go green torbay

Climate Change Mitigation Plan

2020

torbay

Canada

FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

ICLEI Local Governments for Sustainability

neia.org Newfoundland and Labrador Environmental Industry Association

fundamental inc

Local Climate Action Plan
2020 – Living Document

Issued for:
Partners for Climate Protection (PCP) Milestone 3

October 8th, 2020 – IFR

REVISION HISTORY

Revision	Date	By	Purpose
R0	2020Feb20	Emma Power	Initial draft for Town review
R1	2020Apr30	Emma Power	Revised draft for Town review
R2	2020Aug4	Emma Power	Internal revisions prior to comprehensive review
IFR	2020Oct8	Emma Power	Addition of 2019 GHG Inventory info, revised according to review with town staff, inclusion of emissions reduction target

CITATION REFERENCE:

Climate Action Plan: Issued in Accordance with Partners for Climate Protection (PCP) Milestone 3
The Town of Torbay, 2020
FCM Transition 2050 Partnership Grant Initiative

Written by:

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Acknowledgements:

This document is the culmination of support and effort on the part of several Departments within the Town of Torbay. With thanks to FCM for developing the Transition 2050 program and generously providing the funding which allowed the project to move forward; and also the Newfoundland and Labrador Environmental Industry Association (NEIA) for taking the role of lead proponent and facilitating all project administration.

This Climate Action Plan has been drafted based on industry best practice and the guidance documents provided by the Federation of Canadian Municipalities (FCM) including:

- Greenhouse Gas Protocol: Global Protocol for Community Scale Greenhouse Gas Emissions Inventories
- FCM: PCP Protocol: Canadian Supplement to the International Emissions Analysis Protocol
- FCM + ICLEI: Reaching Milestone 2 – How to set emissions reduction targets
- FCM + ICLEI: Partners for Climate Protection – Six Steps to a Sustainable Community: A Guide to Local Action Planning
- FCM + ICLEI: Reaching Milestone 3 – How to Create a Local Action Plan to Manage Energy and Emissions
- *A Guidance Document for Reporting Greenhouse Gas Emissions for Large Industry in Newfoundland and Labrador*. Government of Newfoundland and Labrador Office of Climate Change, 2017.
- 2019 *Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Intergovernmental Panel on Climate Change. 2019. Volume 5, Chapter 6 – Wastewater Treatment and Discharge
- *National Inventory Report 1990-2018: Greenhouse Gas Sources and Sinks in Canada, Canada's Submission to the United Nations Framework Convention on Climate Change.* Environment and Climate Change Canada. 2020.

EXECUTIVE SUMMARY

The Town of Torbay demonstrated their commitment to climate action by joining a cohort of six municipalities as a partner in the Federation of Canadian Municipalities (FCM) Municipalities for Climate Innovation Program (MCIP) Transition 2050 (T2050) Partnership Grant Initiative[1]. Through this program, Town staff have received training regarding climate science, greenhouse gas emissions mitigation, and climate change adaptation. Torbay is also working with Conservation Corps NL to complete a climate change vulnerability assessment. The actions within this Plan focus on climate change mitigation – emissions reductions, energy efficiency and operational cost savings.

One of the targeted outcomes of the T2050 program is to progress through the FCM Partners for Climate Protection (PCP) Program Milestones 1, 2, 3, and (time permitting) Milestone 4.

Milestone 1	Corporate GHG Emissions Inventory (Town owned and operated assets)	See Appendix A	✓ INVENTORY COMPLETED FCM Achievement of Milestone 1
Milestone 2	Set an Emissions Reduction Target (completed through an iterative risk/opportunity analysis)	See Appendix B	✓ COMPLETED FCM Achievement of Milestone 2 – pending approval of this document
Milestone 3	Develop a Local Climate Action Plan *(this document)*	See Section 1 for a detailed list of targeted climate actions	✓ COMPLETED FCM Achievement of Milestone 3 – pending approval of this document
Milestone 4	Implement (on or more projects) within the Local Climate Action Plan	See Section 1	✓ IN PROGRESS T2050 keystone project implementation in progress

<u>GHG EMISSIONS INVENTORY:</u>

The Town of Torbay corporate emissions inventory for 2019 is calculated as **2,387 tonnes of CO2e per year** – GWP AR5. This includes all community solid waste production. Excluding community solid waste, the Town of Torbay emissions inventory is calculated as 1002 tonnes of CO2e per year. See Appendix A for additional details on the GHG emissions for the Town.

The following categories were included as per FCM guidance documents and ISO 14064-1 standard:

BUILDINGS AND FACILITIES	TRAFFIC LIGHTS AND STREET LIGHTS	WATER AND WASTEWATER	FLEET, VEHICLES AND EQUIPMENT	SOLID WASTE
51 tCO2e	12 tCO2e	670 tCO2e	242 tCO2e	1,412 tCO2e, total Community 28 tCO2e, estimated 2% Corporate only
GHGP – Scope 2	GHGP – Scope 2	GHGP – Scope 2 & 3	GHGP – Scope 1 ISO - Direct	GHGP – Scope 3 ISO – Other Indirect

[1] Please see Project Charter – FCM Climate Change Partnership Staff Grant Program, Rev 1 dated 2019 Apr 01 for full details on the overall program.

ISO – Energy Indirect	ISO – Energy Indirect	ISO – Energy Indirect & Other Indirect		

GHG EMISSIONS REDUCTIONS TARGETS:

To arrive at a reductions target, the project leads undertook an iterative Risk and Opportunities analysis which considered equally a) emissions reductions potential, b) project costs and operational savings, c) existing Town initiatives, and d) available funding programs. The realities of climate science and international, national, and provincial commitments were also considered. See Appendix B for further details on the iterative process and evaluation criteria.

The following GHG emissions reduction targets were determined for the Town of Torbay:

- ➔ 3-7% below 2018 levels by 2023
- ➔ 30-45% below 2018 levels by 2030
- ➔ Net-zero by 2050

The actions that will contribute to the achievement of these targets are outlined by emissions category in Section B.4. While a bottom-up approach was taken to ensure the targets are achievable, an expanded target range was specified to ensure sufficient ambition – reflecting the urgency of the climate crisis and striving toward the reductions scientifically required to limit global warming to 1.5°C.

The actions identified for the 2023 and 2030 time periods are expected to result in annual cost savings[1] for the Town of $43,400 and $163,700, respectively, compared to the 2018 baseline year.

CLIMATE ACTION PLAN SUMMARY:

Projects were organized into priority tiers – Tier 1 being highest priority for the Town, Tiers 2 and 3 being lower priority. Ease of execution, available funding, GHG reduction and cost savings potential, timeframe, and alignment with Town goals were some of the factors taken into account when assigning priority tiers. The projects assigned to each tier are shown in the table below. Details related to each project can be found in the respective category-specific action table in Section 1 of this report.

Project	Category
Priority Tier 1	
Solar PV Installation at Town Hall (Phase 1)	Buildings & Facilities
Public Works Depot –Energy Efficiency	Buildings & Facilities
Solar PV Installation at Town Hall (Phase 2) – 12 more panels	Buildings & Facilities
ECO-Driver Training	Fleet
Climate Friendly Driving Policy	Fleet
Internal Staff Commuting Initiatives	Fleet
Water Metering – New Construction Policy	Water & Wastewater

[1] Considering current electricity and fuel prices. Due to the uncertainty associated with projecting these costs, the annual savings estimated are a conservative estimate. The annual savings are cumulative – the 2030 savings amount includes the 2023 savings as the annual savings are continuous

Water Conservation Campaign	Water & Wastewater
Engineered Wetland Wastewater Treatment	Water & Wastewater
Advanced Watershed Model	Water & Wastewater
Waste Reduction Committee/Working Group	Solid Waste
Annual Emissions Tracking	Organizational Change
Public Engagement on Climate Change and GHGs	Organizational Change
Food Security Committee/Working Group	Organizational Change
Priority Tier 2	
Solar PV Installation at Town Hall (Phase 3) – Net-Zero Target	Buildings & Facilities
Net-Zero Energy Municipal Building Policy	Buildings & Facilities
Additional Renewable Energy Installation	Buildings & Facilities
Vehicle Procurement Policy Update	Fleet
Public Transit	Fleet
Water Metering Program	Water & Wastewater
Composting Program Phase 1	Solid Waste
TerraCycle Program(s)	Solid Waste
Municipal Plan Review	Organizational Change
Priority Tier 3	
History House – Fuel Switching	Buildings & Facilities
Additional EV Charging Station(s)	Fleet
Electric Municipal Vehicle(s)	Fleet
Solar street/park/field lighting for all Town owned light standards	Streetlight & Area Lighting
Composting Program Phase 2	Solid Waste
Community Free-Store	Solid Waste
Carbon Offset Purchasing	Organizational Change

The Town of Torbay is also working with Conservation Corps NL (CCNL) to complete a climate vulnerability assessment. This project consists of a series of community workshops that focus on identification of vulnerabilities related to flooding, coastal erosion, slope movement, drinking water supply, winter, and wildfire – this follows the guidelines specified by the Government of Newfoundland and Labrador's *7 Steps to Assess Climate Change Vulnerability In Your Community*. As climate change mitigation and adaptation are interrelated and should be considered together, the summary report completed as a result of the CCNL vulnerability assessment should be reviewed alongside this climate action plan. Greenhouse gas impacts should be considered in the decision-making process when determining effective actions to address climate vulnerabilities. Likewise, mitigation projects should consider community resiliency.

TOWN COMMITMENT:

By adopting this plan, the Town of Torbay commits to:

- Annual completion of a corporate GHG emissions inventory [Responsible Party – Corporate Services Department]
    - Shifting of the baseline year as appropriate (ie. change of emissions factors)
    - Comparison of latest GHG inventory to baseline year to monitor reduction progress
- Review of the Climate Action Plan every 3 years [Responsible Party – Planning Department and Infrastructure & Public Works Department, with review by the Torbay Environmental Advisory Committee]
    - Updating of project priority, project status, and addition of new opportunities
    - Review of the Emissions Reductions Targets and revision as appropriate

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1. CLIMATE ACTION PLAN

Through the FCM T2050 project, the Town of Torbay completed the targeted Milestone 1, 2, 3 and 4 deliverables. This section includes a description of the Climate Action Plan's purpose and a detailed action plan matrix. This matrix is meant to be a living document to guide the Town in actions for addressing climate change within the Town's boundaries.

The Milestones of the PCP Program are as follows:

- Milestone 1 – GHG Emissions Inventory
  - (see Appendix A)
- Milestone 2 – Set Emissions Reductions Target
  - (see Appendix B, Section B.4)
- Milestone 3 – Create a Local Climate Action Plan
  - (this document)
- Milestone 4 – Implement the Local Action Plan
  - One or more projects identified in this document
- Milestone 5 – Monitor Progress and Report Results
  - Ie. record the changes in the organization and track GHG emissions and project progress annually

The individual emissions reducing projects identified herein were selected by means of an iterative risk and opportunity analysis conducted by the T2050 consultant and the Town's project leads. The Categories of Action were defined according to the FCM PCP protocol for municipalities[1]: Buildings, Fleet, Street and Traffic Lighting, Water and Wastewater, and Municipal Solid Waste. An action category was also specified for Organizational Change – this accounts for general policy or organizational actions.

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[1] https://canadainfrastructure.ca/Documents/reports/PCP/PCP_Protocol_Canadian_Supplement_EN.pdf

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The actions that will contribute to the achievement of these targets are outlined by emissions category in Section B.4. While a bottom-up approach was taken to ensure the targets are achievable, an expanded target range was specified to ensure sufficient ambition – reflecting the urgency of the climate crisis and striving toward the reductions scientifically required to limit global warming to 1.5°C.

The actions identified for the 2023 and 2030 time periods are expected to result in annual cost savings[1] for the Town of $43,400 and $163,700, respectively, compared to the 2018 baseline year.

Please see Appendix A for the full emissions inventory, Appendix B for further details on the risk opportunity analysis process, and Appendix C for an overview of the climate science that forms the basis of this plan.

The Town of Torbay is also working with Conservation Corps NL (CCNL) to complete a climate vulnerability assessment. This project consists of a series of community workshops that focus on identification of vulnerabilities related to flooding, coastal erosion, slope movement, drinking water supply, winter, and wildfire – this follows the guidelines specified by the Government of Newfoundland and Labrador's *7 Steps to Assess Climate Change Vulnerability In Your Community*. As climate change mitigation and adaptation are interrelated and should be considered together, the summary report completed as a result of the CCNL vulnerability assessment should be reviewed alongside this climate action plan. Greenhouse gas impacts should be considered in the decision-making process when determining effective actions to address climate vulnerabilities. Likewise, mitigation projects should consider community resiliency.

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    - Updating of project priority, project status, and addition of new opportunities
    - Review of the Emissions Reductions Targets and revision as appropriate

To ensure consistency and transparency in City process, all PCP Milestones will be logged and tracked using the PCP Tool, which can be found here: https://pcptool.ca/.

[1] Considering current electricity and fuel prices. Due to the uncertainty associated with projecting these costs, the annual savings estimated are a conservative estimate. The annual savings are cumulative – the 2030 savings amount includes the 2023 savings as the annual savings are continuous

BUILDINGS & FACILITIES	Details	Budget	Funding Programs Available?	Responsible Party	Timeframe	Status	Priority Tier
Existing Initiatives							
Town Hall Renovations	As part of the Town Hall renovation, the Town upgraded lights to LEDs, increased insulation in select exterior sections of the building, replaced some windows, and added attic insulation over the Council Chambers.					•	
New Initiatives							
Public Works Depot – Energy Efficiency	This is Torbay's building of highest electricity consumption. A proposal has been received from an engineering firm to replace the electric water boiler heating system with a heat pump – estimated annual electricity savings of around $16,000 (HST included)	**Est. $115K** **Includes TakeCharge Rebates**	**TakeCharge NL** **GMF – Retrofit of municipal facilities**	**I&PW**	**2021**	• Propose for 2021 budget	**1**
History House – Fuel Switching	Incorporate conversion of furnace oil heating system to an electric heating system (ie. heat pumps) into ongoing renovation of the history house (~20 tonnes annual emissions savings by removing furnace oil)	**TBD**	**GMF – Retrofit of municipal facilities**	**I&PW**	**Revisit 2025**	• Currently, the boiler system is in good shape (5-10 years remaining life) and conversion to electric would require significant electrical upgrades (engineering + contractor)	**3**
Solar PV Installation at Town Hall (Phase 1)	As the T2050 keystone project, 13.9 kW of solar panels (36x 385W panels) will be installed on the roof of the Torbay Town Hall and Fire Department building. The system design allows for the addition of more renewable energy in the future to make the building net-zero energy. This 13.9 kW system will offset 7.4% of the Town Hall electricity usage, equating to an **annual GHG reduction of 0.36 tCO2e and energy savings of $2,000 per year. These energy savings should be put in a fund for future green initiatives, such as subsequent phases of this project.**	**Use of T2050 $36K funding**	**FCM T2050**	**Fundamental Inc. + Planning + I&PW**	**Expected install late summer/early fall 2020**	• Net metering application approved and installation tentatively scheduled for Sept 22nd	**1**

Solar PV Installation at Town Hall (Phase 2) – 12 more panels	Increase capacity of the solar PV system on the Town Hall/Fire Department roof by 12 more panels (no other infrastructure/electrical changes required compared to Phase 1).	**~ $7,500**	**Keep an eye out**	**I&PW & Planning**	**Review potential spring 2021**	• 12 more panels can be added without changing the inverter	**1**
Solar PV Installation at Town Hall (Phase 3) – Net-Zero Target	Increase capacity of the solar PV system on the Town Hall/Fire Department roof and add additional renewable energy sources (such as a wind turbine) to account for entire load. Additional phases could also include installation of battery technology to store energy for emergency back-up purposes (rather than a diesel generator).	**TBD**	**Keep an eye out**	**I&PW & Planning**	**Revisit 2022**	• eZn batteries planning to be commercially available 2022-2023	**2**
Net-Zero Energy Municipal Building Policy	Define higher energy efficiency requirements for new buildings and retrofits (performance-based requirements such as energy use per area), and require some renewable energy on-site and/or green roofs – explore options Reference Concepts: Passive house, Net-Zero-Ready, Living Building, Green Development Standards Examples: California, New York City, Toronto, Edmonton	**N/A**	**N/A**	**Planning & Council**	**Revisit 2022**	•	**2**
Additional Renewable Energy Installation	Install another small renewable energy system on a municipal building to raise awareness and demonstrate cost savings. This could be a small scale wind turbine and/or some solar panels. One potential location is the Torbay Common. This location would be suitable since it is the emergency warming centre for the Town. Note that the levelized cost of energy (LCOE) for solar power is now around $0.11/kWh. Small scale wind LCOE ranges from $0.03-0.17/kWh.	**TBD**	**If located on a brownfield, could take advantage of: GMF – Renewable energy production on a brownfield**	**I&PW & Planning**	**Review potential 2023**	• **Torbay Common not on a brownfield site** • **Potential at South Pond depot area (pollution from the airport)**	**2**

FLEET	Details	Budget	Funding Programs Available?	Responsible Party	Timeframe	Status	Priority Tier
Existing Initiatives							
EV Charging Station	EV charging station at the Town Hall & 2 at the depot & at the Torbay Common						
Life Cycle Approach to Vehicle/Equipment Purchasing	Vehicle and equipment procurement approach which emphasizes better equipment (via a life cycle cost approach to quoting) and thus lower maintenance costs and environmental impact. Similarly, including fuel mileage as a consideration when purchasing a vehicle or equipment.						
New Initiatives							
ECO-Driver Training	Utilize resources from Natural Resources Canada to conduct fuel efficient driver training with Town staff (SmartDriver in the City). A Powerpoint presentation can be provided for internal use. The powerpoint is self-explanatory and does not require an expert trainer – simply facilitate a meeting whereby the course content is reviewed with Town staff so that they are made aware of efficient driving techniques. Certificates can be given to participating employees upon completion.	**Staff Costs only**	**NRCan**	**I&PW & Planning**	**2021**	• Emma can provide powerpoint	**1**
Climate Friendly Driving Policy	Policy that requires completion of the above driver training by Town staff. Policy can also include anti-idling and other measures to be discussed.	**N/A**	**NRCan**	**I&PW & Planning**	**2021**	•	**1**
Vehicle Improvements	Installation of oil recycling filters on vehicles and equipment which would improve fuel efficiency	**Approx. $8,000 per vehicle** **Pilot Project - $500K** **80% coverage possible**	**GMF – Reduce fossil fuel use in fleets**	**I&PW**	**Review Fall 2020**	• Review current fleet to see if applicable	**TBD**

Anti-Idling Technology	Application to the Freight Transportation Fuel Efficiency Program for Anti-Idling Technologies. https://www.exec.gov.nl.ca/exec/occ/pdf/FTFEP_List_of_Eligible_Fuel_Saving_Devices.pdf	**TBD**	**LCELF**	**I&PW**	**Review Fall 2020**	• Have Town public works or maintenance staff review list of eligible devices to determine if funding is applicable	**TBD**
Additional EV Charging Station(s)	Install additional charging stations at the Town Hall, or new charging stations at other public spaces	**Approx. $3000 – 15,000 each depending on electrical requirements with potential 50% coverage through ZEVIP**	**ZEVIP**	**I&PW & Planning**	**Revisit 2022**	• ZEVIP launches multiple RFPs per year (until 2024), focusing on different streams at a time	**3**
Electric Municipal Vehicle(s)	Purchase an electric vehicle for the municipal fleet. Consider example of Plessisville, Quebec – project previously funded by FCM – whereby an electric vehicle was purchased for Town use but also rented to residents after hours as part of a carshare program	**Total TBD** **Pilot Project - $500K** **80% coverage possible**	**GMF – Reduce fossil fuel use in fleets**	**I&PW & Planning**	**Revisit 2022**	• Could be part of a plan toward fleet electrification	**3**
Vehicle Procurement Policy Update	Incorporate improved fuel efficiency standards or hybrid/electric requirement in procurement policy. Note the following approximate/typical fuel economy comparison: • Electric car – 1.4 to 2.7 L/100km (equivalent cost) • Compact Car – 5 to 10 L/100 km • Mini Van or SUV – 7 to 15 L/100 km • Truck – 10 to 25 L/100 km	**N/A**	**N/A**	**I&PW & Planning**	**Revisit 2021**	• Depends on required use of the vehicle, cost	**2**
Internal Staff Commuting Initiatives	Internal incentive program to encourage carpooling, biking, walking to work, working from home. May include events such as bike/walk to work days, departmental competitions, or an internal carpool matching system. Estimate staff commuting and include in GHG inventory for future monitoring.	**N/A**	**N/A**	**I&PW & Planning & Community Services**	**2020-2021**	• Could branch into community awareness • Relates to wellness	**1**
Public Transit	Work with Metrobus to offer pilot services between St. John's and Torbay or explore micro-transit systems and technologies (refer to case studies from Belleville, ON and Okotoks, AB)	**TBD**	**N/A**	**Planning**	**Revisit 2022**	• Study/report – Town met with Metrobus a few years ago but didn't pan out after the MUN program didn't go through • Julia discuss with councillor	**2**

STREET, TRAFFIC & AREA LIGHTING	Details	Budget	Funding Programs Available?	Responsible Party	Timeframe	Status	Priority Tier
Existing Initiatives							
NF Power LED pilot program	High-Pressure Sodium streetlight bulbs are replaced with LED bulbs as they reach the end of their lives					•	
New Initiatives							
Solar street/park/field lighting for all Town owned light standards	Solar lights have no electricity costs and wouldn't go out in a power outage, therefore, they would have emergency response benefits.	**TBD**		**I&PW**	**Revisit 2022**	• Solar lighting around UTC pond walking trail, potentially – chat with community services • Or Torbay Beach, Town Centre • Primary benefit is fee savings from NL Power	**3**

WATER + WASTEWATER	Details	Budget	Funding Programs Available?	Responsible Party	Timeframe	Status	Priority Tier
Existing Initiatives							
Leak Detection Program	Investigate and repair leaking water and sewer piping infrastructure.	**TBD**	**GMF - Water conservation**	**I&PW**	**2021 est. completion**	• Zoned water metering underway for leak detection	
New Initiatives							
Water Metering Program	Installation of water meters on facilities for commercial and/or residential. Metering alone (ie with no change in fees) has been associated with up to 20% reductions in volumes consumed.	**TBD**	**GMF - Water conservation**	**I&PW**	**Revisit 2022**	•	**2**
Water Metering – New Construction Policy	Ie. required on new commercial buildings, to prepare for future water metering requirements	**N/A**		**I&PW & Planning**	**Revisit 2021**	•	**1**
Water Conservation Campaign	Encourage residents to conserve water by limiting lawn watering, installing low-flow fixtures, etc. Resources available: https://www.mae.gov.nl.ca/waterres/waste/water_conservation.html http://www.ccnl.ca/programs/water-conservation/	**TBD**	**N/A**	**Communications**	**2021**	• New flow meters will allow better data that can be shared publicly as part of this campaign	**1**
Engineered Wetland Wastewater Treatment	Investigating possibility of incorporating a decentralized approach to Town WW treatment using an engineered wetland into wastewater and stormwater management plan in order to meet Federal requirements, increase system resiliency, promote low impact development, and generate carbon offsets.	**Est. $10-20K for a feasibility study**	**GMF – Wastewater systems**	**Public Works** **Planning**	**Study 2021**	• Town staff met with Abydoz on August 12th and visited a sample system site on Sept 15th • Abydoz to prepare a proposal to complete a study – cost may be able to be accommodated in existing budget (Julia to confirm)	**1**

Advanced Watershed Model	Hire a post-doc using funds from Mitacs (Town contribution required, less competitive) or NSERC Alliance Grant (90-100% coverage possible, more competitive) to incorporate advanced climate projections and higher spatial and time resolution into the current watershed model for the Town. This would be a step toward long term sustainability and environmental stewardship in Town services/development, and also relates to stormwater management and flood-risk (climate resilience connection)	**$30K** **50-100% coverage possible**	**Mitacs or NSERC**	**MUN** **PEC** **Public Works** **Planning**	**2021**	• Recommendation is result of meeting held on July 15th, 2020 between Dr. Joe Daraio, Fundamental Inc. and PEC (Progressive Engineering & Consulting Inc.)	**1**

SOLID WASTE	**Details**	**Budget**	**Funding**	**Responsible Party**	**Timeframe**	**Status**	**Priority Tier**
Existing Initiatives							
Curbside Recycling & Campaign	Torbay offers a curbside recycling program. In 2018, the Town initiated an extensive public outreach campaign to address poor community uptake of the service (only 6% waste diversion)	**N/A**	**N/A**			• **Between 2018 and 2019, recycling rates did not increase significantly (+ 0.46% of total waste recycled)**	
Compost Bin Distribution Program	Participation in the Backyard Compost Bin Distribution Program offered by MMSB (Multi-Materials Stewardship Board) whereby bins and tumblers are offered to residents at a discounted price (in partnership with the neighbouring Towns of Flatrock, Pouch Cove, Bauline, and Logy Bay-Middle Cove-Outer Cove).	**N/A**	**N/A**			•	
New Initiatives							
Composting Program Phase 1	Investigate options for a community composting pilot program – small-scale collection or a drop-off site. For example, a Novid 542 composting machine, (costing ~$94,000) could service around 1600 people and **reduce annual GHG emissions by 119 tCO2e and save $10,500 per year in tipping fees.** There is also the potential to sell finished compost for revenue (up to $62,000 per year).	**Est. $150,000 for machine + programming** **with potential for 80% funding if approached as an FCM pilot project**	**MMSB – Community Waste Diversion Fund**	**IPW**	**2025**	• PPP with local farms or garden center? A partner could host the machine on their property in exchange for use of the finished compost or tother arrangement	**2**

	The Novid machines are available in many sizes, are modular (can be expanded later), and are manufactured in Manitoba.		**GMF – Waste Diversion**			• Mandatory composting regulation + waste stream separation required	
Composting Program Phase 2	Community-wide, mandatory composting program (additional stream of curbside collection) – expand existing and/or purchase additional composting machine Organic waste accounts for 1/3 or more of household waste – diversion of this waste from landfill can result in huge emissions reductions and cost savings in the solid waste sector – **464 tCO2e and $41,000 in tipping fee savings annually (total, including the reductions achieved via Phase 1)**	**TBD**	**MMSB – Community Waste Diversion Fund** **GMF – Waste Diversion**	**IPW**	**2030**	• **Key component of achieving long-term emissions reduction target**	**3**
Community Free-Store	Akin to a Farmer's Market (or held at an existing Farmer's Market) create an area where people can donate and pick up used, good quality items.	**TBD (Low)**	**Potentially** **MMSB or GMF**	**Community Services**	**2022**	• Could be a community event rather than a permanent location/program (ex. Host at Torbay Common) – could be recurring if well received • Would have to be considered post-covid	**3**
TerraCycle Program(s)	Implement one or more of the recycling programs offered by TerraCycle. Many are free, either offering pre-paid shipping labels or a drop-off location. Programs may be internal (for Town staff only), or community-wide (the Town could offer a public drop-off location for specific items) https://www.terracycle.com/en-CA/brigades For example, used or broken writing utensils can be collected in a box at the Town Hall, and dropped off to any Staples location	**N/A**	**N/A**	**IPW + Planning + Community Services**	**2021**	• Environmental Committee consideration; could be volunteer run	**2**
Waste Reduction Committee/Working Group	Facilitate the creation of a community committee or working group to discuss waste reduction actions in Torbay Should include public education campaign in order to reach recycling increase/waste reduction goals **(TBD -> associated GHG and $ savings to be calculated)**	**N/A**	**N/A**	**IPW + Planning + Community Services**	**2021**	• Potential focus area or subcommittee for the Environmental Advisory Committee	**1**

ORGANIZATIONAL CHANGE	Details	Budget	Funding	Responsible Party	Timeframe	Status	Priority Tier
Existing Initiatives							
Incorporate Eco-Assets (natural infrastructure, watershed, etc.) into the Town Asset Management Strategy	Including natural assets in existing asset management program in next scope of work						
Climate Vulnerability Assessment	Working with Conservation Corps NL to complete a climate vulnerability assessment via community workshops		**Funded by FCM**				
New Initiatives							
Annual Emissions Tracking	Designate a staff person or hire external consultant to be responsible for updating the emissions inventory and associated costs savings on an annual basis to track progress.	**$3,000 (if external consultant used)**	**N/A**	**Finance**	**Ongoing** **Next: 2021**	• 2018, 2019 inventories complete • **2020 inventory will need to be allocated to an internal or external body in 2021**	**1**
Public Engagement on Climate Change and GHGs	Share GHG inventory results with residents using infographics, highlight Town participation in the T2050 project, educate re: climate change causes and impacts, ways that residents and businesses can reduce their	**TBD**	**N/A**	**Communications + Planning**	**Ongoing**	• Emma to make a T2050 summary page at the end of the project	**1**

	footprint (local food, recycling and composting, water conversation, electrification, etc.)					• Video to be produced re. solar installation at Town Hall • myTorbay website will feature climate change page	
Municipal Plan Review	Review/update municipal plan and development regulations to ensure no preclusions to, or to encourage or require: ▪ Tree planting ▪ Renewable energy generation ▪ Green roofs ▪ Tiny homes ▪ Efficient or net-zero construction ▪ Urban farming/backyard homesteading Review all aspects of plan with specific attention paid to sustainability, energy, renewables, and integrated capital asset management	**N/A**	**N/A**	**Planning**	**2022**	• 5 year cycle – review due in 2022	**2**
Food Security Committee/Working Group	Facilitate the creation of a community committee or working group to discuss food security actions in Torbay. Group can consider project and policy recommendations such as: ▪ Require preference of locally sourced food in procurement processes ▪ Review agricultural zoning/development regulations to encourage farming and urban gardens ▪ Establish a farmer's market (Utilize Food First NL Best Practices Toolkit) ▪ Incentivize businesses to use and provide local food ▪ Establish a community garden (Utilize Food First NL Best Practices Toolkit) o possibly incorporate with community composting program	**N/A**	**Local Food Infrastructure Fund (Agriculture and Agri-Food Canada) – up to $250,000 grant available (continuous submissions)** **Community Healthy Living Fund (Prov. of NL) – up to $10,000 per program (max 3 programs) – Deadline November 30th**	**Planning + Community Services**	**2021**	• Potential focus area or subcommittee for the Environmental Advisory Committee • Discretionary permission of greenhouses and chickens, etc. currently • Community garden in place • Celebrating agricultural history and promoting involvement is important for Torbay	**1**

Carbon Offset Purchasing **Ie. Carbon Neutral Town Hall**	Consider purchasing carbon offsets as part of the Town's overall emissions reduction plan. Purchasing 1 carbon offset allows the Town GHG inventory to be reduced by 1 ton of CO2 equivalent. https://offset.climateneutralnow.org/howtooffset Carbon offsets are generated right here in Newfoundland and Labrador, and the sales of these offsets support local businesses and municipalities to encourage investment in low-carbon infrastructure. http://sharpmgmt.ca/ For example, the Town of Torbay could offset the emissions from the Town Hall and Fire Department building for around $180, if purchasing local offsets for $25/tCO2e	**TBD**	**N/A**	**Planning + IPW**	**2025**	• Minimal impact, but a simple low-cost way to express the Town's climate commitment	**3**

APPENDIX A – GHG EMISSIONS INVENTORY

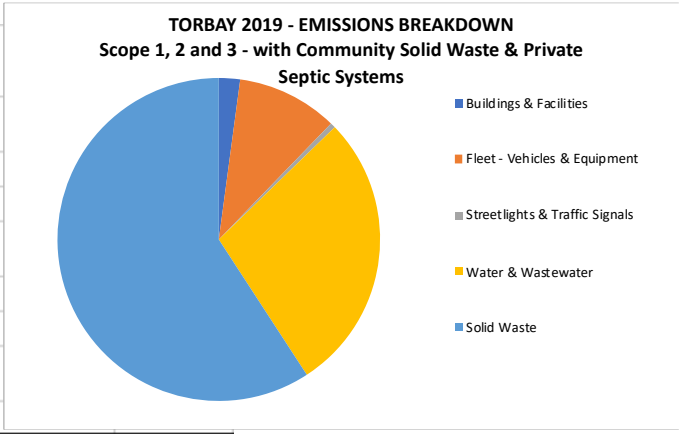
On the following pages is a tabulated version of the Town of Torbay GHG Emissions Inventory 2019. All raw data exists within a detailed and annotated spreadsheet and can be provided upon request. All data will be logged within the PCP Milestone Tool, https://pcptool.ca/ for consistency across inventoried years, and participation with the like-minded cohort which make up the PCP member communities.

The Town elected to conduct a corporate emissions inventory, wherein the inventory boundary is set as those building, facilities, fleet and equipment which are owned and operated by the Town. This emissions protocol was chosen based on the understanding that change starts at 'home' and the Town has the most influence over their own assets.

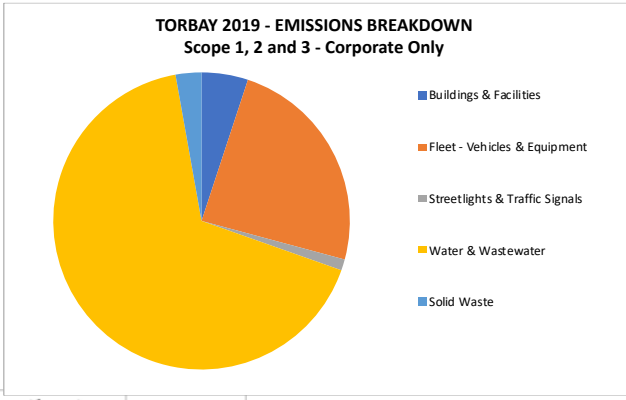
TOTAL EMISSIONS (tonnes CO2e/year)	includes all community waste production
2,386.54	

TOTAL ENERGY (GJ/year)
9,516.39

TOTAL COST ($/year)
$974,189.34



ACTIVITY SECTOR	Emissions (tCO_2e/year)	Energy (GJ/year)	Cost ($/year)	Scope
Buildings & Facilities	50.84	3,591.47	$113,406.51	1 & 2
Fleet - Vehicles & Equipment	241.64	3,428.31	$107,732.85	1
Streetlights & Traffic Signals	12.18	1,623.77	$213,610.20	2
Water & Wastewater	669.41	872.83	$29,046.88	2 & 3
Solid Waste	1,412.47	-	$510,392.90	3



TOTAL EMISSIONS (tonnes CO2e/year)	excludes all community waste and estimates corporate Town waste at 2% of community
1,002.31	

ACTIVITY SECTOR	Emissions (tCO_2e/year)	Energy (GJ/year)	Cost ($/year)	Scope
Buildings & Facilities	50.84	3,591.47	$113,406.51	1 & 2
Fleet - Vehicles & Equipment	241.64	3,428.31	$107,732.85	1
Streetlights & Traffic Signals	12.18	1,623.77	$213,610.20	2
Water & Wastewater	669.41	872.83	$29,046.88	2 & 3
Solid Waste	28.25	-	$510,392.90	3

The GHG Emissions Inventory was completed following the guidance set out in the Greenhouse Gas Protocol international standard on municipal emissions inventories from the World Resources Institute. This standard also aligns with the ISO 14064-1 Greenhouse Gases protocols for conducting GHG emissions inventories.

- Scope 1 – fuels burned directly as part of municipal operations (mandatory inclusion)
- Scope 2 – purchased electricity (mandatory inclusion)
- Scope 3 – all other emissions (optional inclusion)

According to the FCM PCP protocol for municipalities[1], the Town's emissions included the following five categories. Important assumptions and methods used within each category are mentioned below:

Buildings and Facilities – Scope 2

- All electricity data (kWh and costs) was obtained from Newfoundland Power
  - The emissions factor (0.000027 tCO2e/kWh) for NL was taken from: *National Inventory Report 1990-2018 – Part 3: Greenhouse Gas Sources and Sinks in Canada, Canada's Submission to the United Nations Framework Convention on Climate Change.* Environment and Climate Change Canada. 2020. Page 61, Table A13-2.

- Furnace oil and propane volume data was obtained from fuel supplier invoices
  - The emissions factor was taken from: *A Guidance Document for Reporting Greenhouse Gas Emissions for Large Industry in Newfoundland and Labrador*. Government of Newfoundland and Labrador Office of Climate Change. 2017. Page 23, Table 5-2.
    - IPCC AR5 GWP values were used.

Fleet – Scope 1

- All fuel amounts and costs were obtained from fuel supplier Invoices in the Town's files
- The Town decided to exclude emissions associated with employee travel (optional Scope 3)
- Torbay does not operate any public transit services
  - Emissions factors were taken from:
    - *A Guidance Document for Reporting Greenhouse Gas Emissions for Large Industry in Newfoundland and Labrador*. Government of Newfoundland and Labrador Office of Climate Change. 2017. Page 23, Table 5-2.;
    - *PCP Protocol: Canadian Supplement to the International Emissions Analysis Protocol.* FCM & ICLEI. Page 12, Table 2.
    - IPCC AR5 GWP values were used.

Streetlights and Traffic Signals – Scope 2

- Annual kWh used by streetlights was estimated using per-streetlight annual kWh values from:
  - *NL Power Schedule of Rates, Rules and Regulations.* October 2019. Section II. 3. (Page 17), and an inventory of Town streetlights provided by NL Power.
- An inventory of all Town streetlights and the electricity costs were provided by Newfoundland Power
  - The emissions factor (0.000027 tCO2e/kWh) for NL was taken from: *National Inventory Report 1990-2018 – Part 3: Greenhouse Gas Sources and Sinks in Canada, Canada's Submission to the United Nations*

[1] https://canadainfrastructure.ca/Documents/reports/PCP/PCP_Protocol_Canadian_Supplement_EN.pdf

Framework Convention on Climate Change. Environment and Climate Change Canada. 2020. Page 61, Table A13-2.

- Traffic lights in the Town are provincially owned and are therefore excluded from the inventory

Water and Wastewater – Scope 2 & 3

- The Town of Torbay owns and operates its own potable water treatment plant which is powered exclusively by electricity
    - Electricity consumption data provided by NL Power
    - The emissions factor (0.000027 tCO2e/kWh) for NL was taken from: *National Inventory Report 1990-2018 – Part 3: Greenhouse Gas Sources and Sinks in Canada, Canada's Submission to the United Nations Framework Convention on Climate Change.* Environment and Climate Change Canada. 2020. Page 61, Table A13-2.

- 30% of the Town is serviced by a municipal sanitary sewer system which discharges into the surrounding ocean waters. The other 70% of residents have private septic systems. Therefore, these percentages of the population of Torbay (2016 census) were used to calculate the associated emissions. These emissions are classified as Scope 3 and are included to illustrate the impact that a comprehensive municipal wastewater system would have on the overall Town emissions. Although the wastewater is generated by the community as a whole, the Town is responsible for the wastewater treatment methods used, which is the variable that can be controlled to reduce emissions.
    - Emissions factors and calculation methodology were taken from:
        - 2019 *Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Intergovernmental Panel on Climate Change. 2019. Volume 5, Chapter 6 – Wastewater Treatment and Discharge.;
        - *National Inventory Report 1990-2018 – Part 2: Greenhouse Gas Sources and Sinks in Canada, Canada's Submission to the United Nations Framework Convention on Climate Change.* Environment and Climate Change Canada. 2020. Section A3.6.4.;
        - *Global Protocol for Community-Scale GHG Emissions Inventories.* World Resources Institute & ICLEI. 2014. Section 8.6.
        - IPCC AR5 GWP values were used.

Solid Waste – Scope 3

- All municipal solid waste generated by the Town of Torbay is transported to and processed at Robin Hood Bay Landfill and Recycling Facility. The Robin Hood Bay Waste Management Facility is owned and operated by the City of St. John's. Torbay has no direct control of operation of the Landfill Facility.
- The solid waste volume for the entire community was included in the overall Town GHG emissions inventory as a Scope 3 item because it is understood that the Town has some measure of influence over the residents' recycling, composting and waste management habits.
- To better see the distribution of the Town's corporate emissions, the volume of corporate waste was estimated to be 2% of the total community waste volume. Data related to specific corporate waste volumes is unknown.
    - The Methane Commitment Model from the PCP Protocol was used for the emissions calculation.

- *PCP Protocol: Canadian Supplement to the International Emissions Analysis Protocol.* FCM & ICLEI. Page 22.

- The IPCC AR5 GWP was used for methane (28).
- The fraction of methane recovered in the landfill gas (0.623) was provided by the City of St. John's; it was calculated by an experienced professional employed by the City of St. John's specifically for the Robin Hood Bay Landfill facility.

- The Degradable Organic Carbon Content (DOC) was taken as 0.2, as stated for NL in:
  - *National Inventory Report 1990-2018 – Part 2: Greenhouse Gas Sources and Sinks in Canada, Canada's Submission to the United Nations Framework Convention on Climate Change.* Environment and Climate Change Canada. 2020. Table A.3.6-4, page 172.

BUILDINGS & FACILITIES - Electricity

Year	2019	
Emissions Factor (EF)	0.000027	t CO_2e/kWh
EF Source	National Inventory 2020, p. 61, Table A13-2	
Energy Data Source	NL Power Bills and Account Summaries	

TOTAL BUILDING ELECTRICITY EMISSIONS (tonnes CO2e/year)	TOTAL BUILDING ELECTRIC ENERGY (GJ/year)	TOTAL BUILDING ELECTRICITY COST ($/year)
24.26	3,234.40	$105,244.62

BUILDING NAME	CIVIC ADDRESS	NF POWER ACCOUNT NAME	NF POWER ACCOUNT #	BLDG AREA (m^2)	ELECTRICAL (kWh/year)	ENERGY (GJ/year)	COST - HST ($/year)	EUI (GJ/m^2)	ELECTRICAL EMISSIONS (tCO_2e)	
Fire and Town Hall Building	1288 Torbay Road	Main Rd Fire Hall	867705	643	177,760	639.94	$20,929.01	1.00	4.80	
Old Depot - behind Town Hall (Unoccupied)	1288 Torbay Road	Torbay Municipal Garage	867713	190	20,417	73.50	$2,633.89	1.04	0.55	*EUI includes furnace oil
Camp Carey Building (UTC pond park)		Bauline Line	8786147	134	28,138	101.30	$3,371.85	0.76	0.76	
Public Works Depot	1 Pump House Rd	1 Pump House Rd	15097512	1100	407,760	1,467.94	$45,201.24	1.33	11.01	
Recreation Shed (in depot)	1288 Torbay Road	1288 Torbay	15474000		5,575	20.07	$868.75	#DIV/0!	0.15	
Softball Hut at UTC pond park		Bauline Line	1176486		18,496	66.59	$2,366.63	#DIV/0!	0.50	
Clubhouse at UTC pond park		Bauline Line Soccer Pitch	14674691	240	32,280	116.21	$3,978.36	0.48	0.87	
History House (building + area lights)	2 Convent Lane	Convent Lane	15294671	237	2,459	8.85	$803.69	1.02	0.07	*EUI includes furnace oil
Torbay Common		8 Kinsmen Pl	15282932	1953	205,560	740.02	$25,091.20	0.38	5.55	

BUILDINGS & FACILITIES - Fuel

Year	2019
Fuel Data Source	Irving & North Atlantic Invoices

TOTAL BUILDING FUEL EMISSIONS (tonnes CO2e/year)	TOTAL BUILDING FUEL ENERGY (GJ/year)	TOTAL BUILDING FUEL COST ($/year)
26.58	357.07	$8,161.89

BUILDING NAME	CIVIC ADDRESS	FUEL TYPE (Select)	VOLUME (L)	ENERGY (GJ/year)	COST ($/year)	EMISSIONS (tCO_2e)
History House	2 Convent Lane (G/L code: 5442-6530)	Furnace Oil	6324.7	232.24	$5,322.18	17.29
Old Depot	1288 Torbay Road (G/L code: 5019-6230)	Furnace Oil	3399.3	124.82	$2,839.71	9.29
				0.00	$0.00	0.00

FLEET

	Year	2019		TOTAL FLEET EMISSIONS (tonnes CO2e/year)		TOTAL FLEET ENERGY (GJ/year)		TOTAL FLEET COST ($/year)
	Fuel Data Source	Iriving and North Atlantic Invoices		241.64		3,428.31		$107,732.85

LOCATION/SUPPLIER/VEHICLE	FUEL TYPE (Select)	VOLUME (L)	ENERGY (GJ/year)	COST ($/year)	EMISSIONS (tCO_2e)
Iriving Energy (G/L code: 5083-6210)	Gasoline	38599.7	1,337.87	$44,620.00	91.78
North Atlantic (G/L code: 5082-6210)	Diesel	54044.7	2,090.45	$63,112.85	149.85

STREET LIGHTS & TRAFFIC SIGNALS

Year	2019	
Emissions Factor (EF)	0.000027	t CO_2e/kWh
EF Source	National Inventory 2020, p. 61, Table A13-2	
Energy Data Source	NL Power Report	

TOTAL LIGHTING EMISSIONS (tonnes CO2e/year)	TOTAL LIGHTING ENERGY (GJ/year)	TOTAL LIGHTING COST ($/year)
12.18	1,623.77	$213,610.20

SITE	NF POWER ACCOUNT NAME	NF POWER ACCOUNT #	ELECTRICAL (kWh/year)	ENERGY (GJ/year)	COST ($/year)	ELECTRICAL EMISSIONS (tCO_2e)
All Area Lighting at UTC (Softball field, dog park, etc.)	Bauline Line Lits	2689339	5517	19.86	$1,306.13	0.15
Holy Trinity Flashing Light	Main Rd TrafficLite	668798	1320	4.75	$305.23	0.04
Holy Trinity Amber Light	Pedistrian Lights	670513	600	2.16	$224.10	0.02
Fire Dept Flashing Lights	1288 Torbay Rd TVFD Light	12630117	60	0.22	$163.54	0.00
Gateway Sign	1 Cox Marsh Rd	14913297	1244.38	4.48	$9,067.00	0.03
Streetlights*		1816255	439,344	1,581.64	$202,179.07	11.86
Torbay Xmas Lights		15916570/16360505	2963	10.67	$365.13	0.08
				0.00	$0.00	0.00
*Annual kWh per streetlight estimated using values from NL Power Schedule of Rates, Rules and Regulations II. 3. (Page 17)				0.00	$0.00	0.00
and streetlight inventory provided by NL Power				0.00	$0.00	0.00
				0.00	$0.00	0.00
Note:				0.00	$0.00	0.00
The traffic signals on the Torbay Bypass Road are provinicially owned and are therefore excluded from the corporate inventory				0.00	$0.00	0.00

WATER & WASTEWATER - TREATMENT

Year	2019	
Electricity Emissions Factor (EF)	0.000027	t CO_2e/kWh
EF Source	National Inventory 2020, p. 61, Table A13-2	
Data Source	NL Power Invoices	

TOTAL WATER EMISSIONS (tonnes CO2e/year)	TOTAL WATER ENERGY (GJ/year)	TOTAL WATER COST ($/year)
669.41	872.83	$29,046.88

TYPE	NF Power Account #	VOLUME (m^3/year)	Electrical (kWh/year)	ENERGY (GJ/year)	EMISSIONS CREATED PER VOLUME (tCO2e/m^3)	COST ($/year)	TOTAL EMISSIONS (tCO2e/year)
North Pond Potable Water Treatment Plant (Station Rd Pumphouse)	765610	**	51,552	185.59	#VALUE!	$5,846.16	1.39
Chlorination Plant at South Pond Road	765586		40,258	144.93		$4,652.22	1.09
Wastewater - Ocean Outfall*							52.39
Wastewater - Septic Systems*							610.48

*Calculated according to IPCC 2019 Chapter 6 methodology. Considers 30% of Town population on outfall, 70% on private septic systems

**Meter not installed until mid 2019 so data not yet available

WATER & WASTEWATER - DELIVERY

SITE/PHYSICAL ASSET	NF POWER ACCOUNT NAME	NF POWER ACCOUNT #	ELECTRICAL (kWh/year)	ENERGY (GJ/year)	COST ($/year)	ELECTRICAL EMISSIONS (tCO_2e)
2 Sewage Pumps and Septic Tank (WW)	17 Motion Rd	12106902	9,230	33.23	$1,408.49	0.25
Reddy Dr. Lift Station (WW)	Reddy Dr Lift Stn	766352	7299	26.28	$1,063.71	0.20
Thornes Lane Pumphouse (PW)	Thornes Lane Pumphouse	2135630	102,420	368.71	$11,240.54	2.77
Coppertop Place Lift Station (WW)	Coppertop Pl Lift Stn	2175602	641	2.31	$313.43	0.02
Whitty's Lift Station (Torbay Rd North Lift Station) (WW)	Torbay Road Nrth Lift Stn	3714342	5,351	19.26	$843.60	0.14
Penney Lift station (WW)	214 Marine Dr	5410022	20,600	74.16	$2,863.04	0.56
Torbay Beach Lift Station (WW) - Ocean Outfall Site	Torbay Beach Lftst	7470982	5,102	18.37	$815.69	0.14

SOLID WASTE

Year	2019
GWP (Methane)	28
GWP Source	AR5 (IPCC 5th Assessment, GHGP)
Data Source	T2 Ventures Inc. Waste Management Division
Calculation Method	Methane Comittment Model (PCP Protocol)

TOTAL WASTE EMISSIONS (tonnes CO2e/year)	TOTAL WASTE COST ($/year)
1,412.47	$510,392.90

TYPE	MASS (tonnes)	DEGRADABLE ORGANIC CARBON CONTENT** (DOC) (t carbon/t waste)	METHANE GENERATION POTENTIAL (L_o) (tCH_4/t waste)	COST ($/year)	EMISSIONS (tCO_2e)
Municipal Solid Waste (black bag)	1858.44	0.2	0.08	$125,765.76	1,412.47
Recyclables (blue bag) *	121.6			$2,432.00	
Service fee + HST				$382,195.14	

*Excluded as per PCP Protocol

**DOC for Newfoundland and Labrador via 2020 National Inventory Part 2 - Table A.3.6-4, page 172

APPENDIX B – THE TORBAY CONTEXT

B.1 BEING A LEADER IN CLIMATE ACTION:

The Town of Torbay's commitment to climate action is confirmed by their decision to join a cohort of six municipalities as a partner in the Federation of Canadian Municipalities (FCM) Municipalities for Climate Innovation Program (MCIP) Transition 2050 (T2050) Partnership Grant Initiative. Through this program, Town staff have received training regarding climate science, greenhouse gas emissions mitigation, and climate change adaptation. Torbay is also working with Conservation Corps NL to complete a climate change vulnerability assessment. The plan outlined in this document focuses on climate change mitigation – emissions reductions, energy efficiency and operational cost savings.

Torbay's 2015-2025 Municipal Plan and 2018-2021 Strategic Plan identify the following policy objectives germane to this plan:

- To encourage future growth in a manner that ensures land use compatibility, orderly development and the economic use of municipal services
- To provide municipal services at environmentally acceptable standards
- To manage municipal expenditures with restraint, aiming for maximum return on investment
- To protect natural resources from degradation including water, air, soils, agricultural land, forests and scenic areas
- Continue to promote hobby/small scale farming and the keeping of residential livestock, in line with Torbay's agricultural history
- Determine the most viable, sustainable option to meet federal wastewater treatment obligations
- Develop a Transit Plan, including actions for improved walkability
- To identify hazardous areas prone to landslide and coastal erosion and prohibit development in these areas
- To encourage the multi-functional use of existing community buildings
-

The Town of Torbay became a member of FCMs Partners for Climate Protection (PCP) program in 2020. This document marks the completion of the Milestone 3 requirement.

The Milestones of the PCP Program are as follows:

Milestone 1 – GHG Emissions Inventory
- (see Appendix A)

Milestone 2 – Set Emissions Reductions Target
- (see Appendix B, Section B.4)

- Milestone 3 – Create a Local Climate Action Plan
  - (this document)

Milestone 4 – Implement the Local Action Plan
- One or more projects identified in this document

Milestone 5 – Monitor Progress and Report Results
- Ie. record the changes in the organization and track GHG emissions and project progress annually

The Town intends to achieve Milestone 4 as a result of participating in the FCM Transition 2050 Initiative.

B.2 TOWN CONTEXT

The Town of Torbay is located on the east coast of the Avalon Peninsula in the St. John's Urban Region. Torbay initially developed as a fishing and farming community and in recent years has been increasing in size as a residential community for commuters to St. John's, but strives to retain its rural character. The population is approximately 7,899, housed in approximately 3,005 homes. Growth rates were 6.8% for the 2016 census. The Town has a population density of approximately 226 pers/km^2.

Torbay currently owns and operates the following:

<table>
<tr><th>BUILDING AND FACILITIES</th><th>TRAFFIC LIGHTS + STREET LIGHTS</th><th>WATER AND WASTEWATER CHAMBERS</th></tr>
<tr><td rowspan="2">▪ Fire Hall and Town Hall Building
▪ Old Depot – behind the Town Hall Building (unoccupied)
▪ Camp Carey Building (UTC Pond Park)
▪ Public Works Depot
▪ Recreation Shed
▪ Softball Hut at UTC Pond Park
▪ Clubhouse at UTC Pond Park
▪ History House
▪ Torbay Common</td><td>Area Lights:
▪ Upper Three Corner Pond Park (softball field, dog park, etc.)
Signs:
▪ Gateway Sign
▪ Fire Dept. Flashing Lights
Streetlights
*Traffic lights in the Town are provincially owned and are therefore excluded from the inventory</td><td rowspan="2">▪ North Pond Potable Water Treatment Plant
▪ Chlorination Plant at South Pond
▪ Motion Road pumps and septic tank
▪ Reddy Drive. Lift Station
▪ Thornes Lane Pumphouse
▪ Coppertop Place Lift Station
▪ Torbay Rd North (Whitty's Lift Station)
▪ Penney Lift Station
▪ Torbay Beach Lift Station</td></tr>
<tr><td>FLEET VEHICLES AND EQUIPMENT

▪ Light Duty Vehicles
▪ Heavy Duty Vehicles
▪ Construction Equipment
▪ Snow Clearing
▪ Small equipment, e.g. trimmers, mowers, generators, chainsaws, etc.</td></tr>
</table>

The Town of Torbay owns and operates its own potable water treatment plant at North Pond and a chlorination plant at South Pond, which use electric energy only. The amount of electricity used to treat and deliver the water that is used at Town facilities would be considered Scope 2; however, since the Town has some measure of influence over the water consumption habits of the community as a whole, the emissions related to all water treatment and delivery are included as Scope 3.

30% of the Town is serviced by a municipal sanitary sewer system which discharges into the surrounding ocean waters. The other 70% of residents have private septic systems. Therefore, these percentages of the population of Torbay (2016 census) were used to estimate the associated emissions using IPCC Volume 5 Chapter 6 methodology. These emissions are classified as Scope 3 and are included to illustrate the impact that a comprehensive municipal wastewater system would have on the overall Town emissions. Although the wastewater is generated by the community as a whole, the

Town is responsible for the wastewater treatment methods used, which is the variable that can be controlled to reduce emissions.

All municipal solid waste generated by the Town of Torbay is transported to and processed at Robin Hood Bay Landfill and Recycling Facility. The Robin Hood Bay Waste Management Facility is owned and operated by the City of St. John's. Torbay has no direct control on operation of the Landfill Facility. Solid waste was included in the overall Town GHG emissions inventory as a Scope 3 item – because it is understood that the Town has some measure of influence over the residents' recycling, composting and waste management habits.

All electricity is supplied by Newfoundland Power (NF Power), which purchases electricity from NL Hydro and is generated by a combination of large scale hydro (Churchill Falls), medium scale wind (at St. Lawrence and Fermeuse), and combustion of bunker 'C' fossil fuel at Holyrood Generating Station. In 2022 it is anticipated that Muskrat Falls large scale hydro will be brought online, and Holyrood Generating station will be decommissioned. There is anticipated to be a significant increase in cost of electricity concurrent with a significant decrease in emissions. Newfoundland does not have natural gas infrastructure.

Provincially, Newfoundland and Labrador has released the 'Made in Newfoundland and Labrador Approach to Carbon Pricing' which outlines the provincial approach to emissions reduction programs and carbon pricing. Municipalities are exempt from the carbon tax, and are not required to participate in the cap and trade system of large industry regulated by the *Management of GHG Act*.

Specifically for the context of this project, the Town is among a cohort of five other communities spanning across the island of Newfoundland. Although each community will address their specific needs, there is a desire among the partner communities to leverage the benefits of participating in a joint capacity and building towards a greater cumulative impact.

B.3 RISK AND OPPORTUNITY ANALYSIS:

To arrive at the targeted GHG emissions reduction recommendations, the T2050 consultant, in coordination with Town Staff, conducted an iterative Risk and Opportunities Analysis to identify key projects which would simultaneously optimize for the criteria shown in Figure 1.

To develop data with which to evaluate each of these criteria for the five municipal emissions categories, the following research was undertaken:

1. Benchmarking exercise for select Town owned and operated building assets (in GJ/m2 and compared against National Energy Use Database (NEUD) data for buildings of similar use categories in similar climates). See Table B.3 - 1.
2. Research on emissions reductions options for each of the five municipal categories – based on the expertise of the staff person and available case studies for similar context and size of municipality. See Table B.3 - 2.
3. Inventory of existing City initiatives. See Table B.3 - 3.
4. Research into existing (and expected) funding programs and available grid-connection opportunities. See Table B.3 - 4.

TABLE B.3 - 1 – BENCHMARKING OF CITY OWNED AND OPERATED BUILDINGS (SELECT BUILDINGS SHOWN)

BUILDING NAME	Building EUI	Canadian Average	Atlantic Average	Above Average (+) Below Average (-)
	GJ/m2	GJ/m2	GJ/m2	+/-
History House	1.02	1.19	0.99	+/-
Old Depot	1.04	0.82	0.83	+
Public Works Depot	1.33	0.82	0.83	+
Fire and Town Hall	1.00	1.16	0.96	+/-
Torbay Common	0.38	1.19	0.99	-

TABLE B.3 - 2 – EMISSIONS REDUCTIONS RESEARCH – KEY OPTIONS

FLEET – ▪ Driver training ▪ Vehicle and Equipment Improvement (installation of specific technologies e.g. driver awareness gauges, oil recycling filters, anti-idling tech) ▪ Replacement with electric and/or PHEV (good quality used but in-warranty electric vehicles are available locally) – update procurement policy ▪ Carpooling programs (corporate/internal or community-wide) ▪ Public transit system – explore micro-transit systems and technologies	BUILDNGS AND FACILITIES – ▪ Fuel switching (furnace oil) ▪ Energy efficiency through e.g. long term improvements and integration of capital asset management strategy ▪ Energy efficiency through building commissioning and improved controls ▪ Renewable energy installations	WATER AND WASTEWATER – ▪ Water conservation campaigns – public programs and internal to the organization ▪ Water metering – residential and/or commercial ▪ Leak detection of water sewer infrastructure ▪ Eco-asset management low-impact development strategies
STREET LIGHTS AND TRAFFIC SIGNALS – ▪ LED street lights and traffic signals ▪ Solar street lights and traffic signals ▪ Replacement over the long term with traffic circles	MUNICIPAL SOLID WASTE – ▪ Composting programs ▪ Recycling programs ▪ Support of locally grown and sold, e.g. farmer's markets (less packaging) ▪ Support of re-usable bags/bins programs ▪ Ban single-use plastics ▪ Increased municipal taxes for garbage beyond a limit ▪ Community Free Store	OTHER – ▪ Improved public transit and walkability ▪ Land Use Mapping ▪ Green roofs ▪ Car Free Zones ▪ Food security initiatives

TABLE B.3 - 3 - EXISTING CITY INITIATIVES

SOLID WASTE • Curbside recycling offered • Public education campaign in 2018 • Green Depot available in the community for drop-off of recyclable beverage containers • Participates in the Backyard Compost Bin Distribution Program offered by MMSB (Multi-Materials Stewardship Board) • Torbay 30 Minute Cleanup day hosted in May whereby residents and businesses are encouraged to clean up neighbourhoods and public spaces. Gloves and bags provided	CLIMATE CHANGE VULNERABILITY • Working with Conservation Corps NL to complete a climate change vulnerability assessment

WETLAND CONSERVATION • Member of the Municipal Wetland Stewardship Agreement since 1997; Habitat Management Plan included in 2015-2025 Municipal Plan	FLEET • EV charging station installed at the Town Hall • Procurement policy for vehicles and equipment considers life cycle and fuel efficiency
ENERGY EFFICIENCY ▪ As part of the Town Hall renovation, the Town upgraded lights to LEDs, increased insulation in select exterior sections of the building, and added attic insulation above the Council Chambers	ORGANIZATIONAL • Environmental Advisory Committee in place

TABLE B.3 - 4 – FUNDING AND FINANCIAL OPPORTUNITIES

FLEET – ▪ NRCan SmartDriver in the City Course ▪ LCELF Freight Transportation Fuel Efficiency Program ▪ FCM GMF – Reduce fossil fuel use in fleets ▪ FCM GMF – Transportation networks and commuting options ▪ ICIP – Public Transit ▪ NRCan – ZEVIP (Zero Emission Vehicle Infrastructure Program)	BUILDNGS AND FACILITIES – ▪ NL Power – Net Metering ▪ FCM GMF – Retrofit of municipal facilities ▪ FCM GMF – New construction of energy-efficient facilities ▪ FCM GMF – Energy recovery or district energy ▪ Take Charge NL Town Challenge ▪ Take Charge NL Business Efficiency Program	WATER AND WASTEWATER – ▪ FCM GMF – Stormwater quality ▪ FCM GMF – Wastewater systems ▪ FCM GMF – Water Conservation ▪ FCM GMF – Septic wastewater systems ▪ MCW
STREET LIGHTS AND TRAFFIC SIGNALS – ▪ NF Power Pilot projects	MUNICIPAL SOLID WASTE – ▪ MMSB – Community Waste Diversion Fund ▪ MMSB – Backyard Composting Bin Distribution Program ▪ FCM GMF – Waste Diversion ▪ FCM GMF – Waste stream management	OTHER – ▪ ACOA – Innovative Communities Fund (ICF) ▪ ACOA – Canadian Experiences Fund (CEF) ▪ Local Food Infrastructure Fund ▪ FCM GMF – Signature Initiative ▪ FCM GMF – Brownfield site redevelopment ▪ FCM GMF – Renewable energy production on a brownfield ▪ ICIP – Green Infrastructure ▪ MCW ▪ Community Healthy Living Fund

B.4 GHG EMISSIONS REDUCTION TARGETS

Via the risk and opportunities analysis described herein and the resulting Climate Action Plan; Town emissions projections and project reduction estimations; the realities of climate science; and international, national, and provincial commitments, the Town of Torbay has adopted the following GHG emissions reduction targets:

- ➔ 3-7% below 2018 levels by 2023
- ➔ 30-45% below 2018 levels by 2030
- ➔ Net-zero by 2050

The actions that will contribute to the achievement of these targets are outlined by emissions category in Section B.4. While a bottom-up approach was taken to ensure the targets are achievable, an expanded target range was specified to ensure sufficient ambition – reflecting the urgency of the climate crisis and striving toward the reductions scientifically required to limit global warming to 1.5°C.

Actions beyond 2030 required to reach the net-zero goal by 2050 will be determined upon periodic review of this plan and assessment of opportunities (at least every 3 years). Progress toward achieving these reduction targets will be monitored annually. The targets may be modified at any time to reflect economic, political, technological, or social circumstances.

The actions identified for the 2023 and 2030 time periods are expected to result in annual cost savings[1] for the Town of $43,400 and $163,700, respectively, compared to the 2018 baseline year.

[1] Considering current electricity and fuel prices. Due to the uncertainty associated with projecting these costs, the annual savings estimated are a conservative estimate. The annual savings are cumulative – the 2030 savings amount includes the 2023 savings as the annual savings are continuous

By 2023

Project	Potential Annual GHG Change (- or +)	Potential Annual $ Change (- or +)	Assumptions	Category % GHG Change from Baseline	Total % GHG Change from Baseline
Buildings & Facilities					
Solar PV Installation at Town Hall - Phase 1	-0.40	-$1,757.01	Use of $36K T2050 funds	-0.66	-0.02
Public Works Depot Energy Efficiency	-3.75	-$12,953.80	Rough estimate	-6.23	-0.16
Solar PV Installation at Town Hall - Phase 2	-0.12	-$526.13	12 more panels can be installed for ~$7,500	-0.20	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
Current change from baseline	-9.38			-15.57	-0.40
Category Total				**-22.66**	
Fleet - Vehicles & Equipment					
Efficient Driver Training	-45.02	-$20,939.82	20% efficiency improvement	-20.00	-1.90
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
Current change from baseline	16.5			7.35	0.70
Category Total				**-12.65**	
Streetlights & Traffic Signals					
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
Current change from baseline	0.15			1.21	0.01
Category Total				**1.21**	
Water & Wastewater					
Water Conservation Policy	-33.51	-$1,490.25	Reduce treated volumes by 5%	-5.00	-1.41
Leak Detection & Repair	-33.51	-$1,490.25	Reduce treated volumes by 5%	-5.00	-1.41
Expected Change in Volumes	13.40	$596.10	ie. 2% due to population growth	2.00	0.57
				0.00	0.00
				0.00	0.00
Current change from baseline	-0.7			-0.10	-0.03
Category Total				**-8.10**	
Solid Waste					
				0.00	0.00
Increase Recycling Rates	-67.6	-$4,242.63	Increase baseline recycling rate by 80% to reach about 10% of total MSW being recycled	-4.82	-2.85
Expected Change in MSW	28.1	$10,185.80	ie. 2% due to population growth	2.00	1.18
				0.00	0.00
				0.00	0.00
Current change from baseline	8.89			0.63	0.38
Category Total				**-2.19**	
TOTAL CHANGE FROM BASELINE					**-5.35**
TOTAL COST SAVINGS		**-$43,399.89**	*Does not include additional (positive) costs due to growth		

By 2030

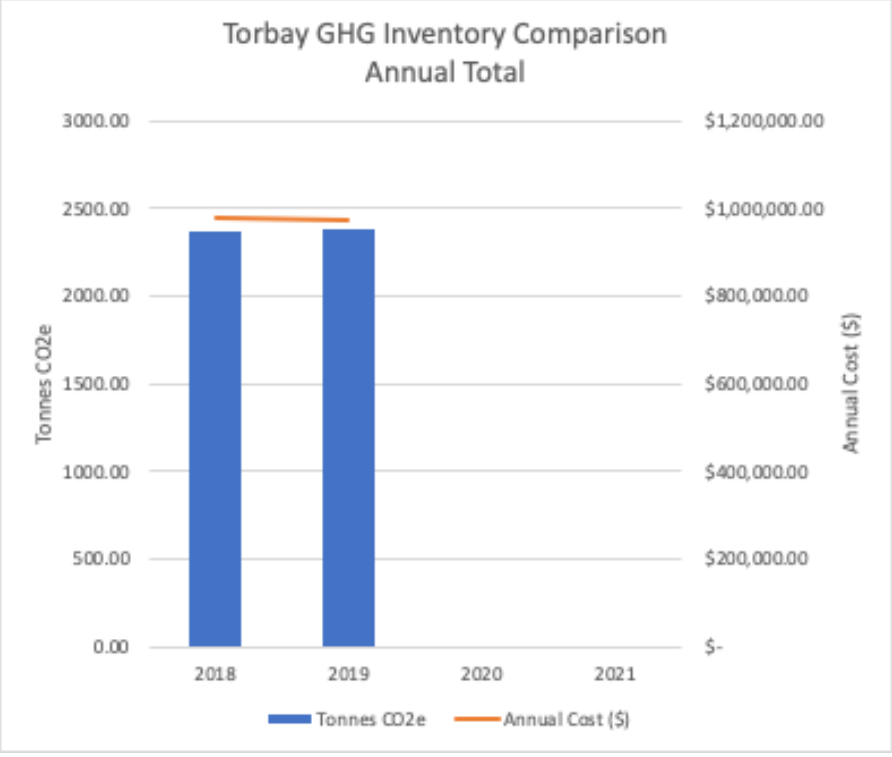
Project	Potential GHG Change	Potential $ Change	Assumptions	Category % GHG Change from Baseline	Total % GHG Change from Baseline
Buildings & Facilities					
History House Fuel Switching	-15.85	$592.62	Cost of electricty and fuel stay the same	-26.32	-0.67
Solar PV Installation at Town Hall - Phase 3 (net Zero)	-4.31	-$19,134.47	Likely would need to include wind turbine to reach net zero	-7.15	-0.18
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
Category Total + previous period				**-56.13**	
Fleet - Vehicles & Equipment					
Electrification of Fleet + increased efficiency	-56.27	-$26,174.78	25% fuel reduction	-25.00	-2.37
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
Category Total + previous period				**-37.65**	
Streetlights & Traffic Signals					
LED Upgrades	-1.0	-$16,039.51	10% existing streelights replaced with LEDs (80% more efficient)	-8.00	-0.04
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
				0.00	0.00
Category Total + previous period				**-6.79**	
Water & Wastewater					
Commerical Water Metering	-33.51	-$1,490.25	Reduce treated volumes by an additional 5%	-5.00	-1.41
Leak Detection & Repair	-33.51	-$1,490.25	Reduce treated volumes by an additional 5%	-5.00	-1.41
Expected Change in Volumes	13.40	$596.10	ie. An additional 2% due to population growth	2.00	0.57
				0.00	0.00
				0.00	0.00
				0.00	0.00
Category Total + previous period				**-16.10**	
Solid Waste					
Community Composting Phase 2	-345.2	-$30,735.16	Organic waste of entire community diverted from landfill (target 2030)	-24.59	-14.56
Increase Recycling Rates	-232.5	-$14,584.04	Increase baseline recycling rate by an additional 275%, reaching about 25% of MSW being recycled	-16.57	-9.81
Expected Change in MSW	28.1	$10,185.80	ie. An additional 2% due to population growth	2.00	1.18
Community Composting Phase 1	-119	-$10,619.86	ie. Purchase of Novid 542 composting machine (target 2030)	-8.50	-5.03
				0.00	0.00
				0.00	0.00
Category Total + previous period				**-49.84**	
TOTAL CHANGE FROM BASELINE + previous period					**-39.09**
TOTAL COST SAVINGS + previous period		**-$163,668.22**	*Does not include additional (positive) costs due to growth		

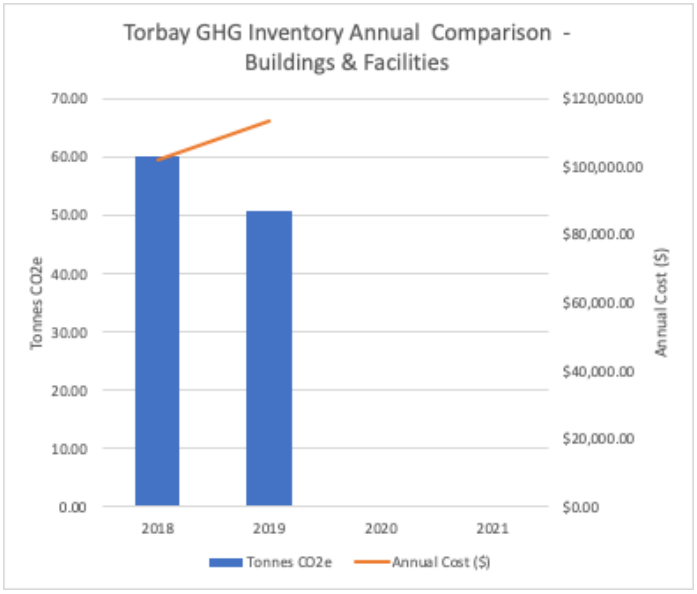
B.5 GHG EMISSIONS REDUCTIONS TO DATE

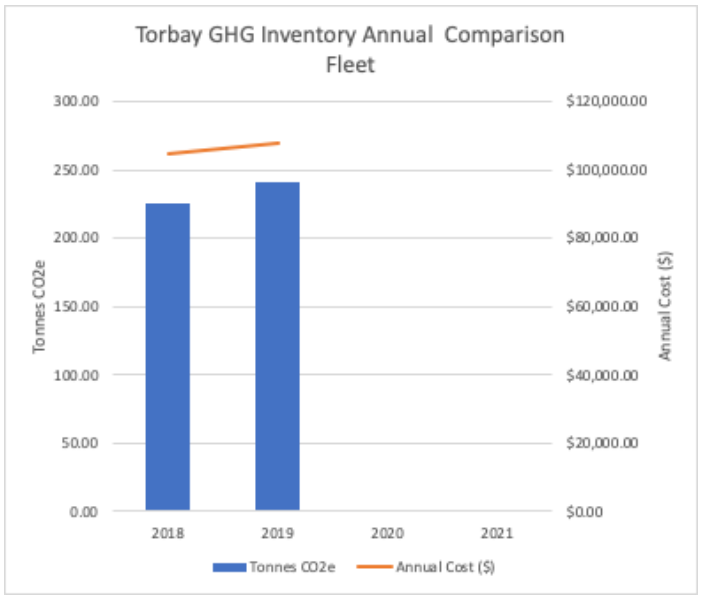
The Town of Torbay has completed GHG inventories for the years 2018 and 2019. 2018 is taken as the baseline year. Compared to the 2018 baseline, the Town of Torbay's 2019 corporate emissions have changed by the following amounts in each category:

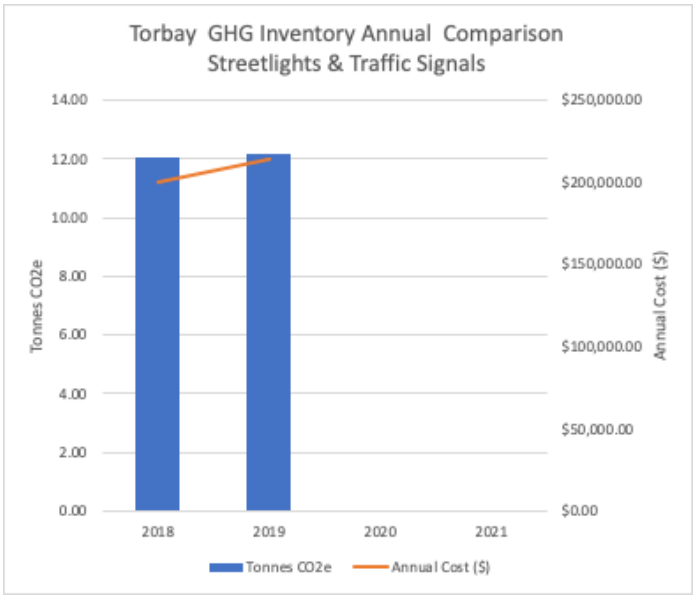
BUILDINGS AND FACILITIES	TRAFFIC LIGHTS AND STREET LIGHTS	WATER AND WASTEWATER	FLEET, VEHICLES AND EQUIPMENT	SOLID WASTE
- 15.6% **- 9.38 tCO2e**	**+ 1.2%** **+ 0.15 tCO2e**	**- 0.1%** **- 0.7 tCO2e**	**+ 7.3%** **+16.54 tCO2e**	**+ 0.6%** **+ 8.89 tCO2e**
ISO – Scope 2	ISO – Scope 2	ISO – Scope 2	ISO – Scope 1	ISO – Scope 3

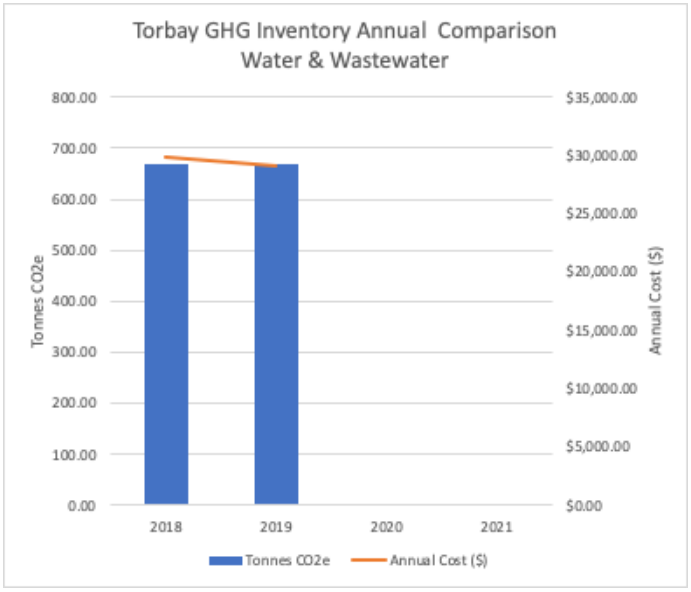
Compared to the baseline year of 2018, the Town of Torbay's 2019 corporate GHG emissions have increased by **15.5 tCO2e** or **0.7%** overall. The reduction in the building sector is primarily due to a reduction in furnace oil use at the History House and Old Depot – overall electricity use across the building portfolio was near constant. Both gasoline and diesel amounts increased moderately. The overall amount of solid waste produced in the community increased by just over 1%, but the proportion that was recycled increased slightly compared to 2018 – from a 5.7% diversion rate to 6.1%. The cost of electricity increased in October of 2018.

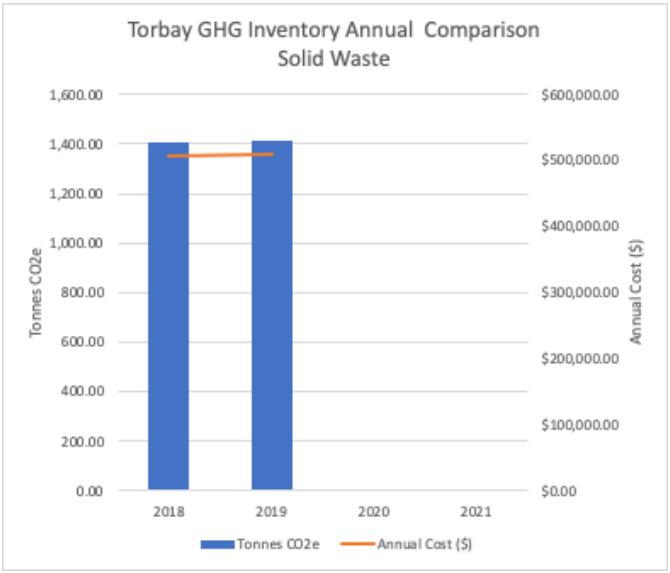



Torbay GHG Inventory Annual Comparison - Buildings & Facilities
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Tonnes CO2e
$120,000.00
$100,000.00
$80,000.00
$60,000.00
$40,000.00
$20,000.00
$0.00
Annual Cost ($)
2018
2019
2020
2021
Tonnes CO2e
Annual Cost ($)


Torbay GHG Inventory Annual Comparison Fleet
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Tonnes CO2e
$120,000.00
$100,000.00
$80,000.00
$60,000.00
$40,000.00
$20,000.00
$0.00
Annual Cost ($)
2018
2019
2020
2021
Tonnes CO2e
Annual Cost ($)


Torbay GHG Inventory Annual Comparison Streetlights & Traffic Signals
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Tonnes CO2e
$250,000.00
$200,000.00
$150,000.00
$100,000.00
$50,000.00
$0.00
Annual Cost ($)
2018
2019
2020
2021
Tonnes CO2e
Annual Cost ($)


Torbay GHG Inventory Annual Comparison Water & Wastewater
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Tonnes CO2e
$35,000.00
$30,000.00
$25,000.00
$20,000.00
$15,000.00
$10,000.00
$5,000.00
$0.00
Annual Cost ($)
2018
2019
2020
2021
Tonnes CO2e
Annual Cost ($)


Torbay GHG Inventory Annual Comparison Solid Waste
1,600.00
1,400.00
1,200.00
1,000.00
800.00
600.00
400.00
200.00
0.00
Tonnes CO2e
$600,000.00
$500,000.00
$400,000.00
$300,000.00
$200,000.00
$100,000.00
$0.00
Annual Cost ($)
2018
2019
2020
2021
Tonnes CO2e
Annual Cost ($)

APPENDIX C – CLIMATE SCIENCE

Climate change refers to a change in weather patterns over a long period of time. A defining characteristic of climate change is an increase in the global average air temperature, termed global warming. The climate change that we are experiencing today is occurring at a rate unprecedented in geological history, and scientists are virtually certain that it has been caused by human activity (primarily the burning of fossil fuels and land use). This is evident in the correlation between atmospheric carbon dioxide concentrations (currently at the highest level experienced in millions of years) and global average temperature. This change in our atmospheric composition has and will affect the climate in different parts of the world differently. Extreme temperatures and precipitation; weather events such as floods, droughts, wildfires, and hurricanes; sea level rise, ocean acidification, and biodiversity loss are observed changes that are projected to continue and intensify for centuries to come. The degree to which these changes occur is now up to us.

The Intergovernmental Panel on Climate Change (IPCC)[1] is the United Nations body for assessing the science related to climate change. They provide policymakers with knowledge and guidance regarding climate change projections, implications and potential future risks, as well as adaptation and mitigation options. The 5th assessment report released in 2013 is the most recent extensive climate analysis. The 6th assessment report is expected in 2022.

The United Nations Framework Convention of Climate Change (UNFCCC or UN Climate Change)[2] is the entity tasked with supporting the response to the threat of climate change, based on the IPCC scientific assessments. The UNFCCC is the parent treaty of the Paris Agreement of 2015 and the Kyoto Protocol of 1997. The objective of each of these global agreements is to "stabilize greenhouse gas (GHG) concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system, in a time frame which allows ecosystems to adapt naturally and enables sustainable development".

The IPCC released a special report in October 2018 titled "Global Warming of 1.5°C". A 1.5°C increase in global average temperature above pre-industrial levels is considered a critical threshold beyond which the impacts of climate change on ecosystems and society will be far more significant. The report describes how a jump from 1.5°C to 2°C may be the difference between the ability and inability to adapt. Human activities are estimated to have already increased global average temperature by 0.8°C to 1.2°C above pre-industrial levels (as of 2018). At current emissions levels, we are on track to exceed 2°C of warming, reaching as high as 4°C by 2100 if climate policies do not become more ambitious.

To avoid warming beyond 1.5°C, the IPCC states that global net GHG emissions must decline by about 45% from 2010 levels by 2030, reaching net zero emissions around 2050. To limit warming below 2°C, emissions must decline by 25% by 2030 and reach net zero by 2070. These scientifically determined pathways must guide the emissions reduction targets of countries, municipalities, and organizations alike in order to prevent unmanageable global climate change.

Canada, as a signatory of the Paris Agreement, has committed to reducing GHG emissions by 30% below 2005 levels by 2030 and achieving net-zero by 2050. Newfoundland and Labrador has aligned with this federal target. Municipalities in Newfoundland and Labrador and across Canada must play their part as members of the global community to ensure a liveable, equitable, and sustainable future for all.

[1] https://www.ipcc.ch/

[2] https://unfccc.int/