovation and Sustainability Strategy at the TTC, employees across the TTC, City of Toronto, and a broader array of experts within the space were drawn on through consultations and benchmarking.

Further, KPMG conducted benchmarking against other leading transit agencies and private industry worldwide.

Key themes from these discussions and research were consolidated and used to shape the Innovation and Sustainability Strategy.

Through organizations, such as COMET, ZEBRA, OPTA, APTA, CUTA, and others, the TTC will continue to mature this Innovation and Sustainability Strategy, remaining focused on maximizing all of the benefits of transit and, in doing so, to realize our vision to be a transit system that makes Toronto proud.

Public and employee consultation was conducted in August 2024. Both the public and employees responded positively, with at least 75% of the public and 64% of employees agreeing with all initiatives outlined in this strategy. The most common suggestion from the public was to keep the public informed, and the most common suggestion from employees was to provide more resources to deliver on these actions.



B. Environmental, Social, and Governance Integration

The Innovation and Sustainability Strategy represents the environmental pillar of the broader Environmental, Social and Governance (ESG) discussion.

Although all pillars of ESG are important to the TTC, the focus of this strategy is on environmental sustainability. Given the significant impact that we know improving our environmental sustainability will create, we want to ensure we take a targeted and focused approach to make the greatest positive impact to our community. This requires time, effort, benchmarking, and a well thought out strategy for the long term.

However, we do want to highlight available resources to learn more about the TTC's progress within the social and governance pillars of the ESG discussion.

Socially, the TTC’s policies outline the boundaries by which TTC employees must adhere, as well as those doing business with the TTC. Policies include Respect and Dignity, Workplace Violence, Accessible Customer Service, TTC Privacy Code and Green Procurement.

Governance is important to the TTC. Various levels of management aim to keep employees, customers, and the public abreast of proceedings to ensure preparedness for the future. Governance at the TTC is built on the principal of transparency. All meetings held by the TTC are outlined in detail online as well as annual reports, expense reporting and TTC policies.

In addition to transparency within governance and social objectives, the TTC has always placed customer safety and comfort at the forefront of its operations. Ensuring all customers have equal access to transit and can do so within a safe and secure environment, is critical to the success of the TTC. This will be monitored for continuous improvement. Outlined in our 2024-2028 5-Year Corporate Plan, the TTC is committed to working with all partners to become the preferred connection to the communities, people, experiences and opportunities you care about in this city.

C. Environmental Sustainability Focus

Sustainability must be a core focus area given the nature and breadth of the services that we provide.

We strive to understand and reduce our environmental impact and provide equitable and accessible opportunities for all stakeholders while delivering transparent policies and procedures that hold teams accountable for offering sustainable services.

The TTC began operations in 1921, representing over 100 years of service to the community. The TTC must always ensure an eye towards the future, noting the impacts of business decisions today will inherently impact the outcomes of tomorrow. Given the TTC's breadth across all communities in Toronto, factoring in future generations, the planet, and overall business operations, sustainability considerations must be at the center of our business and existence.

When developing this report, we carefully reviewed opportunities to embed innovation, environmental sustainability, and climate resilience across the TTC. Our guiding principles by which the TTC, and specifically the Innovation and Sustainability Program operate within, include:

1. Ensure equal access to transit is prioritized;
2. Ensure investment in innovation and sustainability are aligned with the due diligence required of the TTC as a public sector organization;
3. Encourage a modal shift by implementing the actions outlined in the 5-Year Service and Customer Experience Action Plan;
4. Ensure the highest safety standards are upheld; and
5. Minimize environmental impact and invest in resiliency while working towards service levels outlined in the 5-Year Service and Customer Experience Action Plan.

D. Glossary

Terminology	Definition
Active Transportation	Describes all human-powered forms of travel, such as walking or cycling.
Agile Innovation	An iterative and flexible approach to project management and product development, emphasizing collaboration, adaptability, and continuous improvement
APTA	American Public Transportation Association.
Balanced Breakthrough Model	A tool for prioritizing ideas and projects in an innovation portfolio pipeline. The framework strategically assesses customer desirability, technical feasibility and financial viability.
Climate Resilience	The ability to anticipate, prepare for and respond to hazardous events, trends or disturbances related to climate.
CO_2e	Carbon dioxide equivalent or CO_2e means the number of metric tonnes of CO_2 emissions with the same global warming potential as one metric tonne of another greenhouse gas.
COMET	Community of Metros Benchmarking Group.
Customer Panel	A representative panel of TTC customers that closely follows the demographics of the City of Toronto and reflects Toronto's diversity and population growth. The panel is aimed at building external and internal customer awareness as an important decision-making resource.
CUTA	Canadian Urban Transit Association.
Deep Retrofit	A deep retrofit is an extensive, holistic overhaul of a building's systems to significantly reduce energy consumption and greenhouse gas emissions.
Design Thinking	A problem-solving approach that focuses on understanding user needs, ideation, and iterative prototyping to create innovative solutions.
Direct Emissions	GHG emissions from sources that are owned or controlled by the TTC.
eBuses	A bus that is propelled using electric motors as opposed to an internal combustion engine.
Electric Vehicles	A vehicle that is propelled using electric motors as opposed to an internal combustion engine.
eMobility	Using electric propulsion for a wide range of transportation types.
Environmental Sustainability	Pursuit of impactful action towards the reduction of GHG emissions, increase in operational resiliency, responsible consumption of limited resources, while maximizing service reliability for our customers.
Environmental Sustainability Report	Annual report on the progress of immediate climate actions, systematic reviews, and our ever-improving environmental performance.
GHG Emissions	Greenhouse Gas Emissions, gases that trap heat in the atmosphere, including CO2, Methane, Nitrous Oxide and Fluorinated gases.
GHG Emissions Inventory	An organization's measurement and accounting of GHG emissions emitted during a specific time (e.g. in a year).

D. Glossary

Terminology	Definition
Green	Supporting the protection of the environment.
HVAC	Heating, ventilation, and air conditioning.
Indirect Emissions	GHG emissions from the purchased energy generated offsite but consumed by the organization or the GHG emissions that occur in the organizations value chain.
Innovation	Corporate innovation is a strategic and systematic method of soliciting, embracing, evaluating and adopting new ideas.
Innovation Pipeline	The TTC's process to evaluate innovative technologies and solutions ensuring strategic fit and benefit, customer desirability, technical feasibility, financial viability, and safety before proceeding to seek funding.
Innovation Sustainability Program (ISP)	An organization-wide program at the TTC, with a mandate to advance planning, delivery, integration and reporting of innovation initiatives while incorporating a climate and resiliency lens.
International Youth Alliance for Innovation (IYAI)	A challenge designed to encourage young people to develop innovative solutions to address challenges.
ISO 56000 Innovation Management Framework	Aligns innovation with broader business goals, ensuring that innovation is not merely about novelty, but about creating substantial value.
Lean Innovation	A methodology emphasizing efficiency and rapid iteration to develop and deliver products or services with minimal resources to test key assumptions.
Modal Shift	A switching of energy consumption methods, when people switch from cars to buses, trains and electric bicycles.
MVP	Minimum Viable Product (MVP) is the most least cost effective way to test assumptions.
Net Zero	Achieving a balance between emissions produced and emissions removed from the atmosphere.
OPTA	Ontario Public Transit Association.
PowerON	PowerON Energy Solutions LP is a subsidiary of Ontario Power Generation.
Procurement Policy	The process that governs the way we buy goods and services.
Proof of Concepts	Small-scale experiments or prototypes used to validate the feasibility and viability of a concept
Rewards and Recognition Program	The TTC's program that recognizes employees who go above and beyond, and demonstrate the TTC's core values.
Scope 1 Emissions	Direct GHG emissions occurring from sources that are controlled or owned by the organization.

D. Glossary

Terminology	Definition
Scope 2 Emissions	Indirect GHG emissions from purchased energy generated offsite, but consumed by the organization.
Scope 3 Emissions	All other indirect emissions that occur in an organization's value chain.
Scope 4 Emissions	Emissions avoided when a product is used as a substitute for other goods or services, fulfilling the same functions, but with a lower carbon intensity.
Sustainable City of Toronto Fleet Plan	City of Toronto's strategic document that provides an overview of the City Fleets' goal and objectives in addressing climate mitigation and adaptation, this includes TTC vehicles.
Toronto Green Standard	City of Toronto's set of standards for new private and city-owned developments to achieve near zero emissions by 2040.
TransformTO	Toronto's climate action strategy.
TTC's 15-Year Capital Investment Plan	The Capital Investment Plan is TTC's strategic document that provides a comprehensive view and understanding of the TTC's state of good repair needs and capital requirements necessary to provide transit service that is safe, efficient, reliable, affordable and equitable over a 15-year period.
TTC's 5-Year Corporate Plan	TTC's 5-Year Corporate Plan serves to guide, and create strategic alignment amongst organizational initiatives, reflective of Board priorities and corporate requirements striving to realize TTC's vision and mission.
TTC's 5-Year Service and Customer Experience Action Plan	The 5-Year Service and Customer Experience Action Plan is a strategic document that serves as a blueprint that identifies service and customer-related improvements to public transit service in the city of Toronto between 2024-2028.
TTC's Annual Service Plans	The Annual Service Plans are strategic documents that measure past route performance, present actions for the upcoming year, and identify resource requirements that will serve as the basis for TTC's annual Operating Budget submission.
TTC's Green Bus Program	The approach to procure hybrid electric buses as a transition technology towards zero emissions buses, followed by the procurement of only eBuses starting in 2024.
TTC's Green Bus Technology Plan	Strategic document outlining the current state of available bus propulsion technologies and provides recommended next steps for the immediate and long-term adoption of low and zero-emissions buses into TTC's fleet of approximately 2000 buses.
ZEBRA	Zero Emission Bus Resource Alliance.

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Final Note

The numbers, figures and tables in this report are representative of the data, calculations and information available at the time the document was developed. While this information will mature over time, this report presents baseline data against which future reporting can measure progress.