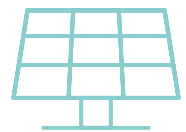


Truro Community Energy and Emissions Plan

prepared for the Town of Truro
September 2024



Mayor's Message

On behalf of Truro Town Council and the entire community, I'm excited to unveil Truro's Community Energy and Emissions Plan.

Across the globe, our communities are increasingly feeling the effects of climate change. The pressure is mounting, and it's crucial that we act swiftly. We must significantly cut our greenhouse gas emissions and rethink our approaches to tackle these challenges.

Our actions must involve shifting to more sustainable energy production and consumption, reimagining our transportation methods, ensuring our community's growth is both sustainable and minimal in its environmental impact, innovating in waste management, and maintaining our infrastructure to keep our air and environment clean.

Our new Community Energy and Emissions Plan is our first detailed strategy for achieving net-zero emissions.

It's essential that we collaborate with our community, as well as regional, provincial, and federal partners, to adopt cutting-edge solutions for combating climate change. This plan details our shared emissions and outlines the necessary community actions to reduce them. These targets cannot be met by the Town alone.

Now is the time for us to unite and seize the opportunity to reach net-zero. As you'll see in this plan, working together to meet these targets will not only mitigate the effects of climate change but will also enhance the vitality of our community, economy, resiliency, and our collective future.

I extend my gratitude to the Town's Climate Sustainability Stakeholder Group for their guidance on this plan, and to the many residents who contributed to its development. Thanks also to our Town Council and staff for their dedication in supporting and shaping this initiative. Most importantly, I appreciate everyone who will now join us in taking action.



WR (Bill) Mills
Mayor
Town of Truro

Acknowledgments



LAND ACKNOWLEDGMENT

The Town of Truro acknowledges our Indigenous peoples' past, present, and future as the rightful and traditional protectors and caretakers of this land as we sit in the ancestral and unceded territory of the Mi'kmaq People. We recognize that we must help protect and steward our lands to show our respect and gratitude. This land is governed by the treaties of Peace and Friendship and we recognize that we are all treaty people and have responsibilities to each other and this land.

We will use this Community Energy and Emissions Plan to continue our work and engagement in Mi'kma'ki, and further our work of truth, reconciliation, and equity.

PROJECT TEAM

This report was developed under the leadership of Truro Town Council, with funding provided by the Town of Truro and the Nova Scotia Department of Environment, Low Carbon Communities Program.

The Town of Truro's Climate Sustainability Committee was created to provide guidance and oversight through creation and development of the CEEP. Members of the Climate Sustainability Committee included Town Councillors, industry and organizational members, representatives from adjacent local governments, residents, and Town staff members.

On behalf of the Town of Truro, the project team would like to thank all groups, organizations, businesses and individuals who participated in the project's community engagement strategy, as well as those who answered or distributed the project's engagement survey.

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How to Read this Plan

Truro's Community Energy and Emissions Plan (CEEP) provides an overall strategic direction for community energy and emissions reductions and outlines the scale of efforts needed to make meaningful change. The CEEP presents one feasible pathway to achieve ambitious change within the Town of Truro over the next 10 years, with **recognition** that the municipality will need to be prepared to act dynamically as new opportunities and technologies emerge in the coming years. The content of the plan is divided into three main parts:

Part One: Introduction

Introduces Truro's local context, the CEEP development process, and energy and emissions targets for 2035, 2040 and 2050.

Part Two: Truro's Goals and Actions

Provides discussion and details on the CEEP's 6 goals and 26 actions.

Part Three: Truro's 10 Year Plan

Details how Truro will move from planning to implementing the CEEP.

Abbreviations

CH₄ - Methane

CO₂ - Carbon dioxide

CO₂e - Carbon Dioxide Equivalent

BAU - Business as Usual

GHG - Greenhouse Gas

GWP - Global warming potential

EV - Electric Vehicle

NZE - Net Zero Energy

NZER - Net Zero Energy Ready

PPA -Power Purchase Agreement

PV - Photovoltaic

VKT - Vehicle kilometers travelled

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Part 1: Introduction

1.1 What is a Community Energy and Emissions Plan?

A Community Energy and Emissions Plan (CEEP) is a strategic tool that helps municipalities measure, identify, prioritize and manage local energy use and greenhouse gas (GHG) emissions, while also stimulating economic development. CEEPs typically outline a vision, goals, and specific actions aimed at improving energy efficiency, increasing the use of renewable energy, and reducing overall GHG emissions in various sectors, such as residential, commercial, transportation, and municipal operations¹.

A CEEP is a critical step for local governments to take to address the challenges of climate change, enhance sustainability, and improve the quality of life for their communities. It provides a clear roadmap for transitioning to a low-carbon future, aligning local efforts with broader environmental and economic goals. This is intended to be a living document, with the expectation that Truro will modify the goals, plans and actions as needed to adapt to evolving circumstances over time.

1.2 The Partners for Climate Protection Program

The Partners for Climate Protection (PCP) program is a national network of over 400 municipalities with the shared goal of acting to mitigate and adapt to a rapidly changing climate while reducing local greenhouse gas emissions. The program is managed and delivered by the Federation of Canadian Municipalities (FCM) and Local Governments for Sustainability Canada (ICLEI Canada). The PCP program guides municipalities through a five-step milestone framework to help develop and implement local action plans. The five milestones are:

1. Creating A Baseline Emissions Inventory
2. Set Emissions Reduction Targets
3. Developing a Local Climate Action Plan
4. Implementing a Local Climate Action Plan
5. Monitoring and Reporting Results

In 2021, the Town of Truro made a commitment to climate action by becoming a member of Partners for Climate Protection (PCP) Program.

1.3 Local Impacts of Climate Change

Nova Scotia's climate is changing. Greenhouse gases released into the atmosphere as a result of human activity have built up in the atmosphere over hundreds of years, leading to rapidly

¹ (Partners for Climate Protection Program, 2024)

rising global temperatures and changing weather patterns. Some of these effects will continue to escalate for decades. If global greenhouse gas emissions continue to increase, our climate will continue to change in various ways, some of which are outlined below:

- **It will continue to get warmer.** June 2024 was the warmest June in recorded history, the 13th consecutive month the global temperature average record was broken². Average temperatures year-round will continue to reach higher temperatures than they are now. There will be more extremely hot days and longer heat waves.
- **Precipitation patterns will change.** We will see more annual rainfall, and it will fall more often in severe rain events. In the summer of 2023, Nova Scotia saw numerous flash flooding events as many areas saw double or triple their average rainfall amounts³. We will see less snow in the winter, which will mean less snowpack to recharge natural water systems. This leads to increased risk of forest fires, as was also the case in 2023, as Nova Scotia suffered devastating wildfires, with 220 fires burning approximately 25,000 hectares of land⁴.
- **Storms will be more frequent and severe.** Atlantic Canada will be hit harder and more often by tropical storms and hurricanes, which feature high-speed winds and storm surge events. Truro knows this all too well, as post-tropical storm Fiona caused severe damage to both the natural and built environment in fall 2022⁵.
- **Sea levels will rise, and flooding events will get worse.** Coastal communities will be more severely impacted by rising sea levels. Due to its location adjacent to Salmon River and proximity to the Bay of Fundy, Truro is subject to flooding at one of the highest frequencies of any developed area in Atlantic Canada⁶. Historical flooding in Truro has occurred due to heavy rainfall, snow melt, ice jams, high tides, and storm surge. As a result of the climate change impacts noted above, both the risks and potential impacts of flooding are expected to increase over time.

Similar to Nova Scotia climate modelling, Truro specific details show an increase in annual temperatures, more precipitation overall and in heavier events, and increase in evapotranspiration (conditions for periodic dryness, and more high winds). Given the location of Truro, flooding has been an ongoing issue and is projected to worsen. Further details on projected climate impacts to Truro have been provided by ClimAtlantic and can be found in Appendix B.

Climate action, energy efficiency and GHG emissions reductions also align with Truro's broader commitments to sustainable community development. In 2010, the Town of Truro launched a Community Sustainability Plan and adopted a Sustainability Charter. The vision statement for a

² (Climate.gov, 2024)

³ (CBC News, 2023)

⁴ (Nova Scotia Department of Natural Resources and Renewables, 2023)

⁵ (CBCL, 2016)

⁶ (CBCL, 2016)

sustainable Truro was developed in consultation with the citizens of the Town: *Truro is a just and vibrant community with a thriving economy and sustainable environment.*

Truro Town Council approved a new Community Plan in 2023, after an extensive community engagement process. Truro's Community Plan identifies sixteen Community Goals to form the framework for policies and strategic priorities of the Town of Truro:



In 2024, Truro embarked on completing the first three Milestones of the PCP Program: creating a baseline greenhouse gas (GHG) Inventory, setting emissions reduction targets, and the development of a local climate action plan.

1.4 Truro's Local Context

Truro is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People, and is subject to the Treaties of Peace and Friendship. Geographically located in central Nova Scotia, Truro serves as a key hub for the province. The 37.52 km² town is situated at the head of Cobequid Bay, part of the Bay of Fundy, and lies at the junction of major transportation routes, including highways and rail lines. The surrounding area is characterized by the fertile farmlands of the Annapolis Valley to the west and the Cobequid Mountains to the north, with the Salmon River running through the town.

Truro is often referred to as the "Hub of Nova Scotia" due to its central location and significance as a transportation and commercial center. The town has a rich history, with roots in the Mi'kmaq First Nation, and later, European settlement. In the broader context of Nova Scotia, Truro plays a crucial role as a regional service center, providing education, healthcare, and retail services to surrounding communities. It maintains strong ties to rural Nova Scotia while also adapting to the changing economic landscape, with efforts to attract new businesses and industries.

As of 2021, Truro had a census population of 12,954 residents (13,875 including Millbrook First Nation). The Town has made active efforts to increase density, with the number of people per square kilometer increasing from 320.5 to 345.3 between 2011 and 2021. Over that same period, the average annual population increased by 0.74% per year (approximately 96 people per year). Between 2016 and 2021 the Town grew by 5.7% while the greater Truro-Colchester region grew by 0.9%. These figures indicate that most of the recent growth in the area has been concentrated in the urban core of Truro. The number of private dwellings in Truro increased by almost 400 units, or 6.3 % from 2011 to 2021, rising from 6,263 dwellings in 2011 to 6,658 dwellings in 2021⁷.

Truro's Natural Environment

Truro is located in the flood plain of the Salmon River which feeds the Bay of Fundy. With the arrival of European settlers, large areas were dyked for agriculture and housing. Because of its location and land changes flooding is an ongoing issue⁸. Projects such as the Onslow-North River Managed Dyke Realignment and Tidal Wetland Restoration Project (Onslow-North River project) are underway to restore wetland areas⁹

Lepper Brook watershed provides surface drinking water to the Town and habitat for a number of species. The system drains through Victoria Park, a natural woodland park that covers roughly 3,000 acres¹⁰. In addition to Victoria Park, Truro has several smaller parks, gardens, green spaces, and deciduous and coniferous trees throughout the community. The devastation of many old trees from recent hurricanes was a topic raised by community members in engagement sessions. Truro's Civic Square on Prince Street and the King Street Community Garden are examples of public green space that was developed at the request of the broader community.

Truro has a municipal Tree Committee, and a full-time Urban Forestry Coordinator. The Tree Committee coordinates the Town's annual tree planting program and is responsible for tree protection, preservation and new planting.

Energy and Facility Renewal Project

In 2019, the Town of Truro launched an energy performance contract (EPC) that aligned with its commitment to climate action and sustainability. The Project was developed in partnership with Honeywell, with goals to address energy consumption, deferred maintenance, and greenhouse gas (GHG) emissions within Town-owned buildings. Completed in 2022, this project has advanced Truro's efforts to reduce its environmental impact.

The Town is expected to reduce its CO₂ emissions by 452 tonnes annually. These upgrades contribute to climate change mitigation and enhance the operational efficiency of the Town's facilities. One of the notable aspects of the project was its inclusion of the Rath Eastlink

⁷ [2021 Census of Population, Truro \(Town\)](#)

⁸ (Parker, 2019)

⁹ (Changing Climate, 2021)

¹⁰ (Town of Truro, 2024)

Community Centre, a cost-shared endeavor with the Municipality of the County of Colchester. The collaborative nature of this effort is a successful demonstration of regional cooperation and commitment to sustainability.

The Town's investment of \$2 million is backed by guaranteed savings over 25 years¹¹, with energy savings guaranteed to cover the cost of the upgrades over their lifespan. A portion of the funding for this project came through the Green Municipal Fund's Community Building Retrofit Initiative, supported by FCM, reinforcing the alignment between Truro's local goals and national funding for green infrastructure.

This project aligns closely with Truro's CEEP, which outlines the Town's long-term strategy for reducing emissions, improving energy resilience, and fostering sustainable community growth.

Land Use Planning

For nearly 20 years, Truro has been encouraging intensification and new development to accommodate new growth without adding new infrastructure costs for roads, water and wastewater management. In 2023, Truro released its new Community Plan¹², an integrated plan which includes the Community Sustainability Plan, the Municipal Planning Strategy, and the Land Use Bylaw. The Community Plan was formed after a community consultation process¹³, and builds upon past success in creating complete neighbourhoods for Town residents.

The Community Plan was built around four priority areas which guided its development: Fiscal Stewardship, Ecological Stewardship, Designed Growth, and Community Wellbeing. Through new development, redevelopment, and infill, Council wishes to foster a variety of Downtown housing choices supporting a critical mass of people from diverse backgrounds to ensure that all residents can access central spaces, share ideas, and pursue opportunities. The CEEP has been aligned with these priorities.

Land use planning and regulations are powerful tools for municipal climate action. Since transportation and building energy use are the two largest sources of community emissions, municipal planners can play central roles in CEEPs by incentivizing developments that target both density and connectivity. Development plans should aim to make a variety of lower emissions transportation options viable while creating compact development patterns that lead to efficient use of existing infrastructure. These activities act as "multipliers" for climate actions, making public transit and active transportation systems more accessible and effective, and facilitate the development of renewable energy systems at a community level¹⁴.

Creating compact, mixed-use neighborhoods with multiple services in proximity to each other helps encourage walking, expansion of active transportation networks and creation of efficient

¹¹ (Town of Truro, 2024)

¹² (Municipality of the Town of Truro, 2023)

¹³ (Municipality of the Town of Truro, 2021)

¹⁴ (Province of Manitoba, 2024)

transit routes. When buildings are close to each other, heating and cooling sources can be shared, reducing overall community energy use.

Active Transportation Master Plan

Truro recently completed its Active Transportation Master Plan, which lays out the vision for expanded multi-modal connectivity between Truro, Millbrook, Bible Hill, and other nearby communities. The active transportation network will connect neighbours, neighbourhoods, the town and the region overall, while supporting wellness through activity, facilitating connection to natural and cultural assets while providing the foundation for the Town's evolving growth¹⁵.

Climate Sustainability Committee

Truro's Climate Sustainability Committee was formed to advise the Town of Truro by providing guidance on the development of the CEEP and will be engaged to monitor implementation and progress of the CEEP moving forward. The Committee consists of local community members and leaders from diverse backgrounds who can provide a local perspective on climate action while giving due consideration to the balance between social, environmental and economic aspects of climate action.

Community Climate Capacity Program

Truro is actively participating in Clean Foundation's Community Climate Capacity (CCC) program, which provides communities with a dedicated staff of specialists who can help guide them through climate and sustainability initiatives at the local level. Funded by the Nova Scotia Department of Environment and Climate Change, the CCC program helps municipalities with policy and planning initiatives and helps implement local adaptation and mitigation actions. Clean Foundation were actively involved in the development of the CEEP and will support its implementation moving forward.

Net-Zero Communities Accelerator Program

In August 2024, it was announced that Truro will be one of 15 Atlantic Canadian Communities participating in QUEST Canada's Net-Zero Communities Accelerator (NCA) program¹⁶. The NCA program is funded through a \$2 million contribution from Atlantic Canada Opportunities Agency (ACOA) and will equip participating communities with the knowledge necessary to develop and continuously implement their energy and emissions plans over the next three years.

Truro's participation in this program will help jumpstart the implementation of the CEEP, as the Town moves from planning to implementation. The NCA will provide supports to help Truro embed the CEEP into its municipal operations and continue conversations with important partners and the broader community to accelerate Truro's transition to net zero.

¹⁵ (Town of Truro, 2023)

¹⁶ (Atlantic Canada Opportunities Agency (ACOA), 2024)

1.5 Climate Action at All Levels

International Action

Climate change is a global emergency that requires actions on a global scale. In 2015, world leaders signed The Paris Agreement¹⁷, a legally binding international treaty committing all countries to work together to take action to reduce their impact on climate change and adapt to changing climate conditions. The overarching long-term climate mitigation goal established in the Paris Agreement is to hold global temperature increase to well below 2°C above pre-industrial levels and pursue efforts to limit it to 1.5°C above pre-industrial levels. This science-based target aims to reduce the worst projected impacts from global warming.

Federal Action

Canada's response to the Paris Agreement was the *Canadian Net-Zero Emissions Accountability Act*, which was passed into law in 2021. The Act commits Canada to achieving net-zero emissions by 2050. Achieving net-zero emissions means Canada's economy either emits no greenhouse gas emissions or offsets its emissions through actions such as tree planting or employing technologies that can capture carbon before it is released into the air¹⁸. The Act also mandates that Canada sets targets in five-year intervals (2030, 2035, 2040, 2045), and reports on progress annually. Currently, Canada's target for 2030 is to reduce GHG emissions by 40-45% relative to 2005 levels.

Provincial Action

In Nova Scotia, climate goals have been legislated in the Environmental Goals and Climate Change Reduction Act (EGCCRA)¹⁹. Nova Scotia's goals for climate action are as follows:

- 80% of electricity in the province is supplied by renewable energy by 2030.
- GHG emissions reductions of at least 53% below 2005 levels by 2030.
- Phasing out coal-fired electricity generation by 2030.
- Net zero emissions by 2050 through balancing emissions with GHG removals and offsetting.

Municipal Action

Municipalities will play a vital role in Canadian climate action. Over half of Canada's GHG emissions and energy use come from municipalities, with an average of only 15% of energy spending staying in local economies²⁰. Small municipalities with populations less than 30,000 make up more than 90% of Canadian communities and generate 27% of Canadian GDP²¹. Smaller

¹⁷ (The United Nations, 2016)

¹⁸ (Government of Canada, 2025)

¹⁹ (Government of Nova Scotia, 2021)

²⁰ (QUEST Canada, 2024)

²¹ (Partners for Climate Protection, 2024)

municipalities also have unique advantages that make them poised for being leaders in climate action. Small and rural communities face fewer administrative barriers to plan implementation, have closer relationships with key partners, and can facilitate impactful roles for community champions.

Municipalities have several tools at their disposal to implement climate action:

- They can **enable** sustainable choices through **infrastructure development**.
- They can **shape** sustainable choices through **policy and regulation**.
- They can **support** sustainable choices through **engagement and outreach**.

However, it is important to understand the limitations of the role that municipalities can play in climate action. While local government actions are necessary to address the causes of climate change, municipalities only have direct control over municipally owned buildings, vehicles, and infrastructure like streetlights, water and wastewater systems. All other community assets are not under the direct control of local governments.

Municipalities can directly or indirectly influence land use patterns, energy efficiency standards, transportation networks, food security, and solid waste generation. They have little or no control over how utilities provide energy to residents, vehicle efficiency standards, or industrial energy efficiency.

While the content of this plan focuses on areas where the Town of Truro has a level of direct or indirect influence, it is noted that the goals of the CEEP cannot be achieved without action beyond its sphere of influence. Not only will residents and businesses need to take part, but successful climate action will also require long-term partnerships and financial, regulatory, and policy commitments from senior levels of the provincial and federal governments.

1.6 Creating the Plan

Project Scope

Timeframe: The CEEP establishes a long-term vision for a transition to net-zero emissions by 2050, while focusing on an immediate action plan for the next 10 years (2025-2035).

Focus: The CEEP's primary focus is on energy and GHG emissions reductions, in line with the requirements of the Partners for Climate Protection Program. However, throughout the creation of the plan, links to important community co-benefits in areas such as environmental, health, economic and climate adaptation are drawn.

Boundaries: The CEEP covers the municipal boundaries of the Town of Truro, including all energy consumed and emissions generated within the town, including energy generated or emissions incurred on its behalf outside its borders. The CEEP also considers broader regional considerations when proposing action emphasizing the importance of collaboration with provincial partners to achieve common objectives.

Direct and Indirect Actions: Although the Town of Truro is directly responsible for only a small fraction of the community's overall GHG emissions, it is well positioned to lead climate action and coordinate community initiatives. The Town can have an outsized impact through facilitating sustainable choices by community members. Truro will manage the implementation of the CEEP and work in partnership with local organizations, businesses, and funding bodies when opportunities present themselves.

Broader Policy Context: Emissions outcomes in Truro will be influenced by municipal, provincial, federal, and international policies. The Town of Truro will work in tandem with higher levels of government, as ongoing support from provincial and federal entities will be crucial to realizing a net-zero future.

Project Plan

Situational Analysis

The planning process began with a situational analysis, where the project team reviewed existing plans, policies, and other documentation from the Town of Truro to gain a thorough understanding of its current context. By examining the current state of energy and emissions planning in the Town of Truro, the team was able to identify key areas of focus and drafted potential actions that could be taken to address identified issues. Additionally, the project Team conducted a thorough review of community energy and emissions plans from various Canadian communities, both within Nova Scotia as well as other provinces to identify best practices that were viable options for Truro's plan. Over 20 community energy plans were reviewed in detail.

This phase also involved crafting a comprehensive community engagement strategy to ensure that the voices and opinions of the community of Truro and various sectoral partners were integral to the planning process.

Corporate and Community GHG Inventories

Following the situational analysis, the team developed GHG Inventories to quantify both corporate and community emissions. GHG inventories are comprehensive accounts of all GHG emissions within a specific geographic area, organization, or sector over a defined period. These inventories are crucial for understanding and managing an organization's contributions to climate change. They provide the data necessary to inform policy decisions, track progress towards emission reduction goals, and ensure compliance with regulatory frameworks.

The PCP Program requires two GHG inventories, each with its own emissions sources and sectors. The first, a corporate (*or municipal*) inventory outlines the GHG emissions resulting from a municipality's operations and services and is used to identify the emissions for which the municipality is directly accountable. The second GHG inventory in the PCP program is a community inventory. This is a much larger undertaking that estimates GHG emissions generated within the jurisdictional boundary of the community.

This step was critical in establishing a baseline year, which would serve as a reference point for benchmarking future performance. The inventory also provided an understanding of the "business as usual" scenario, offering a way to measure the potential impact of various actions and scenarios.

Community Engagement

As the foundational analysis and GHG inventory were completed, the project also embarked on a community engagement strategy, recognizing that the success of any plan hinges on the support and involvement of the people it aims to serve. Community engagement strategies brought together key community members, including government officials, community leaders, business owners, and representatives from various interest groups. The purpose of the strategy was to facilitate open dialogue, allowing participants to share their insights, concerns, and aspirations for the community's future.

A Steering Committee with Town staff, Councilors and community members was created to provide advice on the Plan and planning process. Committee members provided guidance on groups to connect with, strategy ideas, and communications. Details on the results of the community engagement strategy can be found in the next section of this report, *What We Heard*.

Delivering the 10 Year Plan

Finally, the team moved into the phase of drafting the 10 Year Plan. Here, the impact of proposed actions and strategies was carefully evaluated and modeled, ensuring that the plan would be both

effective and feasible. An implementation plan was then created, detailing the steps necessary to bring the strategies to life.

1.7 Truro’s GHG Reduction Targets

In developing energy and emissions reduction targets for 2030, 2035, 2040, and 2050, a bottom-up approach was used to ensure that the targets were based on actions the community can realistically achieve. The process began by identifying specific actions the community could take to reduce energy consumption and emissions across various sectors, such as energy efficiency, renewable energy adoption, transportation, and waste management.

Through detailed modeling of these actions, the potential impact of the actions on reducing emissions and energy use was analyzed. The feasibility of each action was assessed, considering local conditions, resources, and capacities. By aggregating the anticipated outcomes of these actions, progressively ambitious yet achievable targets were established for the short, medium, and long term.

The CEEP’s targets reference performance improvements compared to the community’s 2021 baseline for energy consumption and GHG emissions:

Table 1: Truro’s 2021 Baseline GHG Emissions

| Year | Emissions Total ²² |
|---------------|-------------------------------|
| 2021 Baseline | 304,689 tCO ₂ e |

Milestone 2 of the PCP Program requires communities to set absolute reduction targets for both community and corporate emissions, and that these targets are formally adopted by a council resolution.

Based on the results of the emissions reduction modelling, Truro will set the following targets for compliance with Milestone 2 of the PCP Program:

- **65% reduction in community-wide emissions by 2035 compared to the 2021 baseline.**
- **Net-Zero Municipal operations by 2040.**
- **Net-Zero community-wide by 2050, including 80% reduction in emissions by 2050 compared to the 2021 baseline.**

²² Scope of the Baseline GHG emissions inventories follows the PCP Program Protocol and covers Scope 1 and 2 Emissions.

In addition to the requirements of the PCP program, Truro also looked to set interim community-wide targets for 2030 and 2040 to help monitor plan implementation between 2025 and 2050:

Table 2: Truro’s GHG Emissions Reduction Targets, 2030-2050

| Year | Emissions Reduction Targets | Emissions Total |
|------|-----------------------------|----------------------------|
| 2030 | 30% | 213,282 tCO ₂ e |
| 2035 | 65% | 106,640 tCO ₂ e |
| 2040 | 70% | 91,406 tCO ₂ e |
| 2050 | 80% | 60,321 tCO ₂ e |

The focus of the CEEP is a feasible pathway to achieve significant emissions reductions from the baseline by 2030 and 2035. The 2040 and 2050 targets are the result of modelling what may be achievable for the Town given current federal and provincial policies, legislated decarbonization of Nova Scotia’s electrical grid, and technologies that are currently viable. There are some industries and sectors that will be a challenge to decarbonize without broader support.

With additional support in terms of policies and funding from senior levels of government, as well as technological advances that lower the cost of decarbonization, it is possible that emissions in 2040 and 2050 could reduce even further, closing in on net-zero emissions by 2050. The “emissions gap” or remaining emissions that are not addressed through various actions, will need to be addressed in the future through solutions such as carbon credits, carbon sequestration, or carbon offsetting. Evaluating the impact of these measures was outside the scope of this project.

1.8 Benefits of Action

Economic Development

As outlined in QUEST Canada’s evaluation of the economic impact of community energy plans in New Brunswick²³, implementation of energy and emissions plans can stimulate local economies in three main ways:

1. Local dollars are kept in the community.
2. Direct, indirect and induced job creation from keeping spending localized.
3. New investments are made towards activities that support plan implementation.

The most direct way that CEEPs can stimulate the local economy is through redirection of energy spending. On average, approximately 80% of community energy spending leaves communities to fund energy infrastructure located elsewhere. By reducing energy costs, local governments can

²³ (QUEST Canada, 2020)

help its residents and businesses keep more of their money to spend on services in their communities.

In terms of job creation, QUEST recommends viewing CEEP implementation as a multiplier of local economic impacts. First, jobs are directly created as a result of spending on activities related to energy efficiency or GHG mitigation, as the companies who offer these services hire workers to build capacity. Additionally, as households retain more of their income due to reduced energy costs, they spend their money in the local economy as, which creates more direct jobs. Next, indirect job creation occurs as supply chains expand to deliver goods and services required by the companies who have added workers due to new demand. Finally, induced jobs are created as workers in direct or indirect job categories begin to spend their new earnings in the local economy. Thus, a multiplier effect occurs in the local economy, all from CEEP implementation.

The third way that CEEPs can drive economic development is by attracting new investment to the local economy. As countries and regions throughout the world transition to net-zero emissions, markets for renewable energy, energy efficiency technologies, and supporting infrastructure are constantly expanding. Government net-zero mandates and incentive programs are driving changes in the way people live and work, and with that comes opportunities to attract new businesses, as well as public and private investment, into Canadian communities.

Total Truro community spending on energy in 2021 was estimated to be **\$111.5 Million** (in 2024 dollars). Currently, most of this spending leaves the community, which is a missed opportunity for local economic development.

Based on a methodology established by QUEST Canada, achieving the CEEP's targets should result in an estimated 15% reduction in energy consumption by 2035, requiring an investment of approximately **\$133 Million** will be required (based on projects with an estimated 10-year payback), keeping **\$16.7 Million** of avoided annual energy spending within the community.

The initial investment required, along with energy cost reductions are estimated to create 502 jobs during the investment phase of the CEEP (2025-2035), as well as 134 person-years of employment for at least 20 years during the savings phase²⁴.

Broader Community Co-Benefits

Implementing a CEEP offers a multitude of co-benefits that extend beyond its direct reductions in energy consumption, GHG emissions, and energy costs. From improving public health to enhancing social equity and boosting the local economy, these plans are foundational to building a sustainable, resilient, and thriving community. These co-benefits often intersect with each other in ways that are intangible and difficult to quantify. Although the scope of this plan is focused on lowering energy consumption and GHG emissions, it is important to acknowledge the spinoff

²⁴ (QUEST Canada, 2020)

effects that the CEEP's implementation will have on the broader community. Below is a summary of some (but not all) of the expected co-benefits from the CEEP.

Affordability and Cost of Living

Implementing energy efficiency measures and transitioning to renewable energy sources can lower utility costs for residents and businesses. This reduction in energy costs directly translates to more affordable living, as households spend less on electricity, heating, and cooling.

Access to Renewable Energy

By increasing access to renewable energy sources such as solar, wind, and geothermal, these plans ensure that all community members can benefit from clean, reliable, and sustainable energy. Local renewable energy production also provides resiliency from price shocks that occur when communities are dependent on commodities such as fossil fuels that rely on global supply chains.

Accessibility

A focus on sustainable transportation options, such as public transit, cycling, and walking infrastructure, can improve mobility and accessibility within the community. These initiatives reduce reliance on personal vehicles, leading to lower greenhouse gas emissions and a reduction in traffic congestion. Improved public transit and active transportation infrastructure also make it easier for all residents, including those without cars, to access essential services, work, and recreation.

Public Health

Reducing emissions and transitioning to cleaner energy sources have direct health benefits. Lower levels of air pollution reduce the incidence of respiratory and cardiovascular diseases, leading to a healthier population. Additionally, initiatives that promote active transportation and green spaces contribute to physical and mental well-being, making the community a more vibrant and healthier place to live.

Social Equity

A well-designed CEEP should address social equity by ensuring that all residents benefit from energy efficiency programs and clean energy initiatives, regardless of income level. By focusing on inclusive community engagement and equitable access to resources, these plans can help bridge gaps in energy access and reduce gaps in environmental quality, ensuring that vulnerable populations are not left behind in the transition to a net-zero future.

Preservation of the Natural Environment

By reducing reliance on fossil fuels and promoting sustainable land use practices, these plans help preserve local biodiversity, protect water resources, and reduce the community's overall ecological footprint. This not only enhances the natural environment but also ensures that future generations can enjoy the benefits of a healthy and thriving ecosystem.

Climate Change Adaptation

By enhancing infrastructure resilience, decentralizing and diversifying energy sources, protecting and restoring natural ecosystems, reducing energy demand, and fostering local energy ownership, CEEPs can equip communities with the tools they need to withstand and thrive in the face of a changing climate.

1.9 Truro's Community Energy and Emissions Profile

Milestone 1 of the PCP program includes the completion of two GHG emissions inventories. The first is a Community Emissions Inventory, which accounts for emissions generated by all community activities within the jurisdictional boundaries of the Town of Truro. The second inventory is the Corporate GHG Inventory (a subset of the Community Inventory), which estimates the emissions for Municipal government operations.

Truro's GHG inventories track three principal greenhouse gases: carbon Dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O). All three gases have different levels of Global Warming Potential (GWP), which is a measure of how much energy the emission of 1 ton of a gas will absorb over a given period, relative to the emission of 1 ton of CO₂, expressed as a CO₂ equivalent (CO₂e). Using CO₂e as a metric allows simplification of the reporting of GHG emissions. Therefore, in this report, GHG emissions are reported in units of total mass (tonnes of CO₂ e). The Intergovernmental Panel on Climate Change (IPCC) provided the following 100-year GWPs in its Fifth Assessment Report:

Table 3: Global Warming Potentials for Greenhouse Gasses

| Greenhouse Gas | Formula | Global Warming Potential |
|----------------|------------------|--------------------------|
| Carbon Dioxide | CO ₂ | 1 |
| Methane | CH ₄ | 28 |
| Nitrous oxide | N ₂ O | 265 |

Appendix A includes the report for both GHG inventories, in fulfillment of the requirements of Milestone 1 of the PCP Program. An executive summary of the major findings of the GHG inventory is presented here for context.

Truro's Community Inventory provides an estimate of both energy use and GHG emissions attributable to key activities within the jurisdictional boundary of Truro, as well as specific trans-boundary activities generated as a result of community activities. The Corporate Inventory is a subset of the Community Inventory, and accounts for all activities taken directly by Truro's municipal government. The PCP Program requires Corporate (or Municipal) inventories, so that

local governments can identify and manage emissions sources for which they have direct accountability.

The Community Inventory includes emissions from residential, commercial, institutional buildings, on-road transportation and community solid waste. The Corporate Inventory includes emissions from Municipal buildings and facilities, fleet vehicles, water and wastewater infrastructure, streetlights and traffic signals, and Municipal solid waste. Both inventories have a baseline calendar year of 2021, which aligns with Canada’s 2021 Census data, as well as availability of historical data for the Town of Truro. In 2021, the Census population for Truro was 12,954.

Overall, the Town of Truro’s Community GHG emissions for 2021 are estimated to be 308,823 tonnes of carbon dioxide equivalent (CO₂e), or approximately 23.2 tonnes CO₂e per capita. This is significantly higher than the estimated 2021 per capita emissions for both Nova Scotia (14.7 tCO₂e) and Canada (17.5 tCO₂e)²⁵. There are several factors which could contribute to higher per capita emissions; Truro is amongst the denser communities in the province²⁶, but does not have public transit systems that other dense communities like Halifax, Sydney, or Kentville. Additionally, Truro has a high percentage of commercial and industrial buildings compared to other rural communities, which consume more energy than residential properties. Truro’s emissions are much lower than per capita emissions in Alberta and Saskatchewan (57.6 tCO₂e and 56.8 tCO₂e, respectively).

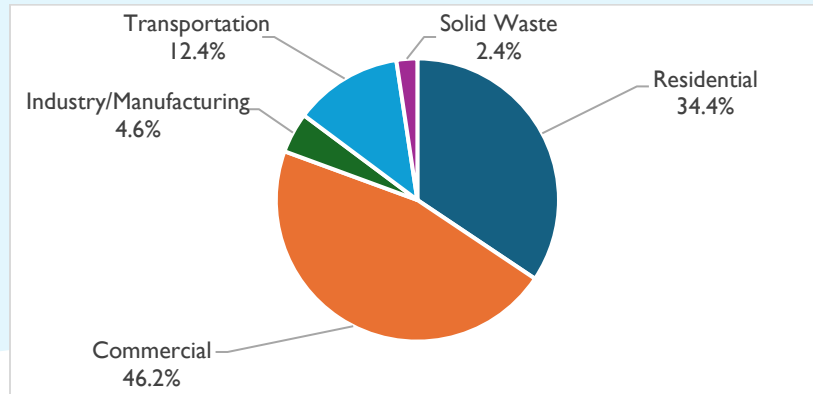
Table 4: Truro’s 2021 Baseline Community GHG Emissions Inventory

| Baseline Community GHG Inventory Sectors | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Community Emissions |
|---|--------------------------------|---|-----------------------------------|
| Residential Energy Consumption | 968,939 | 104,774 | 34.4% |
| Commercial/Institutional Energy Consumption | 1,093,446 | 140,790 | 46.2% |
| Industry/Manufacturing Energy Consumption | 171,679 | 14,048 | 4.6% |
| On-Road Transportation | 549,754 | 37,802 | 12.4% |
| Solid Waste | N/A | 7,275 | 2.4% |
| TOTAL | 2,783,818 | 304,689 | |

²⁵ NIR 2023.

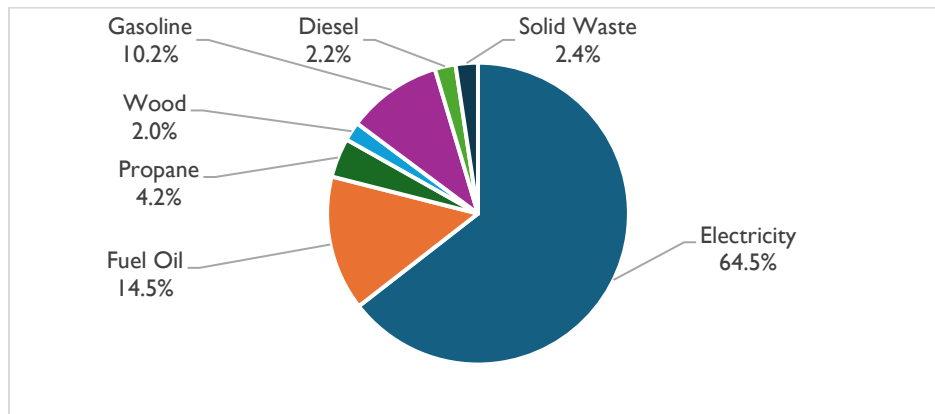
²⁶ (Statistics Canada, 2021)

Figure 1: Truro's 2021 Baseline Community GHG Emissions Inventory



Electricity is the largest source of Truro's community GHG emissions (64.5%). This is due to the carbon intensity of Nova Scotia's electricity grid, which currently relies heavily on fossil fuels for power generation. After electricity, heating oil is the second largest source of community emissions. Since there is no natural gas available in Truro, many homes and businesses still rely on oil as their primary source of heat. Gasoline is the third largest source of emissions, which is due in part to the rural nature of Truro and its surrounding communities, and the lack of available public transportation options.

Figure 2: Truro's 2021 GHG Emissions Sources

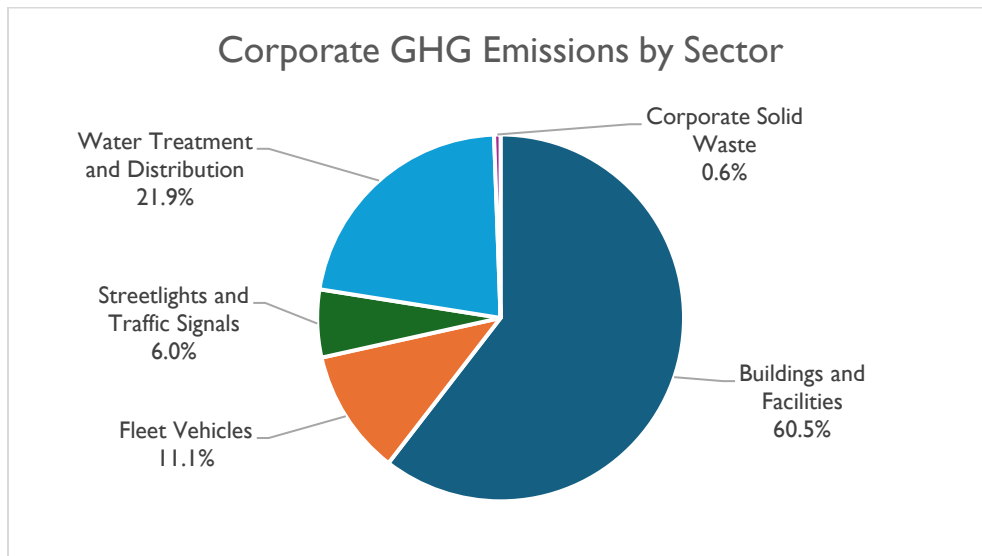


Truro's municipal operations resulted in an estimated 4,970 tonnes of emissions from fuel, electricity, and refrigerants in the 2021 baseline year. Most corporate emissions came from municipal buildings and facilities (60.5%), followed by energy use by Truro's Water Treatment Plant (WTP) and associated pumping stations (21.9%). Fleet vehicles make up 11.1% of emissions, with streetlights and traffic signals contributing 6% and corporate solid waste making up the final 0.6% of corporate emissions.

Figure 3: Truro's 2021 Baseline Corporate GHG Emissions Inventory

| Corporate GHG Inventory Sectors | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Corporate Emissions |
|-------------------------------------|--------------------------------|---|-----------------------------------|
| Buildings and Facilities | 24,388 | 3,005 | 60.5% |
| Fleet Vehicles | 3,530 | 550 | 11.1% |
| Streetlights and Traffic Signals | 1,811 | 297 | 6.0% |
| Water and Wastewater Infrastructure | 6,643 | 1,090 | 21.9% |
| Solid Waste | | 28 | 0.6% |
| TOTAL | 36,373 | 4,970 | |

Figure 4: Truro's 2021 Baseline Corporate GHG Emissions Inventory



1.10 What We Heard

Early in the project, a community engagement strategy was designed to solicit feedback on the goals and actions in the CEEP. Organizational sessions, interviews, workshops and a public survey were conducted to capture a diversity of community perspectives to shape understanding and ground planning efforts. This information helped to shape plan goals, principles, strategies and the assessment of strategies.

One-hour sessions were organized with local organizations. A background document and presentation were sent in advance of the sessions. This information provided ideas on potential plan strategies to start the discussion. Notes were taken and sent back to the organization

representative for confirmation. Sixteen organizations were contacted for sessions. Sessions were held with representatives of eleven organizations. Survey information was sent to all organizations and the general public.

Information on specific strategy options was gathered through focused interviews and meetings. Town staff and planning team members attended the Nova Scotia Federation of Municipalities' Low Carbon Leadership Conference, hosted by Truro in June 2024 to workshop strategy ideas around transportation management and learn and engage with participants working on similar planning efforts.

A public survey was promoted from June 3rd to June 23, 2024, through social media, organizational representatives, and town promotional efforts. Overall, 485 Responses were received with 55% from Truro, 40% from nearby communities; and 5% from other locations. Participants provided feedback on their knowledge, concern and strategy ideas. Survey results confirmed trends seen in organizational meetings while offering some additional insights.

By actively involving the community the project has benefited from local knowledge and expertise. A list of groups we met with, and a summary of common themes we heard, is found below. Detailed results of the community engagement strategy can be found in Appendix C.

On behalf of the Town of Truro, the project team would like to thank the following groups, organizations and businesses for their time and participation in workshops and meetings. Thank you to additional organizations that forwarded the survey.

- Town of Truro Senior Staff
- Truro Climate Sustainability Committee
- Millbrook First Nation
- The Living Earth Council
- Truro Chamber of Commerce
- Boys and Girls Club of Truro & Colchester
- Truro and Colchester Partnership for Economic Prosperity
- Truro Housing Outreach Society
- Alternative Resource Energy Authority (AREA)
- Confederacy of Mainland Mi'kmaq
- Steps on Arthur
- Dalhousie University Agricultural College
- Downtown Truro Partnership
- Truro Farmers Market
- Nova Scotia District Health Authority
- ClimAtlantic
- EfficiencyOne
- Municipality of Colchester
- Roswall Development Inc.
- United Way of Colchester County

Table 5: Common Themes Heard Throughout the Community Engagement Process

| Plan Elements | Key Themes from Community Engagement |
|--|--|
| <p>Goals and Targets</p> | <ul style="list-style-type: none"> • Policies and programs should not drive-up costs. Those most vulnerable will be impacted the most. • Targets need to be meaningful and outline practical action to get there. More substance, less flash. • Education for individuals is important (such as help through navigating programs). • Community-based initiatives such as social enterprises and volunteer efforts are desirable. • Connecting to existing Community and Active Transportation plan goals makes sense. |
| <p>Guiding Principles</p> | <ul style="list-style-type: none"> • Affordability and energy equity were identified the most often. • Other identified principles included collaboration, leadership, accountability, fairness, equity, diversity and inclusion, synergy and action. |
| <p>Strategies: Buildings</p> | <ul style="list-style-type: none"> • Rebates, interest free loans, grants and subsidies, community and contractor education, social enterprises and volunteer programs with a focus on equity were mentioned the most. • Business and industry should act in proportion to their emissions and make commitments to emissions reductions. • Resources and programs should be provided for tenants who want to access energy saving measures. Truro/Colchester has a high rental population. Strategies could include energy efficient appliances, weatherization and heat pumps. • More accessible green spaces like green roofs, community gardens, edible fruit trees. • Municipally driven standards, solar installations, district energy systems with waste wood. • Other strategies identified included space utilization, green building standards, green revolving fund concept, incentives for meeting standards such as green space, density, affordability and environmental performance, renewables, and small district energy. |
| <p>Strategies: Transportation</p> | <ul style="list-style-type: none"> • Transit and safe, accessible and connected cycling and pedestrian infrastructure were identified as priorities. Reasons given were safety, affordability, equity, and fair access. • Transit and cycling were mentioned as providing commuter, living, health, recreational, and environmental benefits. Cycling is seen to be more accessible with the adoption of e-bikes. • Car share services. • Policies and programs that reduce vehicle congestion in the downtown area. • Affordability strategies for commuters of all types. • Some mentioned EV charging and its business benefits. |

| Plan Elements | Key Themes from Community Engagement |
|--|---|
| <p>Strategies: Land Use/Natural Environment</p> | <ul style="list-style-type: none"> • Top mentions included urban tree planting for flood protection, absorbing carbon, beauty, cooling, and biodiversity. • Make developments preserve or create green space, including trees, parks, natural buffer areas around areas like the reservoir, and shared spaces for food and recreation. • Indigenous Protected and Conserved Areas are an important strategy for the protection of the environment and cultural areas. • Increase housing density and diversify– apartments, towers in denser areas, townhouses, semi- detached or small single-family homes with green spaces as well. • Building and landscapes changes that are resilient to address extreme weather such as flooding and winds. • Landscapes that support shared transportation such as car share spots and cycling infrastructure. |
| <p>Strategies: Waste</p> | <ul style="list-style-type: none"> • The concept of a community free store was mentioned as a top strategy along with other activities to promote and expand programs for the reuse of items and recovery of food. • More education about waste diversion, buying less, and proper recycling/composting. • More public waste diversion bins in Truro and surrounding area. • Limit food waste through better diversion from stores and restaurants to those who need it. • Bylaws and enforcement that deal with industrial pollution and support backyard and community food production. • Different approaches – using land fill, recycling, landscape waste for heat generation; waste hauling price reductions for better diversion and affordability; have another truck to pick up reusable items at the curb and bring this to non-profits. • Other mentions included sustainable procurement, promoting local farmers, using clean organics for farm fertilizer as opposed to mixed in with general waste, and waste management education. |
| <p>Implementation</p> | <ul style="list-style-type: none"> • Having adequate staff and resources was the most mentioned strategy. • Concerns that permit fees and other fees would impact affordability. • Some mentions that parking fees in certain areas could help fund transportation initiatives potentially. |

1.11 Where is Truro Going?

The Modelling Process

The modelling process for this project took the following steps to determine the potential impact of the CEEP:

1. Based on the community's energy and emissions profile, a **“Baseline” Scenario** was established that acted as a reference point for measuring the impact of future actions.
2. Based on a review of existing plans and policies, energy and emissions reductions likely to occur without municipal or local action were modeled to show the **“Business as Usual (BAU)” Scenario**. The BAU Scenario focuses on the impacts of population growth, existing plans and policies at national and provincial levels, as well as trends in industry because of existing legislation.
3. Next, a “bottom-up” approach was taken to model the estimated impact of actions that the municipality could feasibly take to reduce community energy consumption and GHG emissions. This **“Ambitious” Scenario** focuses on actions that the municipality can feasibly to directly or indirectly influence energy consumption or GHG emissions reductions.
4. Finally, the **“Transformational”** scenario takes the actions of the ambitious scenario and scales them up in several ways to account for the realm of what may be possible with increased scale and scope of the net-zero transition.

Business as Usual Scenario

The PCP program requires a Business as Usual (BAU) forecast for approximately 10 years beyond the community's baseline. Since a goal of Truro's CEEP was a 10-year implementation plan with a timeline of 2025 - 2035, it was decided to forecast BAU emissions in 2035, which is 14 years past Truro's baseline year of 2021. Forecasting out to 2035 provides the Town of Truro an estimation of what their energy consumption and GHG emissions could look like if the Town takes no further mitigation measures are taken beyond their 2021 baseline.

The main factors contributing to the BAU forecast include gradual increases in population, decarbonization of the provincial electricity grid, increased fuel efficiency standards for new vehicles, and federally mandated electric vehicle sales. Further details on the BAU assumptions can be found in Appendix A – Truro's Greenhouse Gas Emissions Inventories.

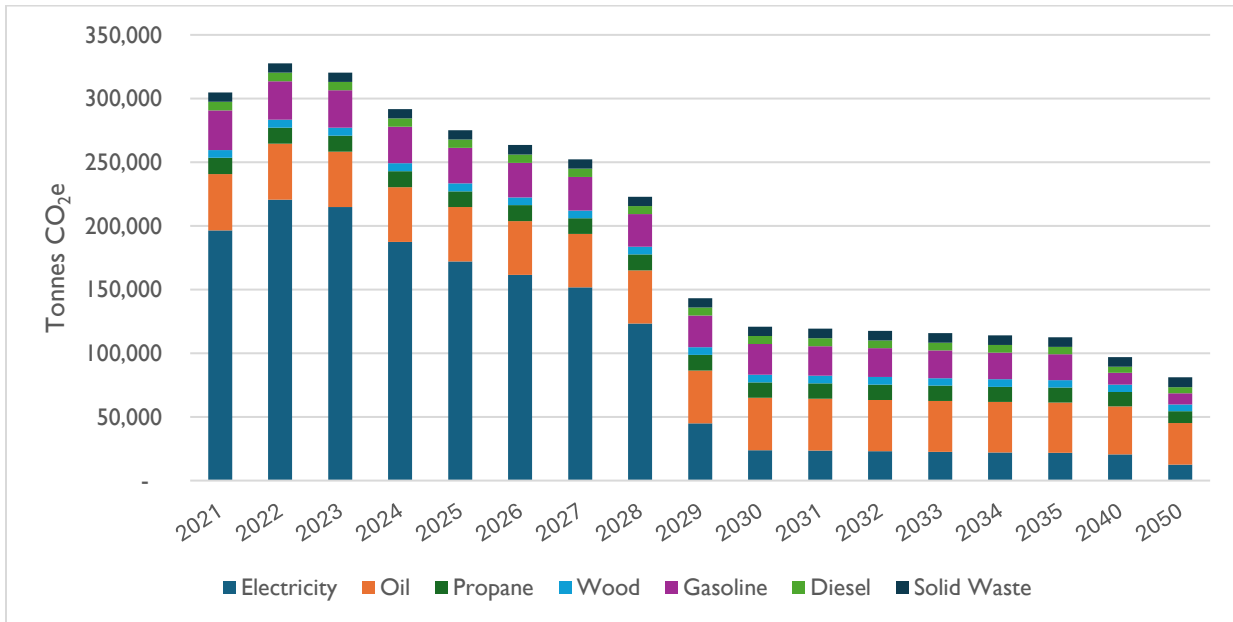
In Nova Scotia, BAU GHG emission forecasts look somewhat different than they do in other Canadian jurisdictions. This is because Nova Scotia's provincial electricity grid is currently in the midst of a transition away from fossil-fuel power generation to more renewable sources of energy. Provincial climate goals and regulations have mandated that our electric grid phases out coal-fired generation and supplies 80% of its electricity through renewable sources by 2030. This means that as part of the BAU forecast emissions from electricity are expected to drop significantly after 2030.

The decarbonization of Nova Scotia’s electricity grid should be taken as an opportunity for aggressive climate action. By investing significantly in electrification of community heating sources through proven technologies such as heat pumps, the Town can rapidly decrease its GHG emissions over the next 10 years.

Table 6: Business as Usual (BAU) Emissions Forecast

| Year | Energy Use (GJ) | GHG Emissions (tCO ₂ e) |
|------|-----------------|------------------------------------|
| 2021 | 2,783,818 | 304,689 |
| 2030 | 2,684,137 | 120,915 |
| 2035 | 2,628,759 | 112,619 |
| 2040 | 2,484,862 | 96,990 |
| 2050 | 2,313,199 | 81,193 |

Figure 5: Business as Usual Emissions Forecast



In the BAU Scenario, Truro achieves an estimated 65% reduction in GHG emissions in 2050 compared to 2021 baseline levels. This would be primarily due to the decarbonization of Nova Scotia’s electricity grid. In this scenario, significant emissions remain from private building heating sources that are not electrified, as well as transportation emissions from combustion engine vehicles which is not reduced by electrification, public transit or active transportation.

Ambitious Actions

During development of the ambitious scenario, a “bottom-up” approach was taken to model the estimated impact of actions that the municipality could feasibly take to reduce community energy consumption and GHG emissions. Several concepts were central to the modeling process:

- Focus on ambitious but achievable actions in areas that the municipality can directly or indirectly influence.
- Action should be pragmatic, based on municipal capacity, existing funding support and identified partnership opportunities.
- Base assumptions on available analysis of current market trends or feasibility studies.

The ambitious scenario adds expected energy savings and GHG emissions reductions from municipal actions on top of expected trends that were modeled in the BAU scenario. This results in significant opportunities for emissions reductions over the next 10 years. Main activities modeled in the ambitious scenario include:

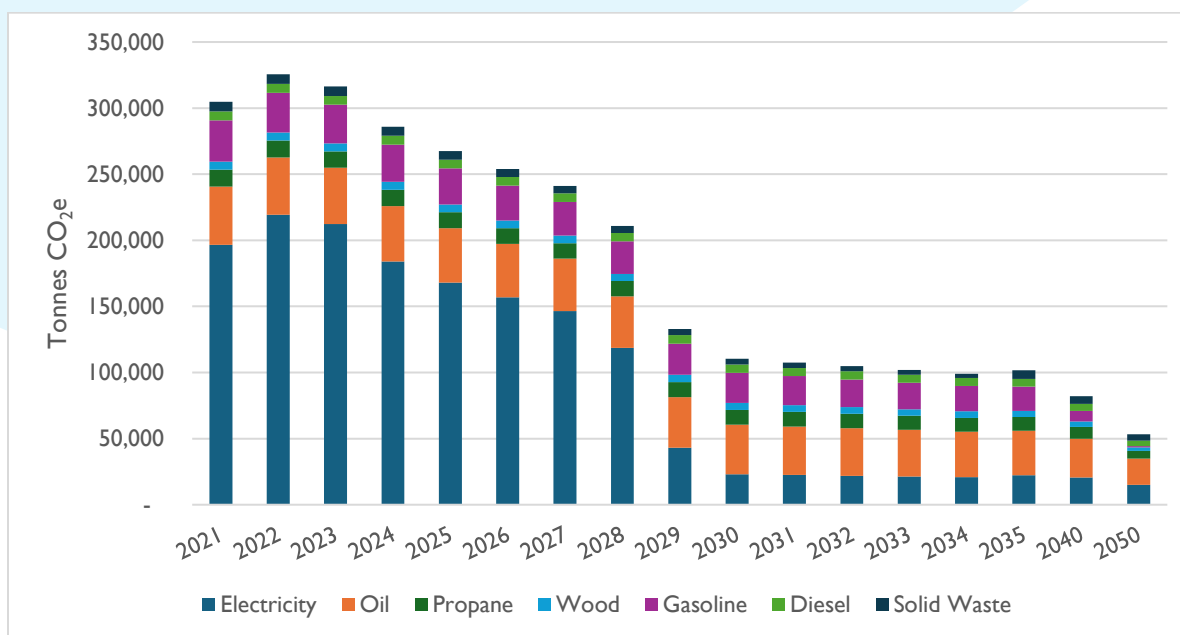
- **Grid Decarbonization:** Nova Scotia Power achieves provincial target of 80% renewable energy sources for power generation by 2030.
- **Building Energy Efficiency:** Deep energy retrofit pace accelerated to double its current rate (0.8%) by 2030. New construction is electrified with heat pumps and achieves net-zero ready performance by 2035.
- **Renewable Energy:** Behind the meter and net metered solar is installed at a rate that will achieve 10% coverage of all properties by 2050. Truro installs a community solar garden before 2030 and procures or installs increasing amounts of renewable electricity for municipal buildings by 2035.
- **Transportation:** EVs are adopted at rates aligned with federal sales projections. New combustion engines are more efficient over time. Truro introduces public transit and builds out active transportation networks, allowing for moderate switching of commuting mode share away from personal vehicles.
- **Solid Waste:** Organics cross contaminated in landfill stream is gradually reduced over time. Food waste is reduced, and more materials are recovered for a second life.

A detailed list of modeling assumptions for all scenarios can be found in Appendix D of this report. The ambitious action modeling results were used to establish Truro’s GHG emissions reductions targets for 2030, 2035, 2040, and 2050.

Table 7: Ambitious Scenario Forecast

| Year | Energy Use (GJ) | GHG Emissions (tCO ₂ e) |
|------|-----------------|------------------------------------|
| 2021 | 2,783,818 | 304,689 |
| 2030 | 2,549,210 | 213,282 |
| 2035 | 2,314,602 | 106,640 |
| 2040 | 2,050,190 | 91,406 |
| 2050 | 1,598,355 | 60,321 |

Figure 6: Ambitious Scenario Emissions Forecast



Results of the Ambitious Scenario estimate that Truro could achieve approximately an 80% reduction in emissions in 2050 compared to their 2021 baseline. The emissions gap would primarily be from remaining private buildings not yet retrofitted or electrified, combustion engine vehicles that remain on the road, and electricity grid emissions not offset by new installations with renewable electricity at scale.

Transformational Changes

The transformational scenario takes the actions of the ambitious scenario and scales them up in several ways to account for the realm of what may be possible with increased scale and scope of the net-zero transition. It is important to acknowledge that the type of transformational changes required to achieve net-zero emissions by 2050 will require action at a higher level than the Town of Truro can influence. Reaching net-zero will require action at all levels, including expanded policy and financial support from senior levels of government, market transformation through technologies that are currently at the concept stage, and everyday lifecycle changes to how Canadians live and work.

The actions modeled in the transformational scenario were deemed to be highly beneficial but were assessed to be less feasible in the shorter term (2025-2035) due to current technical, legal or financial constraints. Some of the main additions in the transformational scenario include:

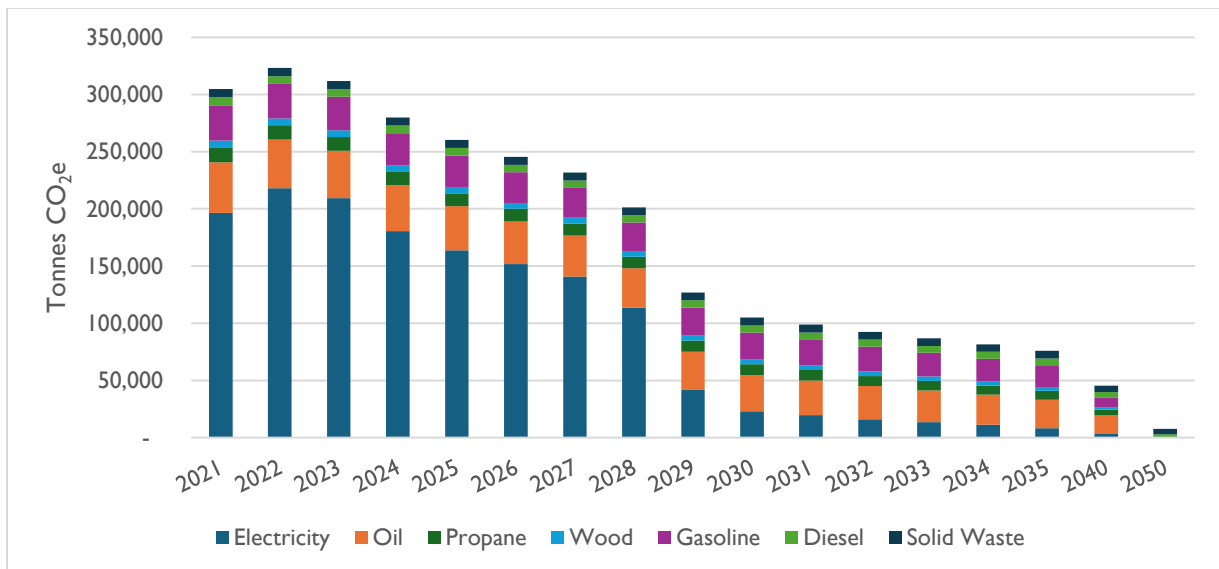
- **Grid Decarbonization:** The transformational scenario assumes that Nova Scotia’s grid continues to decarbonize between 2030-2050 at rates projected by Environment and Climate Change Canada based on federal policies for decarbonization.

- Renewable Energy:** The transformational scenario accelerates the pace of behind-the-meter and net metering solar, targeting deployment at 1 in 3 buildings in 2050. Additionally, more installations of community solar and wind turbine deployment were modeled between 2040 and 2050 to account for future opportunities that are not currently feasible for cost and logistical factors.
- Building Energy Efficiency:** Retrofits are accelerated at a pace that achieves deep energy retrofits at all buildings by 2050. This rate was deemed currently not feasible given the amount of annual investment required, but this could change with future federal programs such as the Greener Homes Program which ended in 2024. The Greener Homes Program demonstrated that if enough financial support is available, the pace of retrofits will increase significantly.
- Transportation:** Electric vehicle adoption accelerates after 2035, with assumptions that further subsidies and competition in the market lower costs for new EVs. Use of public transit and active transportation is higher than in the ambitious scenario.
- Solid Waste:** Organics amount and diversion from landfill happens at a faster rate than the ambitious scenario.

Table 8: Transformational Scenario Forecast

| Year | Energy Use (GJ) | GHG Emissions (tCO ₂ e) |
|------|-----------------|------------------------------------|
| 2021 | 2,783,818 | 304,689 |
| 2030 | 2,280,947 | 107,969 |
| 2035 | 2,001,574 | 80,477 |
| 2040 | 1,567,140 | 52,373 |
| 2050 | 812,067 | 13,310 |

Figure 7: Transformational Scenario Emissions Forecast



In the Transformational Scenario, GHG emissions are estimated to decrease to 95% of the 2021 baseline levels by 2050. Remaining emissions include transportation and industrial sector emissions which are more difficult to decarbonize, as well as residual solid waste emissions from landfilled organic materials.

Point of Interest: District Energy

District energy systems supply energy to a network of connected buildings – such as a neighborhood, business district, or college campus. Instead of each building having its own heating and cooling system, the district energy system generates energy centrally and distributes it via a series of underground pipes. District energy systems can significantly reduce the total energy required to heat and cool buildings on a district-level basis.

District energy systems can use a variety of energy sources, including biomass, geothermal, or waste heat from other community processes, making them highly adaptable to local energy resources. Fuel source, square footage and types of buildings served, and the baseline energy use of the buildings connected to the system would be significant contributors to the potential impact of a future district energy system.

One of the main challenges with creating district energy systems is that they require a significant initial investment to start up, as retrofitting existing systems to tie-in to a new district energy system can be costly. Nonetheless, reasonable business cases can be built as long as the targeted district has sufficient residential density, large buildings with various use types and high energy demand (Stratego, 2016). Due to projected growth of Truro over the next 10 years, this was deemed an uneconomical solution in the short-term unless new funding programs are launched.

However, Truro does have several promising potential areas for district energy systems in the medium-long term. Additionally, Truro's industrial park has a large volume of energy intensive building types, including manufacturing, grain mills, and construction services. It is feasible that collectively, the industrial park could support some level of district energy system in the future.

Truro's Downtown Core is becoming denser as new developments aligned with the Community Plan bring more residents to the area. Additionally, the Colchester Legion Stadium, two large regional schools, and a newly announced 523 mixed-use residential development at the Stanfield's site are all located in close proximity. Dalhousie University's Agricultural Campus is located across the Salmon River in Bible Hill, and its combined heat and power (CHP) plant is powered by biomass currently rejects waste heat that Dalhousie does not need. There is potential that Dalhousie's waste heat could be leveraged to support a district energy system in the downtown area.

Part 2: Truro’s Goals and Actions

The goals of the CEEP were chosen to provide high-level strategic vision for the desired long-term outcomes of the Plan. They are meant to be easily communicated and understood by a broad audience so that the themes of the CEEP can reach as many community members as possible. The CEEP ultimately has six key goals, and each goal has several linked objectives or targets that define measurable outcomes to track progress. The 26 actions of the CEEP will help Truro to achieve these targets and objectives, and ultimately achieve the community’s goals. Goal selection was influenced in part by the PCP Program, best practice review, as well as community engagement and themes that aligned with Truro’s Community Plan. The six goals of the CEEP are:

1.  **Improve Energy Efficiency in the Built Environment**
2.  **Accelerate the Community Transition to Renewable Energy**
3.  **Reduce Emissions from Community Transportation**
4.  **Reduce Community Solid Waste Generation**
5.  **Enhance Truro’s Natural Environment**
6.  **Educate and Engage the Community**

Action Identification and Selection

Throughout the initial phase of the project, the project team collected ideas and concepts for projects, policies, and programs that could be assessed for inclusion in the CEEP. Potential energy and emissions reductions “actions” Truro to take for energy and emissions reductions were identified through four main strategies:

Table 9: Action Selection Strategies

| Strategies | Summary |
|-----------------------------|---|
| Situational Analysis | <ul style="list-style-type: none"> • Review of existing Federal, Provincial and Municipal Policies. • Meetings with existing municipal and potential partners. |
| Best Practice Review | <ul style="list-style-type: none"> • Review of 20+ climate plans from Canadian Cities and Municipalities, as well as existing Climate Planning Guidance from Nova Scotia and other Canadian jurisdictions. |

| Strategies | Summary |
|--------------------------------------|--|
| | <ul style="list-style-type: none"> Review of academic papers and reports on municipal climate planning Attendance of industry events on climate planning in a municipal context. |
| <p>Community Engagement</p> | <ul style="list-style-type: none"> Community meetings, interviews, survey responses, Steering Committee Feedback. Identifies which actions and co-benefits are important and desirable within the local context. |
| <p>Baseline GHG Inventory</p> | <ul style="list-style-type: none"> The GHG inventory provides insight into major sources of emissions in the municipality, which facilitates analysis of opportunities for GHG emissions reductions. |

Once a list of all potential actions was generated, a series of screening questions were asked to test the actions for alignment with the strategic direction of the CEEP. These questions were intended to sort out actions that would not fit within the strategic vision of the Plan.

After the initial screening, a short list of the most strategically aligned actions were evaluated in further detail. The framework for action selection methodology was adapted from C40 Cities’ Climate Leadership Action Selection and Prioritization Process (ASAP) tool²⁷. The ASAP tool was designed to support communities in prioritizing climate actions through a comparison of benefits and technical challenges to implementation. Along with ASAP, C40 Cities created a process guide, which was adapted to suit the scope of this project. The three main factors used to prioritize actions for Truro’s CEEP were: **primary benefits (energy and emissions reductions), community co-benefits, and feasibility.**

Further details on the action selection and prioritization process can be found in Appendix E – Action Selection and Prioritization Methodology.

²⁷ (C40 Cities Climate Leadership Group, 2024)



2.1 Goal 1: Improve Energy Efficiency in the Built Environment

| COMMUNITY | | |
|---|---|--|
| Target: Double the current pace of deep energy retrofits by 2030. | | |
| # | Action | Description |
| 1 | Partner with Colchester to expand their retrofit PACE Program (Cozy Colchester) to Truro. | Homeowners are provided low-interest loans to reduce their upfront costs for energy projects. |
| 2 | Pilot an Energy Navigator Program | Expert advice and guidance for homeowners to navigate home energy retrofits. |
| Target: By 2035, all new construction is net-zero energy ready. | | |
| 3 | Advocate for adoption of 2020 National Model Codes. | Advocate for the adoption of the 2020 National Model Codes to accelerate the energy efficiency standards of new construction projects. |
| CORPORATE | | |
| Target: Use existing municipal facilities as demonstration projects for GHG reduction, achieve net-zero emissions by 2045. | | |
| # | Action | Description |
| 1 | Develop and implement a pathway to achieve 50% reduction in GHG emissions in Truro's major municipal buildings by 2035. | Conduct a feasibility study to identify the most cost-effective pathway to achieve a minimum 50% reduction in GHG emissions across its building portfolio by 2035. |
| 2 | Develop and incentivize Green Development Standards. | Voluntary measures which encourage developers and builders to use sustainable design principles. |
| 3 | All new municipal buildings and major retrofits after 2030 are designed to be net-zero energy | A net-zero energy (NZE) building can produce as much clean energy as it consumes. |

Discussion: Energy Efficiency in the Built Environment

The built environment - including residential, commercial and industrial buildings as well as supporting infrastructure - is a significant consumer of energy and a major contributor to community GHG emissions. In Truro, the buildings sector is responsible for approximately 84% of total community emissions. To achieve its targets for GHG emissions reductions, the Town will need to empower its residents and businesses to make sustainable choices about how they use energy.

Improving energy efficiency in the built environment is a strategic investment in the long-term sustainability and resilience of a community. By reducing emissions, lowering energy costs, and fostering economic growth, energy efficiency delivers a range of direct and indirect benefits that align with broader community goals. As such, improving energy efficiency in the built environment is a central pillar of the CEEP, with a focus on ensuring a sustainable, equitable, and prosperous future for all residents.

The Town will help accelerate the rate of deep energy retrofits in residential and commercial buildings as well as encourage new developments to strive for sustainable design and construction

strategies. By using its own buildings as demonstration projects, it will lead by example in its commitment to forward-thinking retrofit strategies.

Targets and Objectives: Energy Efficiency in the Built Environment

Target: Double the current pace of deep energy retrofits by 2030

On average, every year approximately 2,500 homeowners participate in Efficiency Nova Scotia's Home Energy Assessment (HEA), the Mi'kmaw Home energy Efficiency Project (MHEEP), and HomeWarming programs combined. The mean energy reduction for a participating household is 26% or approximately half of the baseline definition of a deep energy retrofit (50% energy reduction)²⁸. At 2,500 projects per year, the throughput of these three programs is equivalent to approximately 0.8% of Nova Scotia's existing stock of single-detached and single-attached dwellings.

Truro will strive to double the provincial pace of deep energy retrofits within the Town by 2030, aiming for 2% of residential homes (125 homes) per year.

Target: By 2035, all new construction is net-zero energy ready

Any new commercial building built today will still be in operation in 2050. That means new construction projects must rapidly advance their approach to target net-zero energy performance. The province has made a commitment to ban installations of oil-fired heating equipment in new buildings by 2025, but this alone will not be enough. Any building built today that does not have a pathway to net-zero energy performance through its lifetime will require retrofits in its first 20-25 years, which is not cost-effective.

Truro can support the adoption of National Tiered Building Codes at a provincial level and work to incentivize developers to build innovative new projects.

Target: Use existing municipal facilities as demonstration projects for GHG reduction, achieve net-zero emissions by 2045

Municipal buildings are often among the most visible and heavily used facilities in a community. By implementing energy efficiency measures in recreation facilities, civic buildings, and community centers, local governments can showcase the benefits of sustainable practices, inspire broader community adoption, and lead by example. The Town of Truro can use its own facilities as showcases for sustainable development and building energy efficiency by achieving net-zero emissions at municipal facilities by 2045. This will be accomplished through creating 20-year plans that strategically align with facilities renewal plans and replace existing heating equipment with low-carbon systems at end of life, while also greatly improving building envelope performance and overall energy efficiency over time.

²⁸ (EfficiencyOne and Halifax Regional Municipality, 2023)

Community Actions: Energy Efficiency in the Built Environment

Partner with the Municipality of Colchester to expand their home energy retrofit PACE Program (Cozy Colchester) to residents of Truro

Property Assessed Clean Energy (PACE) are temporary low-interest loans offered by municipalities or non-profit organizations to provide financing for property owners to conduct retrofit projects. These loans are repaid by homeowners through their property tax bill. Their status as a special charge on the tax role means PACE assessments remain with the property when sold rather than with the former owner. This allows homeowners to finance larger energy projects than they typically would be able to afford, allowing them to reduce their dependence on fossil fuels while lowering their overall energy costs.

PACE programs have been proven successful in many Nova Scotian communities, including Cozy Colchester and Solar Colchester, which have led to hundreds of successful home retrofit projects and solar PV installations. Homeowners are provided low-interest loans to reduce their upfront costs for energy or solar projects. Municipalities and building owners benefit from increased property values, marketability, and economic activity. By linking loans to existing property tax structures, PACE programs are easier to administer and present low risk to the Municipality.

Truro should explore partnering with Colchester to expand Cozy Colchester to residents of Truro. Consider households' socio-demographic conditions, such as income when designing components of the program. Currently, Colchester's PACE programs waive administrative fees for households with incomes below certain thresholds. Truro should consider expanding the program to include the upfront cost of electrical service upgrades required when replacing fuel heating systems with heat pumps, which is a common barrier to heat pump adoption.

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| GHG Reduction Potential | If the target of deep energy retrofits of 125 homes is reached by 2030, roughly 10% of homes would realize a 30-50% reduction in energy consumption by 2035. The Residential Sector accounts for approximately 34% of community emissions, meaning a conservative estimate of GHG reduction potential is approximately 1-2% of community emissions, or 3100-4,600 tonnes per year by 2035. This estimate does not account for fuel switching to electricity or the impact of the higher efficiency of heat pumps compared to fossil fuel heating systems. |
| Cost | At \$30,000 in funding per home, the 2030 target of 125 homes per year would cost approximately \$3.75 million in total investment each year. The Town's investment would be repaid with interest over the terms of the PACE loans. |
| Timeline | Extend the PACE program to Truro in 2025, retrofit homes as funding allows over 2025-2035. |

Pilot an energy navigator program to help the first cohort of PACE program homeowners through their retrofit projects

The process of completing a home energy retrofit can be a daunting task for most. Home Energy Navigator Programs are free programs created by local governments to engage and support homeowners throughout their retrofit journey. Participants are connected with an Energy Concierge, who is available throughout their retrofit project to answer questions, provide support, and give local, expert advice and guidance to navigate the complex world of home energy retrofits. Energy Concierges help with everything from: choosing a contractor and getting quotes, planning which upgrades to select, completing selected upgrades, and applying for rebates.

The pilot program should target homes below a specified income threshold, to target lower income homeowners. Homes in the program should have suggested target of 50% energy reduction, which is in line with other municipal and provincial programs.²⁹

To evaluate the impact of the pilot program, the Town should choose two cohorts of similar houses based on applications to PACE programs and compare the results of a cohort with an Energy Concierge to a cohort without one, to gather real world data to support the cost of the program.

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| GHG Reduction Potential | No direct reduction in emissions but would act as a supporting action which could accelerate the rate of retrofits or raise the average total energy savings of homes in the program. |
| Cost | \$50,000 to run the pilot program. |
| Timeline | Start the pilot program in 2025 along with the PACE program. |

Advocate for adoption of 2020 National Model Codes

In Canada, provinces and territories regulate building construction but can adopt and modify the national building codes that are developed as a model. Currently, Nova Scotia has adopted the 2015 National Building Code (NBC) and 2017 National Energy Code for Buildings (NECB). In March 2022, the National Research Council published the latest version of the National Model Building Codes for new buildings. This “2020” version of the codes is an integral component of Canada’s climate action plan.

This version of the model codes includes performance “tiers” with the highest tier consistent with a net-zero energy-ready (NZEr) standard. Net-zero energy-ready means a building is so energy efficient that it can supply its own needs over the course of a year with the future addition of on-site (or off-site) renewable energy. This version of the code is a pathway to make all new buildings consistent with national net zero policy objectives.

²⁹ (SaveEnergyNB, 2024)

Currently, Nova Scotia has not adopted the 2020 National Model Codes until the province and local industry can plan and adapt to new code requirements. Truro could join other Municipalities and organizations across the province to advocate for the adoption of the 2020 National Model Codes to accelerate the energy efficiency standards of new commercial and residential construction projects.

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| GHG Reduction Potential | No direct reduction in emissions through advocacy, but the adoption of energy step codes will be fundamental to the overall success of the CEEP. |
| Cost | Staff time. |
| Timeline | Energy step codes should be adopted as soon as possible through provincial legislation. |

Corporate Actions: Energy Efficiency in the Built Environment

Develop and implement a pathway to achieve 50% reduction in GHG emissions in Truro’s major municipal buildings by 2035

The Town has already made significant progress in building decarbonization through its Energy and Facilities Renewal project. To meet its goal of net-zero emissions at municipal facilities by 2045, Truro will need to continue to act to rapidly decarbonize municipal buildings over the next ten years.

Truro should conduct a feasibility study to identify the most cost-effective pathway to achieve a minimum 50% reduction in GHG emissions across its building portfolio by 2035. Next, the Town should seek funding and partners to implement this phase of its decarbonization pathway in a phased approach by 2035. Below is an outline of the steps Truro could take to tackle emissions from municipal buildings.

I. Building Energy Auditing and Recommissioning

As part of the Energy and Facilities Renewal project, Truro conducted energy audits at twelve of the Town’s facilities and implemented numerous energy conservation measures for lighting, building envelope, water conservation, building automation and HVAC systems. Some identified energy conservation measures were removed from the final project scope during the measure review process. These measures offered energy and cost savings but did not meet the defined financial criteria of the project at the time.

The Town should use the measures for future consideration to develop scopes of work for recommissioning and energy conservation projects across the twelve facilities where they were identified. In addition, the Town can conduct energy audits at the remaining buildings that were not targeted in the initial project and use the recommendations from the audits to implement recommissioning projects at the rest of the core building portfolio.

2. Deep Energy Retrofits and Fuel Switching

Complete deep energy retrofits at all municipal buildings, starting with the core building portfolio. These projects should focus on electrification of space and water heating systems, building automation improvements, and envelope and insulation upgrades to achieve as much energy reduction as possible while being mindful to not disturb facades of heritage buildings.

As Nova Scotia's grid continues to decarbonize, fuel-switching from fossil-fuel heating systems to more efficient, electrified systems like heat pumps will be an effective part of the pathway. Electrification of heating systems should be implemented in the following manner:

- Split heat pumps for buildings that have fossil fuel space heating as well as electric space heating.
- Air to water heat pumps and electric back up boilers for existing buildings with hydronic space heating. Where opportunity and funding presents, geo-exchange systems can be explored as they can be more efficient than air-sourced systems.
- Variable Refrigerant Flow (VRF) systems for existing electrically heated buildings.

Based on the Town's Corporate GHG inventory, the Rath-Eastlink Community Centre (RECC) is currently its most carbon-intensive building. The RECC was built in 2013 and features a geothermal ground-sourced heat pump system which will benefit from grid decarbonization over time. The RECC was one of the buildings in the Town's Energy and Facility Renewal Project, but its energy conservation measures did not target recommissioning of the main heating system. As the building is such a large part of Truro's emissions, it should be recommissioned in the near future.

The Town should also focus on buildings with existing oil heating systems which are at or near the end of their useful lives. The group of municipal buildings near Truro's Civic Square on Prince Street (Town Hall, Farmer's Market, Public Library, Police Station and Fire Station), should be evaluated as they account for approximately 35% of corporate building emissions combined and are mostly oil heated. The Colchester Legion Stadium, Douglas Street Recreation Centre, and Public Works Buildings have relatively newer propane heating plants but are energy-intensive and partial fuel switching opportunities should be assessed.

3. Renewable Electricity for Use by Municipal Facilities

Adding solar PV and procuring renewable electricity to further reduce emissions from electricity consumption will be another crucial part of the pathway, and this is covered under the clean energy goal of the CEEP.

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| Lead Department | Engineering and Public Works |
| GHG Reduction Potential | Buildings and Facilities are responsible for approximately 54% of corporate emissions. Achieving a 50% reduction in municipal building emissions would reduce corporate emissions by approximately 27%, or roughly 1,200 tonnes per year. |
| Cost | Feasibility Study: \$100,000-\$150,000 Retrofits: Budgetary estimates are to be determined by the feasibility study, as there are significant unknowns at this time. Rough Order of Magnitude (ROM) Estimate (+/- 50%) is \$20-30 Million invested over 10 years. |
| Timeline | A Feasibility study should be actioned in 2025, with initial projects planned to begin in 2027. |

Develop and incentivize Green Development Standards

Green Development Standards are voluntary measures which encourage developers and builders to use sustainable design principles, considering dimensions of economic, social, and ecological sustainability. The main sources of GHG emissions in most communities are buildings and transportation, which can be reduced through requiring high-performing new buildings, maintaining green spaces, and enabling residents to easily access low or zero carbon transportation options. Green Development Standards also drive the local industry to adapt new design and construction techniques, building the workforce of tomorrow.

Some municipalities have created their own set of guiding principles, based on their municipal priorities and long-term vision, while others use existing frameworks developed by third parties. The Town should review current green building programs to evaluate which programs make the most sense for Truro’s specific context. Ultimately, the Town could choose to select elements or targets from various programs to adapt into a unique development standard just for Truro. A good starting point is the Clean Air Partnership’s Toolkit on Creating Municipal Green Development Standards³⁰, offered through the Municipalities for Climate Innovation Program, which is delivered by the Federation of Canadian Municipalities and funded by the Government of Canada.

At a recent a 2024 green building industry roundtable event hosted by the Building to Zero Exchange (BTZx), developers expressed a desire for standards to be consistent across jurisdictions. Truro could strengthen the impact of their Green Development Standards by aligning their requirements with the Halifax Regional Municipality, Municipality of Colchester and other local communities like Millbrook and Bible Hill.

There are several mechanisms that the Town can use to incentivize voluntary compliance with Green Development Standards:

³⁰ (Clean Air Partnership, 2024)

- **Development Charge Rebates:** If green developments provide less strain on municipal infrastructure, the Town could choose to reduce the fees collected from developers to pay for municipal services.
- **Tax Increment Based Grants:** The deferral of taxes on an incremental scale to encourage the remediation of sites with various issues and significant financial outlay before new development can occur.
- **Expedited Approval Process:** If administratively feasible, building permits could be processed faster for green developments.
- **Recognition Program:** Specific awards for Green Development, or, as a distinct category as part of a larger urban design awards process.
- **Density/Height Increases:** Allowances for higher, denser developments in pursuit of energy efficiency gains.

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| Lead Department | Planning and Development, Engineering and Public Works. |
| GHG Reduction Potential | This action would not have direct impact on current GHG emissions but could prevent future community emissions from new developments. |
| Cost | Staff Time, with potential for external advisory support. |
| Timeline | Develop standards and incentive options in 2025-2026. |

All new municipal buildings and major retrofits after 2030 are designed to be net-zero energy

If Truro aims to achieve net-zero emissions from its municipal buildings by 2045, it cannot afford to introduce new liabilities from an emissions perspective. A net-zero energy (NZE) building can produce as much clean energy as it consumes. According to Natural Resources Canada, NZE buildings are expected to be 80% more energy efficient than a new building constructed to today’s building code minimum. They use on-site (or off-site) renewable energy systems to produce the remaining energy they need. NZE buildings are typically achieved through a combination of electrified heating systems and improvements to the building envelope that reduce the overall energy consumed in the building.

If Truro expands its building portfolio or requires a retrofit of existing properties, it should align their design with overall strategic priorities to avoid the need for costly retrofits in the short- and medium-term. Designing to net-zero energy will come at an initial capital cost premium but will ultimately lead to a lower lifecycle cost due to the impact of utility pricing³¹.

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| Lead Department | Engineering and Public Works |
| GHG Reduction Potential | This action would prevent future carbon emissions from new municipal buildings. |
| Cost | Energy efficient, low carbon buildings are estimated to have an 8-10% Capital Cost Premium. |
| Timeline | By 2030, or earlier if possible. |

³¹ (Canada Green Building Council, 2019)

2.2  **Goal 2: Accelerate the Community Transition to Renewable Energy**

| COMMUNITY | | |
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| Objective: Reduce barriers for residents to access renewable electricity. | | |
| # | Action | Description |
| 4 | Develop a community solar garden to provide community access to renewable electricity. | Provide renewable energy to residents at an affordable cost. |
| 5 | Investigate Feasibility of renewable energy generation at former landfill site and water treatment plant. | Adaptive reuse of a brownfield site for renewable energy production. |
| Target: Install residential solar at a pace of 25 homes per year starting in 2026 | | |
| 6 | Partner with Colchester to expand their solar PACE Program (Solar Colchester) to residents of Truro | Homeowners are provided low-interest loans to reduce their upfront costs for solar projects. |
| CORPORATE | | |
| Target: Municipal buildings use 100% renewable electricity by 2035. | | |
| # | Action | Description |
| 4 | Use power purchase agreements to procure 100% renewable electricity from local sources to offset Municipal electricity emissions. | Purchase energy directly from renewable energy providers at a predetermined rate. |
| 5 | Install 1 MW of net-metered and behind the meter solar PV for use by municipal buildings. | Integrate renewable electricity into municipal operations. |

Discussion: Accelerate the Community Transition to Renewable Energy

Transitioning to clean and renewable energy sources such as solar, wind, and geothermal directly reduces a community’s reliance on fossil fuels. By transitioning away from carbon-intensive energy sources like heating oil and propane to lower-carbon and more efficient options, the Town will not only reduce its environmental impact, but it will also lower energy costs for residents and improve public health.

Electricity is currently the largest source of Truro’s GHG emissions, accounting for approximately 64% of community emissions in 2021. This is because Nova Scotia’s electricity grid is currently amongst the most carbon-intensive in Canada. Our electrical grid relies heavily on coal and natural-gas fired production, whereas most other Canadian provinces have a steady supply of renewable, hydro-electric power. However, in 2022 Nova Scotia’s Electricity Act was amended to require that by 2030, coal-fired power plants must be phased out, and the grid must be powered by 80% renewable energy. This means that the Town’s GHG emissions from electricity will continue to decrease as more renewable energy comes online. While the electricity grid will continue to decarbonize over time, emissions from combustion of fossil-fuels will never decrease.

The Town will invest in renewable energy systems to supply affordable, clean electricity to both its residents, businesses and municipally owned buildings, as well as reduce barriers for

community members to access renewable energy. At the same time, the Town will work with new partners to support the broader community transition away from fossil-fuels.

Targets and Objectives: Accelerate the Community Transition to Renewable Energy

Objective: Reduce barriers for residents to access renewable electricity

Many Nova Scotians experience energy poverty and require support to reduce their energy bills. As the cost of fossil fuels increases over time, those without access to sources renewable energy will be left behind in the transition to net-zero. Upfront cost, lack of roof space, too much shade, or living in an apartment, condo or other shared housing are all barriers to installing solar panels³².

The Town can work to improve access to renewable energy throughout the community by reducing financial and logistical barriers to installing renewable energy systems. This will support energy independence, lower levels of energy poverty, and help stimulate the local economy.

Target: Install residential solar at a pace of 25 homes per year starting in 2026

A 2023 Market Outlook Study on behind-the-meter solar estimated that the current penetration rate of residential solar is 1 in 200 (0.5%) Canadian homes³³, and that with expanded financial support from federal, provincial and municipal incentives, this number could reach 1 in 9 homes by 2050. The study goes on to state that without transformational change in the residential solar market (mandates for solar in new construction, permitting and interconnection improvements), Canada will fall short of the recommended target to support net-zero emissions, which is 1 in 3 homes by 2050.

An ambitious objective for Truro given current conditions is targeting an annual installation rate that would align with a goal of solar PV installed at 1 in 10 homes (10%) by 2050. Assuming that 0.5% of existing homes in the community already have solar installed, the Town should target installations at approximately 25 homes per year to keep on track with this goal.

Target: Municipal buildings use 100% renewable electricity by 2035

Integrating renewable electricity into municipal operations offers numerous benefits that align with Truro's long-term sustainability goals, including significant reductions in greenhouse gas (GHG) emissions, increased energy independence, and financial savings. This shift to renewable energy sources will help reduce the community's carbon footprint, lower energy costs in the long term, and demonstrate local leadership in the transition to clean energy.

As a customer of Nova Scotia Power, the Town can produce solar, wind, and hydro electricity behind the meter to feed a facility directly and not export to the grid and/or participate in

³² (Province of Nova Scotia, 2024)

³³ (Dunsky Energy)

programs such as commercial net metering that enable install up to 1 MW to reduce their net electrical consumption . This provides an ambitious target for the Town to work towards, with multiple pathways to achievement. Renewable energy that cannot feasibly be built on- or off-site should be procured through the use of Power Purchase Agreements (PPAs).

Community Actions: Accelerate the Community Transition to Renewable Energy

Investigate Feasibility of renewable energy generation at former landfill site and Water Treatment Plant

Using former landfills as sites for installation of large solar PV arrays is a common way to reclaim space that is otherwise not suitable for development. In fact, there are several such projects already completed or underway in Nova Scotia. Most recently, Annapolis Valley First Nation, Glooscap First Nation and the Municipality of the County of Kings have partnered to develop a 7MW community solar garden in Meadowview³⁴.

As such, the area surrounding the former landfill site on Young Street, near the Railyard Mountain Bike Park and Water Treatment Plant, could offer an opportunity for adaptive re-use as a site for renewable electricity generation. Limited information is available on the former landfill site, but it is estimated to be approximately 300,000 – 400,000 m² and is zoned in the Parks and Open Space Land Use Policy Area. An area of this size could feasibly accommodate several Megawatts (MW) of solar panels. However, the site must be investigated to ensure any potential projects' success and sustainability. These considerations span environmental, technical, and economic factors.

The site's load-bearing capacity must be evaluated to determine if it can support the weight of solar panels, mounting structures, and any related infrastructure without compromising the landfill's integrity. The site must also be assessed for potential contaminants that could be disturbed or released during construction. This includes checking for any harmful gases (like methane) or leachates that might pose risks during the installation process or the operational phase of a potential project. Near and behind the Water Treatment Plant may also be an advantageous for location for projects.

Landfill gas (LFG) is a natural byproduct of the decomposition of organic material in landfills. LFG is composed of roughly 50 percent methane (the primary component of natural gas). As part of a feasibility study, LFG that is currently being vented to the atmosphere should be evaluated to determine if they produce sufficient methane to produce electricity as part of the Town's renewable energy portfolio, or if the existing methane supply has declined to a point where producing electricity is no longer an option and should be instead captured and treated.

³⁴ (Municipality of the County of Kings, 2024)

If the site is determined to be viable for renewable energy projects, business cases should be evaluated to select the most cost-effective implementation plan, factoring in any onsite remediation or stabilization measures that may be required.

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| Lead Department | Planning and Development |
| GHG Reduction Potential | Supporting |
| Cost | Feasibility Study: \$150,000-\$200,000 |
| Timeline | 2025-2026 |

Develop a community solar garden to provide community access to renewable electricity

The Nova Scotia Community Solar Program was launched in 2024 with a goal of removing barriers to accessing solar. This program will facilitate the installation of 100 Megawatts (MW) of solar electricity generation by non-profits, co-operatives, First Nations communities, municipalities, businesses, universities and colleges. Approved project owners will build, own, and operate a community solar garden on their land or property, to benefit subscribers from the general public, specific community groups, or areas.

The Community Solar Program provides a promising opportunity for Truro to show leadership in community renewable energy, with several options for project development. The Town could:

- Build and administer its own solar garden on Municipal property.
- Partner with other communities such as Millbrook, Colchester and Bible Hill to share costs and administrative capacity, with the project installed in Truro.
- Partner with local businesses or non-profits to host a solar garden on their behalf.

A key benefit of the Solar Community Program is that it allows owners to target a specific subscriber base. The Town could work with project partners to target groups with historical lack of access to renewable energy such as renters, or marginalized, underrepresented, and equity-deserving, -seeking, and -denied groups. By providing renewable energy to residents at a reasonable rate, the Town and its partners could help protect customers from increasing costs for purchasing grid electricity.

Community Solar projects can generate between 500 kW to 10 MW of electricity. For reference, a 1 MW solar garden would cover between four to six acres of land and generate enough electricity to power 131 homes³⁵. The Town could consider a sizeable solar array of between 5-7.5 MW, as Solar PV costs are typically more economical for larger projects. The ultimate size of the array should be determined by a feasibility study which gauges the local market for a tangible subscriber base, from which a business case can be made that provides an acceptable rate of return for the Town and its potential partners.

³⁵ (Province of Nova Scotia, 2024)

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| GHG Reduction Potential | A 7.5 MW solar garden could generate approximately 8,250,000 kWh of renewable electricity each year, which is approximately 2% of current annual community electricity consumption. With current grid electricity emissions, this would offset approximately 4,800 tonnes of GHG emissions annually. However, as electricity emissions are anticipated to decrease over time, the impact of community solar on emissions will also decline as the grid is decarbonized. |
| Cost | Initial Capital Cost: \$19-\$23 million for a 7.5 MW solar garden. This would be cost-shared by partners. Project will generate revenue from subscriber base. |
| Timeline | 2027-2028 |

Partner with Colchester to expand their solar PACE Program (Solar Colchester) to residents of Truro

In similar fashion to Community Action I, Truro should partner with Colchester to expand Solar Colchester to residents of Truro. Amendments to the Electricity Act made in 2022 (Bill 145) introduced a “right to self-generate”, wherein homes and businesses can generate renewable energy systems at their homes and businesses for their own use. Systems must have less than a 27 kW capacity. This electricity is fed directly into the owner’s building (behind the electrical meter), reducing the electricity purchased from the grid and lowering electrical bills. If customers generate more electricity than they use, surplus kilowatt-hours (kWh) are banked and applied to future bills to offset any electricity drawn from the grid.

Solar Colchester currently offers financing at rates of 4.75%, at terms up to 15 years³⁶. Lower monthly loan payments can sometimes be paid for by the expected energy cost savings from the solar system. Once the loan is repaid, homeowners see greatly reduced energy costs for the remaining life of the panels. In addition, Efficiency Nova Scotia’s SolarHomes program currently offers rebates of up to \$3,000 for residential solar PV installations³⁷, further reducing financial barriers for homeowners.

Historically, Colchester has budgeted \$300,000 per year, committing up to \$20,000 per project to support at least 15 solar PV installations per year³⁸.

³⁶ (Municipality of Colchester, 2024)

³⁷ (Efficiency Nova Scotia, 2024)

³⁸ (Colchester County, 2023)

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| GHG Reduction Potential | GHG reduction potential is difficult to estimate, as the size of solar PV systems and their estimated production is highly dependent on the size, location, orientation and efficiency of individual systems. Additionally, incremental GHG reductions from residential solar will decrease gradually over time as Nova Scotia’s electricity grid is decarbonized. This action will also lead to reduced energy costs (and increased affordability) for residents. |
| Cost | <p>\$20,000 per solar system, financed in part by the PACE program. To achieve the objective of 25 residential installations per year, Truro will need to budget approximately \$500,000 per year, which will be repaid over the length of the PACE loans.</p> <p>Individual solar systems in Nova Scotia cost in the range of \$2,500 - \$3,000 per Kilowatt (kW) of installed capacity, depending on existing conditions.</p> |
| Timeline | 2025 |

Corporate Actions: Accelerate the Community Transition to Renewable Energy

Use power purchase agreements to procure renewable electricity from local sources for use by municipal buildings

As communities aim to transition to net-zero emissions, Power Purchase Agreements (PPAs) have emerged as a strategic tool for securing local renewable energy. PPAs allow municipalities, businesses, and other organizations to purchase energy directly from renewable energy providers at a predetermined rate. By entering into these agreements, communities can foster the development of local renewable energy projects, stabilize energy costs, and significantly reduce greenhouse gas emissions. PPAs are attractive because they functionally shift the cost of renewable energy generation from a capital cost to develop a resource into an ongoing operational cost through utility bills, allowing organizations to use capital budgets for other priorities. The Town’s two main options for Nova Scotia based renewable energy procurement are outlined below:

- The Renewable to Retail Program

To provide a pathway for homes and businesses to take advantage of renewable energy without installing onsite solar, in 2014 the Nova Scotia Utility and Review Board (NSUARB) established the Nova Scotia Renewable to Retail program. This program allows consumers to purchase electricity from an alternative option to Nova Scotia Power; one that supplies 100% renewable electricity.

Renewall Energy is currently the only Nova Scotian company that was granted a license through this program and sells 100% renewable energy directly to the people and businesses of Nova

Scotia³⁹. Renewall develops large-scale wind projects and guarantees a reliable energy supply for customers. There are potential opportunities for Truro to work with Renewall to purchase renewable energy, facilitate purchasing for the local community, develop renewable energy resources, or partner on innovative ideas such as microgrid development. In this arrangement the customer of the PPA is granted renewable energy certificates (RECs) that are used to show ownership for greenhouse gas accounting purposes. RECs needed to be verified and retired to be counted.

- The Green Choice Program

The Green Choice Program is a green power offering developed through collaboration between the Province, Nova Scotia Power, energy suppliers and larger energy customers. It allows participants to purchase up to 100% of their electricity from local renewable energy sources⁴⁰. Applications for the Green Choice Program closed in 2024, with renewable energy resources expected to be online by 2028. The Town should monitor developments of any future rounds of the program. If another round is announced, the Town could participate in the program to reduce the impact of its own municipal buildings and facilities. Other public institutions, commercial and industrial businesses, and Millbrook could also participate in a potential future round of the Green Choice Program.

The pricing mechanism for the Green Choice program provides some indication of what the potential costs and credits would be for a renewable energy PPA. The Green Choice Program's Participant Guide states that program participants will pay an administration cost no greater than \$1 per megawatt-hour (MWh) up to an annual maximum of \$100,000 in addition to all other costs on their bill. As a credit, participants will be exempt from paying the output-based pricing system carbon cost per megawatt-hour of delivered energy through Green Choice Program subscribed projects⁴¹.

It should be noted that final cost and credit figures for the program will be determined following Nova Scotia Power's application to its regulator.

If the Green Choice Program is used as an indicator of the cost of renewable energy procurement, renewable electricity PPAs could be an extremely cost-effective way for Truro to decarbonize its electricity consumption well ahead of 2050.

³⁹ (Renewall Energy, 2024)

⁴⁰ (The Green Choice Program, 2024)

⁴¹ (Nova Scotia Department of Natural Resources and Renewables, 2024)

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| GHG Reduction Potential | If the Town installs 1 MW of solar PV, its remaining baseline electricity consumption would be approximately 5,200,000 kWh per year, resulting in a potential GHG emissions reduction of approximately 3,000 tonnes per year (70% of corporate emissions) with current grid emissions. This potential will decrease over time as the electricity grid is decarbonized. Additionally, as the Town electrifies its heating sources, net electrical consumption will increase over time. |
| Cost | Would be an operating expense through utility billing. Estimated cost is difficult to predict at this time and would need to be determined through the procurement process with potential vendors. |
| Timeline | 2027-2030 |

Install 1 MW of net-metered and behind the meter solar PV for use by municipal buildings

As the municipality electrifies its sources of heating over time, its use of fossil fuels will decrease, but its electricity consumption will increase. To help offset the additional electrical load, it is recommended that the municipality install solar PV panels. Not only will this reduce the emissions associated with any purchased grid electricity, but it will also reduce annual operating costs.

Nova Scotian commercial properties can participate in Nova Scotia Power’s Net Metering program to install renewable energy systems to generate their own electricity and offset part, or all, of their own electricity needs while still being able to draw from the power grid when needed. Bill 145 raised the limit of the nameplate capacity of net-metering systems to 1000kW (1 MW) for any commercial customers that pay a demand charge on their bill (ratepayers under the General, Industrial or Municipal Tariff Codes).

If a net-metered renewable energy system generates more electricity than a building can use, surplus kilowatt-hours (kWh) will be banked and applied to future bills to offset any electricity drawn from the grid. This effectively allows a customer to reduce their annual electricity bill to zero if they produce as much electricity as they consume in a year. If a customer has multiple accounts with Nova Scotia Power, one or more renewable electricity generators can be aggregated under a single net-metering agreement, if they are within the same geographical area.

Targeting the maximum amount of net-metered solar allowed by current regulations by 2035 would mean installing approximately 100 kW every year starting in 2025. Rolling out several smaller rooftop solar projects at individual buildings is an option, but would require structural assessments and repair of rooftops, as well as electrical service upgrades at several buildings. Instead, it would be most cost and time-effective to install one larger installation at the same time as Community Action 5: Development of a community solar garden. The community solar garden

and municipal net-metered or behind the meter solar PV could be installed together with separate metering for each system, saving on design and installation costs.

There is also potential to install several ground-mounted arrays phased over a 10-year period. The Town could size each phase based on current and projected electricity consumption of its buildings at the time of project implementation. Factors to consider would include any existing renewable electricity power purchase agreements, impact of electrifying fossil fuel heating systems, and overall improvements in building efficiency over time.

| | |
|--------------------------------|--|
| GHG Reduction Potential | A 1 MW solar system could generate approximately 1,100,000 kWh of renewable electricity each year, which is approximately 17% of current annual corporate electricity consumption. With current grid electricity emissions, this would offset approximately 650 tonnes of GHG emissions annually. However, as electricity emissions are anticipated to decrease over time, the impact of community solar on emissions will also decline as the grid is decarbonized. |
| Cost | Installation Cost: \$2.75-\$3 million for a 1 MW array. This would avoid the cost of grid-purchased electricity, equivalent \$176,000/year. Simple payback would be 17 years. |
| Timeline | 2026-2027 |

2.3  **Goal 3: Reduce Emissions from Community Transportation**

| COMMUNITY | | |
|--|--|---|
| Objective: Provide Supports for Low-Emission Transportation Choices | | |
| # | Action | Description |
| 7 | Feasibility Study for Regional Public Transit System | Investigate feasibility, business case for public transit |
| 8 | Establish a Regional Public Transit System | Launch a public transit system for Truro in partnership with surrounding communities |
| 9 | Implement Active Transportation Master Plan | Build out an active transportation system that serves everyone, protects the environment, and supports a thriving, resilient economy. |
| 10 | Support Deployment of Electric Vehicle Charging Infrastructure | Enable and coordinate private sector investment, set policies and standards, and ensure equitable access to EV charging infrastructure. |
| CORPORATE | | |
| Target: Convert Municipal fleet to non-emitting vehicles by 2040 | | |
| # | Action | Description |
| 6 | Develop a Municipal Light-Duty Vehicle Electrification Strategy | A phased approach to right sizing, sharing and transitioning municipal fleet to EVs |
| 7 | Monitor opportunities for electrification of medium- and heavy-duty municipal fleet vehicles | Identify opportunities to decarbonize larger vehicles and equipment |

Discussion: Reduce Emissions from Community Transportation

Reducing emissions from the transportation sector is a crucial part of Truro’s pathway to net-zero. As of 2020, transportation emissions were the second largest source of GHG emissions in Nova Scotia (30%), only behind electricity generation (43%), and more than twice the total emissions of residential and commercial building emissions (14%)⁴². However, many Canadians rely on private vehicles for transportation because our communities were designed to accommodate them over more active modes, such as walking and cycling. This leads to higher per capita emissions because vehicles are often less fuel-efficient, and the distances traveled are longer.

Transportation is also one of the highest costs for most Canadian households, who pay on average \$11,250 (roughly one fifth of household budgets) each year on car ownership⁴³. Compared to pre-pandemic prices, the cost of monthly car payments rose by 20 per cent for new vehicles and 30 per cent for used vehicles as of 2023⁴⁴. The concept of “forced car ownership” occurs when a lack of alternate options forces people to rely on private vehicles for

⁴² (Canada Energy Regulator, 2020)

⁴³ (Statistics Canada Survey of Household Spending, 2019)

⁴⁴ (The Globe and Mail, 2023)

their travel needs, which creates transport poverty when the cost of vehicle ownership is too much for those with low incomes⁴⁵.

Without transit services, the most vulnerable individuals living in rural areas are challenged to go about their day-to-day lives⁴⁶. By providing a reliable public transit system along with a robust active transportation network, residents can reduce their dependence on personal vehicles, leading to fewer vehicle kilometers traveled (VKT) and lower GHG emissions. Additionally, transit and active transportation systems are a powerful way to address equity concerns. Not all individuals have access to, or the ability to use a vehicle.

Objectives and Targets: Reduce Emissions from Community Transportation

Objective: Provide Supports for Low-Emission Transportation Choices

Transportation is one of the largest sources of greenhouse gas emissions in Canada, contributing significantly to air pollution and climate change. Promoting low-emission transportation choices such as electric vehicles, public transit, biking, and walking not only addresses community emissions, but also lowers transportation costs and enhances public health.

As the “*Hub of Nova Scotia*”, Truro can have an outsized impact on transportation emissions in our province by becoming a leader in rural transportation solutions. By making alternative transportation options more accessible and attractive, Truro can lead the way in creating a transportation system that serves everyone, protects the environment, and supports a thriving, resilient economy.

Modeling the potential impacts of implementing active transportation and public transit systems is challenging due to a lack of data for rural communities. Based on Truro’s 2021 census data, approximately 85% of Truro’s commuting population uses a passenger vehicle, with 11% choosing to walk and 1% choosing bicycles⁴⁷.

A 2019-2020 Dalhousie University commuter survey estimated that commuters at Dalhousie’s Agricultural Campus in Bible Hill chose non-emitting transportation choices more frequently, with approximately 70% of respondents reporting they used passenger vehicles, with 24% walking and 3% choosing to bicycle⁴⁸. Dalhousie’s data is skewed towards the choices available to students, with student populations being more likely to live close to campus and have less access to personal vehicles.

⁴⁵ (Environmental Defence and Equiterre, 2024)

⁴⁶ (Breen & Sutherland, 2022)

⁴⁷ (Statistics Canada, 2021)

⁴⁸ (Walker & Habib, 2020)

When modeling how Truro's mode share could change over time with increased supports for low-emissions transportation, data from current best practices in similar communities was used to estimate potential modal shift over time, with acknowledgement that reducing dependence on personal vehicles in rural Canadian communities is a challenge faced across the country.

In a 2024 report on how transit investment can boost ridership and reduce emissions in Canada, Dunsky Energy Advisors estimated that for jurisdictions with less than 400,000 people, a likely outcome for 2035 is that 10% of people choose active transportation methods, while 6% choose public transportation⁴⁹. This conclusion was drawn from analysis of data from 110 Canadian transit agencies divided into cohorts by regional population.

Target: Convert Municipal fleet to non-emitting vehicles by 2045

With the average lifespan of a Canadian light-duty vehicle being between 10-15 years⁵⁰, Truro needs to create a transition plan for their fleet as soon as possible to achieve net-zero operations by 2050. Truro has a sizable fleet, which includes everything from small off-road vehicles used in grounds maintenance by the Parks and Recreation Department to heavy-duty vehicles and equipment used by the Public Works department for road maintenance and snow clearing. The Town is also responsible for the Police and Fire Services fleets, and support vehicles for other Departmental Responsibilities.

While electric options are quickly becoming available for light- and medium- duty vehicles, the market for heavy duty vehicles is slower to adapt and may leverage other technologies such as hydrogen. Nonetheless, Truro will begin planning for the support infrastructure, procurement methods, and business cases required to support a municipal transition to non-emitting vehicles by 2040.

Community Actions: Reduce Emissions from Community Transportation

Feasibility Study for Regional Transit System

Truro was recently awarded funding through the Nova Scotia Sustainable Communities Challenge Fund to conduct a feasibility study focusing on the social, economic, and environmental dimensions of establishing a transit system for Truro and surrounding areas.

It is recommended that the study investigates revenues and alternative funding sources outside of passenger fees and operating costs from the Municipality. The study should explore alternative structures such as corporate, institutional, community organization partnerships (e.g., sponsorship opportunities, contribution agreements with community groups or post-secondaries, participation of local service clubs).

⁴⁹ (Dunsky Energy and Climate Advisors, 2024)

⁵⁰ (Toronto Star, 2018)

Structures such as public private partnering or transportation management associations (TMAs) should be evaluated. CTCL should be involved in the planning process due to their history of community service. Millbrook First Nation and Colchester are potential partners that would benefit from improved connectivity to surrounding communities and should be consulted early in the process.

| | |
|--------------------------------|---|
| GHG Reduction Potential | No direct GHG reduction impact but could facilitate future emissions reductions from commutes shifting from passenger vehicles to public transit. |
| Cost | \$100,000-\$150,000 |
| Timeline | Ongoing |

Establish a Regional Public Transit System

Building upon the results of the Transit System Feasibility Study, the Town could seek funding to establish a public transit system for Truro in partnership with surrounding communities.

There are increasing levels of support for rural transit systems at both provincial and federal levels. In 2024, Housing, Infrastructure and Communities Canada launched the Canada Public Transit Fund, which will provide \$3 billion per year for public transit and active transportation infrastructure, beginning in 2026-27⁵¹. Within the Canada Public Transit Fund are targeted funding streams for rural transit, as well as zero emission transit.

The recommendations of the feasibility study should be aligned with federal programs like the Rural Transit Solutions Fund (RTSF)’s and the Zero Emission Transit Fund (ZETF)’s streams for planning, design, and capital projects, as well as provincial funding opportunities. The startup and operating costs of a transit system are challenging to quantify at this time and should be determined based on the results of the Feasibility Study.

| | |
|--------------------------------|---|
| GHG Reduction Potential | Based on modeling forecasts of rural public transportation usage, it is estimated that 6% of the local population could use public transit if available in 2035. This would result in approximately 500 tonnes of GHG emissions reductions annually at a community level. |
| Cost | Startup and operating costs to be determined by the Transit Feasibility Study. |
| Timeline | 2027-2030 |

Implementation of the Active Transportation Master Plan

The Town currently is working to implement the Active Transportation Master Plan by studying key routes, observing traffic flows, and creating a phasing plan to allow the Town to budget and plan the building out of the Active Transportation network. The Town is also establishing the

⁵¹ (Housing, Infrastructure and Communities Canada, 2024)

feasibility of the formalizing the Wabanaki Trail as an active transportation pathway– a key component of the master plan. The Wabanaki Trail is currently an informal path and is envisioned as a multi-modal path that repurposes rail corridors between downtown Truro and Millbrook before looping back to downtown on the William Barnhill Drive. The trail also becomes a tool for economic development within Millbrook and Truro, thus bringing the two communities together to create a great user experience for residents and tourists.

| | |
|--------------------------------|---|
| GHG Reduction Potential | Based on modeling forecasts of rural public transportation usage, it is estimated that 10% of the local population could use active transportation methods by 2035. This would result in approximately 900-1000 tonnes of GHG emissions reductions annually at a community level. |
| Cost | Costs for implementation to be determined as part of the feasibility study. Implementation costs to be embedded in capital planning for street and sidewalk projects. |
| Timeline | Implementation plan to be completed in 2025-2026 |

Supporting Deployment of Electric Vehicle Charging Infrastructure

Local governments have an important role to play in supporting the growth of electric vehicle infrastructure, but they should not necessarily be the primary providers of public EV charging stations. The private sector is well-positioned to drive innovation and efficiency in the EV charging market. EV charging could be for vehicles or electric bicycles. Private companies are incentivized to compete by offering better services, lower costs, and more advanced technologies to attract customers. This competition can lead to a more dynamic and responsive charging network than a municipality might be able to provide. Instead, the Town should focus on enabling and coordinating private sector investment, setting policies and standards, and ensuring equitable access to charging infrastructure.

The Town could provide incentives, zoning adjustments, access to public land, or use public procurement to select a private company private companies handle the installation, operation, and maintenance of the charging stations.

Municipalities can play a crucial role in ensuring that underserved areas, such as low-income neighborhoods or rural areas away from the downtown core are not left behind. As public EV charging infrastructure is rolled out, the Town can identify and fill gaps in the market where private companies may not find it economically viable to operate. The Town can show leadership by providing some public charging infrastructure at public buildings, which it has already done at the Truro Farmer’s Market on Prince Street.

Installation of EV charging infrastructure on municipal properties and within the streetscape must not create barriers to mobility or access for those with disabilities, or other accessibility

challenges. The Town has an important role to play in developing accessibility standards for electric vehicle charging infrastructure to ensure equitable access.

| | |
|--------------------------------|--|
| GHG Reduction Potential | No direct impact from installing charging infrastructure but will support decarbonization of the transportation sector. |
| Cost | <p>Rough Order of Magnitude Cost (+/- 50%) for retrofitting EV Charging infrastructure into existing buildings:</p> <ul style="list-style-type: none"> • Level 2 Station (240V): \$15,000-\$40,000 • Level 3 Station (480V): \$75,000-\$100,000 <p>Cost estimates include contingency for civil and electrical work required to install charging infrastructure.</p> |
| Timeline | Ongoing. |

Corporate Actions: Reduce Emissions from Community Transportation

Develop a Municipal Light-Duty Vehicle Electrification Strategy

Given the complexity and cost of fleet transition, the Town will need to implement a phased approach to transitioning their fleet to EVs as current vehicles reach their replacement dates. This requires careful planning to prioritize which vehicles to replace first, balancing immediate emissions reductions with long-term financial and operational sustainability. The development of the strategy should involve the following steps as a scope of work:

1. Fleet Inventory and Analysis

Data on fleet mileage and usage patterns is currently limited. The Town should build upon its inventory of the existing municipal vehicle fleet to include annual fuel consumption, mileage and trip logging. This data can be used to identify which vehicles are suitable for replacement with hybrids and EVs based on their usage patterns, range requirements, and other factors. Replacement vehicles should be right sized for their intended use.

2. EV Readiness Assessment

An assessment of potential EV charging station locations and refinement of installation cost will be required to support fleet transition. Evaluate the current state of Truro’s electrical infrastructure, such as best locations for charging stations, proximity to suitable electrical capacity, and anticipated demand of future EVs. Identify gaps and potential areas for development for development of capital projects.

3. Financial Analysis:

Analyze the financial implications of transitioning to EVs, including the costs of vehicle procurement, charging infrastructure development, and potential savings from reduced fuel and maintenance costs. Consider financing options, grants, and incentives available to support the transition.

4. Implementation Plan

Develop a phased implementation plan that prioritizes the transition based on factors such as vehicle age, operational needs, and budgetary considerations. Start with pilot projects or replace vehicles that are easiest to electrify.

5. Procurement Strategy

Establish a procurement strategy for acquiring EVs and related infrastructure. This should include specifications for vehicle types, procurement timelines, and potential partnerships or purchasing agreements with manufacturers or suppliers.

As a potential procurement solution, the Town should evaluate the option of engaging a fleet management service provider through a competitive public procurement process. By adopting an electrical vehicle leasing model with a fleet management provider the Town could test new electric vehicle models before committing to long-term purchases and reduce maintenance costs as light-duty vehicles are turned over every 4 – 5 years. Fleet management programs are one of the program offerings available from Canoe Procurement Group of Canada in Partnership with the Nova Scotia Federation of Municipalities.

| | |
|--------------------------------|---|
| GHG Reduction Potential | No direct emissions reductions but would facilitate an LDV fleet transition to EVs. Electrifying LDV fleet vehicle emissions along with decarbonization of the electrical grid could reduce fleet corporate emissions by 100-150 tonnes annually. |
| Cost | Feasibility Study: \$60,000-\$70,000 Cost of Fleet Transition to be determined from feasibility study. |
| Timeline | 2025-2026 |

Monitor opportunities for electrification of medium- and heavy-duty municipal fleet vehicles

Medium- and heavy-duty vehicles (MHDVs) play a critical role in municipal operations, including waste collection, snow plowing, and emergency services. While the market for zero-emission MHDVs is growing, there are still limited options available for certain types of vehicles, particularly heavy-duty trucks and specialized vehicles like fire trucks. By staying informed about technological advancements, market trends, and regulatory developments, the Town can strategically plan their transition to a cleaner, more efficient fleet.

The Town should assess procurement opportunities for the potential to purchase vehicles that use battery electric, hybrid, or hydrogen fuel cell technologies on a case-by-case basis. For example, the Town contracts out its waste collection services and could gauge market ability to supply electric waste collection trucks upon the expiry of its current contract.

| | |
|--------------------------------|--|
| GHG Reduction Potential | To be determined as new technologies are rolled out. |
| Cost | Staff Time |
| Timeline | As opportunities arise. |

2.4  **Goal 4: Reduce Community Solid Waste Generation**

| COMMUNITY | | |
|--|--|--|
| Target: Reduce community organic waste in landfill stream 10% by 2035 | | |
| # | Action | Description |
| 11 | Work with Divert NS and other partners to identify waste reduction opportunities in the community. | Collaborate with local food banks, nonprofits, and businesses to create or expand food rescue programs that divert surplus food from businesses and households to those in need. |
| 12 | Establish a community free store or reuse center. | Set up a space where community members can donate, borrow or take lightly used items that others no longer need. |
| CORPORATE | | |
| Target: Reduce corporate organic waste in landfill stream 20% by 2035 | | |
| # | Action | Description |
| 8 | Create a zero-waste events guide and host sustainable community events. | Create a publicly accessible zero-waste event guide |
| 9 | Pilot zero-waste certification at a municipal building. | Zero-waste means achieving greater than 90% diversion through waste reduction, reuse, recycling and composting. |

Discussion: Reduce Community Solid Waste Generation

In 2022, Nova Scotians sent over 400kg of waste to landfill per person⁵². Unfortunately, although Nova Scotia has comprehensive organic waste collection and diversion programs, a significant amount of organic waste ends up in solid waste streams sent to landfills. Over 58% of food in Canada is wasted and costs the average household approx. \$1,100 each year⁵³.

In 2023, Divert NS conducted comprehensive waste audits of the solid waste streams entering each provincial landfill, including the Colchester Balefill facility. Both residential and ICI streams were analyzed in the audit. The study found that organics and paper fibres made up 39.2% of the residential stream and 34.7% of the ICI steam, respectively⁵⁴.

When solid waste is landfilled, its organic components such as paper, food and yard waste decompose over time into simpler carbon compounds by bacteria, generating Methane (CH4) and Carbon Dioxide (CO₂) emissions. Methane is a particularly powerful greenhouse gas which is roughly 28 times more damaging than Carbon Dioxide⁵⁵.

The Town will accomplish this by working with community partners like Colchester and Divert NS to promote reduction, reuse and recycling of solid waste streams in the community.

⁵² (Divert NS, 2024)

⁵³ (Divert NS, 2024)

⁵⁴ (Divert NS, 2024)

⁵⁵ (Environment and Climate Change Canada, 2024)

Targets: Reduce Community Solid Waste Generation

Target: Reduce community organic waste in landfill stream by 10% by 2035

To reach net-zero emissions by 2050, the Town will need to reduce the quantity of organics and paper in its solid waste streams by 1-2% per year between 2025-2050. Education and awareness campaigns will be required to inform the community about the environmental and financial benefits of reducing organic waste.

Target: Reduce corporate organic waste in landfill stream by 20% by 2035

The Town will demonstrate leadership by targeting a more aggressive waste reduction target. This target not only aligns with the Town’s broader energy and emissions goals but also creates a positive ripple effect, fostering a culture of sustainability in the community while supporting long-term environmental health.

Community Actions: Reduce Community Solid Waste Generation

Work with Divert NS and other partners to identify waste reduction opportunities in the community.

The Town can expand its partnership with Divert NS to create educational campaigns focusing on waste reduction, as well as hosting community events such as Waste Reduction Week, workshops, and Swap, Share, Thrift and Repair Events. Collaborate with local food banks, nonprofits, and businesses to create or expand food rescue programs that divert surplus food from businesses and households to those in need.

| | |
|--------------------------------|---|
| GHG Reduction Potential | Solid waste emissions represent 2.4% of the baseline community inventory. Reducing organic materials sent to landfill by 10% would reduce solid waste emissions by approximately 500 tonnes per year. |
| Cost | Staff time. Investment in the infrastructure required to process and manage increased volumes of organic waste may be required but not necessarily at a cost to the Town. |
| Timeline | As opportunities arise. |

Establish a community free store or reuse center.

One way to support local community members while increasing waste diversion is by promoting the use of thrift stores, borrowing libraries, loan or repair programs and free stores. The concept of community free stores has become more popular since the COVID-19 pandemic and involves setting up a publicly accessible space where community members can donate, borrow or take lightly used items that others no longer need.

In order for a community free store to thrive, it requires dedicated groups of volunteers to manage donations and operate the store. The Town of Truro could partner with local

community groups like the Living Earth Council, STEPs on Arthur, and United Way to support ongoing community reuse programs or expand offerings using municipal space.

Community reuse centers are typically located at waste disposal sites, where large and small items originally destined for landfill are separated and put on display for local residents to take “as-is”. Divert NS offers funding support for Municipalities to help them adopt waste diversion programs that have already been established in other regions of the province. The Town could explore the use of this funding stream to establish a reuse center.

| | |
|--------------------------------|---|
| GHG Reduction Potential | No direct impact on solid waste emissions but helps create a culture of waste reduction and was a common theme heard during community engagement. |
| Cost | Staff and volunteer time. |
| Timeline | 2025-2026 |

Corporate Actions: Reduce Community Solid Waste Generation

Create a zero-waste events guide and host sustainable community events.


By creating a publicly accessible zero-waste event guide, the Town could help foster a culture of sustainability for its businesses and community organizations. This concept could be expanded to include broader sustainability events that also target physical activity, energy and water consumption, and restoration of natural resources. When hosting community events, Truro should strive to market them as sustainable and use them as opportunities to educate and engage with the community on the concept of a circular economy.

| | |
|--------------------------------|--|
| GHG Reduction Potential | Reduction in solid waste emissions from reduction in organic waste from landfill stream. |
| Cost | Staff time. |
| Timeline | 2025-2026 |

Pilot zero-waste certification at a municipal building.

The Town should demonstrate leadership in waste management culture at its own facilities by choosing a public building to pilot a zero-waste policy. Zero-waste means achieving greater than 90% diversion from landfill, incineration and the natural environment through waste reduction, reuse, recycling and composting. Core concepts of zero-waste systems include not only reducing waste downstream of a building, but also working with upstream vendors and service providers to prevent the amount of waste stream materials entering a facility. Pursuing a third-party certified zero-waste program such as TRUE (Total Resource Use and Efficiency) Zero Waste certification, which is compliant with LEED and other green rating systems would provide a pathway to achieving zero-waste that would showcase Truro as a leader in waste management.

| | |
|--------------------------------|--|
| GHG Reduction Potential | Reduction in solid waste emissions from reduction in organic waste from landfill stream. |
| Cost | \$25,000-\$40,000 |
| Timeline | 2027-2030 |

2.5  **Goal 5: Enhance Truro's Natural Environment**

| COMMUNITY | | |
|--|--|---|
| Objective: Protect and Expand Tree Canopy and Green Spaces | | |
| # | Action | Description |
| 13 | Pilot urban mini forests | Small-scale urban forests consisting of trees and shrubs |
| CORPORATE | | |
| Objective: Protect and Expand Tree Canopy and Green Spaces | | |
| # | Action | Description |
| 10 | Amend the Town's Tree Policy to require no net loss of biomass | If trees are disturbed, they should be transplanted or replaced to retain the same amount of net biomass. |

Discussion: Enhance Truro's Natural Environment

By strengthening local ecosystems, Truro can improve its environmental health, support biodiversity, and strengthen climate resilience. This initiative focuses on restoring natural landscapes, increasing green spaces, and ensuring that development aligns with ecological preservation. Doing so will not only benefit the environment but also improve the town's ability to adapt to climate change.

Protecting existing trees and planting more of them will be an important way to address climate change and biodiversity loss. Trees naturally absorb carbon dioxide (CO₂) from the atmosphere, storing it as biomass, acting as natural carbon sinks. Trees also filter out pollutants such as particulate matter, ozone, and nitrogen dioxide, improving air quality. Additionally, trees improve soil absorption and reduce stormwater runoff, mitigating flooding risks and reducing the strain on municipal stormwater systems.

Truro currently has a municipal tree policy, which established its Tree Committee and a full-time position for an Urban Forestry Coordinator. The Tree Policy establishes terms for reviewing development plans in relation to tree and forest issues, as well as goals of implementing tree planting programs, such as the current annual tree planting program, which offers 50% rebates to residents who purchase and plant trees.

Objective: Protect and Expand Tree Canopy and Green Spaces

The Town will continue to identify and develop community green spaces in alignment with planned active transportation routes to create a network of amenity spaces that will sequester carbon, manage stormwater and help reduce the heat island effect.

Pilot urban mini forests

Mini forests (or tiny forests) are small-scale urban forests consisting of trees and shrubs designed to be planted in areas that typically would otherwise be paved or otherwise hardscaped. For those without adequate ability to cool themselves in hotter conditions, accessible green spaces with shade can be vital tools to help endure heat waves.

Mini forests provide much-needed amenity spaces for people to enjoy, offering mental health benefits and improving air quality. Mini forests also help reduce runoff, prevent flooding and mitigate the urban heat island effect⁵⁶. Canada has committed to planting 2 billion trees by 2030⁵⁷, which will require significant investment in urban tree-planting.

Piloting an urban mini forest project would not only help beautify the Town of Truro, but it would also be an opportunity to engage local residents, such as schools and recreational groups to play a part in community climate action. The Town could evaluate unused and underutilized areas to identify the best locations for mini forest projects and pilot a project with community partners and the Tree Committee. There may be opportunities to partner with organizations like the Dalhousie Landscape Architecture program, schools, and associations like the Downtown Business Association.

| | |
|--------------------------------|---|
| GHG Reduction Potential | Increases rate of carbon sequestration from existing trees. |
| Cost | \$10,000 per project |
| Timeline | 2027-2030 |

Amend the Town’s Tree Policy to require no net loss of biomass


Trees and other vegetation offer a wide array of benefits such as stormwater reduction, temperature management and improved air quality. Due to their many benefits to both mental and physical health, as well as their role in sequestering carbon, existing trees should be protected as much as possible. However, sometimes trees must be removed as part of new development, maintenance, public safety, or for disease or insect infestation.

The Town should amend the Tree Policy to require that if trees are disturbed, they should be transplanted or replaced to retain the same amount of net biomass somewhere else on municipal property. Replacement trees should increase biodiversity, be native species or non-invasive species, and have a mature canopy spread equivalent to, or greater than, the trees removed. This policy amendment could be managed and implemented through the existing structure of the Tree Committee and the role of the Urban Forestry Coordinator. If the project does not plant trees back on site a fee per tree could be paid to the Tree Committee for further planting.

| | |
|--------------------------------|---|
| GHG Reduction Potential | Maintains current rate of carbon sequestration from existing trees. |
| Cost | \$400 per 5 cm caliper tree installed |
| Timeline | 2027-2030 |

⁵⁶ <https://greencommunitiescanada.org/programs/mini-forest/>

⁵⁷ <https://www.canada.ca/en/campaign/2-billion-trees.html>

2.6  **Goal 6: Educate and Engage the Community**

| COMMUNITY | | |
|--|--|---|
| Objective: Collaborate with local businesses and homeowners to improve energy efficiency in the building sector | | |
| # | Action | Description |
| 14 | Create an engagement campaign focused on community education around energy efficiency and GHG emissions reductions | Develop a community engagement campaign designed to educate and mobilize residents, businesses, and organizations around energy efficiency and (GHG) emissions reductions |
| 15 | Launch a neighbourhood weatherization program | Partner with community organizations to provide financial assistance, materials, education, and technical support to homeowners |
| CORPORATE | | |
| Objective: Collaborate with local businesses and homeowners to improve energy efficiency in the building sector | | |
| # | Action | Description |
| 11 | Create a community micro-grant program to support community innovation | Award small funding grants to project proposals that help solve existing issues, accelerate implementation of the CEEP, or drive community engagement around energy efficiency. |

Discussion: Educate and Engage the Community on Energy Efficiency

While the Town will be focusing its direct investment in energy efficiency and GHG reduction projects that lower the emissions of its own assets, it must also reduce barriers for the broader community to take their own actions. Educating and engaging the community on energy efficiency is essential to driving meaningful progress toward a sustainable future.

A well-informed community is empowered to make smarter energy choices in their homes, businesses, and daily lives, creating a ripple effect that benefits the environment, economy, and overall quality of life. An engaged community fosters a sense of collective responsibility and ownership over the local sustainability agenda. This shared commitment to environmental stewardship encourages community members to take initiative and become champions of energy efficiency in their homes, workplaces, and social circles. As more people get involved, the momentum builds, making energy efficiency and GHG emissions reductions a community-wide priority.

Nova Scotia has many organizations and support programs to help homeowners and businesses to reduce energy consumption and energy costs. The Town should facilitate connectivity between its residents, businesses, and the assortment of partners and service organizations that can help the community advance its energy and emissions reduction strategies while supporting affordability.

Recommendations in this section do not have associated GHG emissions reductions, as they are supporting actions that are intended to increase uptake and effectiveness of actions elsewhere in the CEEP. The following actions and programs will require staffing commitments from within the Town of Truro, but the intent is for them to become an organic part of ongoing economic development within the Town's existing networks and relationships.

Objective: *Collaborate with local businesses and homeowners to improve energy efficiency in the building sector, reducing operating costs and carbon emissions while enhancing community resilience.*

Community Actions: Educate and Engage the Community on Energy Efficiency

Create an engagement campaign focused on community education around energy efficiency and GHG emissions reductions

The Town could develop a community engagement campaign designed to educate and mobilize residents, businesses, and organizations around energy efficiency and greenhouse gas (GHG) emissions reductions. The campaign's goal should be to raise awareness, provide information, and foster community-wide participation in energy-saving activities that contribute to reducing the community's carbon footprint. Below are several areas the campaign could target.

This strategy should have a particular emphasis on engagement with the institutional, commercial, and industrial (ICI) sector. While the municipality will be focusing investment on decarbonizing municipal assets and providing funding support for residential homeowners, it will also need to facilitate connections between business groups and programs seeking to invest in energy efficiency in the ICI sector.

Promote Energy Efficiency in Residential Settings

- Launch community-wide campaigns that educate homeowners about energy-saving practices, such as better insulation, energy-efficient appliances, and smart home technologies.
- Collaborate with local contractors to offer sessions on larger energy-saving projects like upgrading insulation, installing energy-efficient HVAC systems, or solar PV installation, helping homeowners understand their options and what to expect.
- Host open community meetings in collaboration with organizations like Efficiency Nova Scotia and Clean Foundation to inform residents about financial incentives, payback periods, and the environmental benefits of electrification of home heating systems and generating clean energy at home, positioning them as attainable goals for homeowners.

Promote opportunities for energy efficiency in commercial buildings

- Host workshops in collaboration with Efficiency Nova Scotia, the Truro Chamber of Commerce and Downtown Truro Partnership for commercial businesses to educate

business owners about the benefits of energy efficiency and the various rebate programs that are available.

- Encourage partnerships between businesses and deep energy retrofit accelerator programs such as the ReCover Initiative.
- Support development of case studies that demonstrate how energy-efficient upgrades in commercial spaces reduce operational costs and environmental impact. The Town could use its own buildings as example projects or connect leaders in the area with organizations who can tell their story.
- Create a local business energy efficiency recognition program to highlight and reward businesses adopting sustainable energy practices.

Collaborate with community-based organizations to amplify the impact and reach of their energy and emissions reduction efforts

Collaborating with local community organizations is a powerful way to amplify the impact and reach of the CEEP. These organizations often have established relationships, credibility, and inherent knowledge of community needs, making them ideal partners in spreading the message and supporting local actions.

Organizations such as the United Way, the Living Earth Council, STEPs on Arthur, and others that participated in the development of the CEEP all provide opportunities to create tailored initiatives and joint campaigns on energy reduction, active transportation and waste reduction.

Collect and share success stories from community organization-led successes in the media and at public events to celebrate the contributions of community organizations. This encourages others to get involved and builds positive momentum.

Launch a Neighbourhood Weatherization Program

A neighborhood weatherization program helps homeowners make small home improvements to reduce energy consumption, save on utility costs, and improve the comfort of their homes. To implement a successful program, Truro can partner with community organizations to provide financial assistance, materials, education, and technical support to homeowners for weatherization efforts like insulation, air sealing, and window upgrades.

Groups of community volunteers could perform the work, prioritizing low-income households, seniors, and other vulnerable populations who may struggle with high energy costs or live in older, less energy-efficient homes.

Corporate Action: Educate and Engage the Community on Energy Efficiency

Create a community micro-grant program to support community innovation

Create a community micro-grant program that supports innovative creators and local champions who have big ideas about how to address energy consumption and GHG emissions reductions in the community. Award small funding grants to project proposals that help solve existing issues, accelerate implementation of the CEEP, or drive community engagement around energy efficiency.

Part 3: Truro's 10-Year Plan

3.1 Moving from Planning to Implementation

The CEEP will be managed and coordinated through the office of the Chief Administrative Officer (CAO). All Town Departments will have responsibility for various aspects of the CEEP as they pertain to each department's core responsibilities. The goals of the CEEP should be integrated into ongoing and future departmental initiatives, such that they become streamlined and integrated parts of Municipal operations and annual reporting. Key progress indicators (KPIs) identified in the CEEP will be monitored regularly to track progress towards the plan's goals.

Although all Municipal departments will have shared responsibility for implementing the CEEP, there are several initiatives that will require technical support, and ongoing coordination and progress reporting will require a specific skillset. It is highly recommended that a dedicated staff position be created with a direct reporting relationship to the CAO, with responsibility for developing, managing, and overseeing projects related to energy efficiency, renewable energy, and climate change mitigation in municipal operations and the broader community. Other responsibilities could include:

- Coordination with internal departments, external consultants, contractors, and stakeholders to implement energy and climate initiatives.
- Working closely with local, provincial, and national partners to align local efforts with broader climate goals and secure funding opportunities.
- Development and delivery of presentations, workshops, and educational materials to raise awareness about the municipality's climate and energy initiatives.
- Preparing regular reports and presentations for municipal leadership, elected officials, and the public on the status of climate and energy projects.
- Submitting grant applications, managing awarded grants, and ensuring compliance with funding requirements.

The Town can leverage its participation in Clean Foundation's Community Climate Capacity program to support CEEP implementation until a permanent position can be created.

How will the Town of Truro support the CEEP?

- Empower the people and businesses in Truro to make climate-conscious choices.
- Align municipal planning and policies with the goals of the CEEP.
- Consider the impact on GHG emissions when making strategic decisions.
- Align capital planning with a long-term goal of net-zero municipal operations by 2040.
- Forge new partnerships to fund and advance the Town's ambitious emissions reduction goals.

- Align actions with senior levels of government to make Truro a leader in climate action.

The implementation of the CEEP will also require community-wide efforts, supported by the Municipality as well as provincial and federal governments. It will also require collaboration from local businesses and residents to fully realize the vision behind this plan.

How can the provincial and federal governments support the CEEP?

- Continue to provide funding for municipalities, businesses, and residents to advance climate action.
 - For decarbonizing building heating systems and deep energy retrofits.
 - For transition to non-emitting fleet vehicles and public transit systems.
 - For installation of renewable energy systems.
- Update minimum energy efficiency standards for new commercial and residential construction to make new construction net-zero energy ready.
- Regulate decarbonization of provincial electricity grids in a sustainable manner, with a lens on affordability.
- Provide clear frameworks and pathways to achieve federal and provincial GHG emissions reductions targets so local communities can align efforts effectively.

How can local businesses and organizations support the CEEP?

- Adopt their own public energy and GHG targets.
- Integrate building energy efficiency, renewable energy and GHG mitigation into business planning.
- Transition of their fleet vehicles to electric options where possible.
- Provide electric vehicle charging stations to customers.

How can residents of Truro support the CEEP?

- Make sustainable choices in their daily lives, such as:
 - Supporting local businesses by shopping locally.
 - Choose walking, biking or carpooling over driving alone, if possible.
 - Consider hybrid or electric vehicles when purchasing their next car.
 - Reduce the amount of food waste sent to landfill through composting programs.
 - Upgrading living spaces through purchasing energy efficient equipment, appliances and systems.
 - Upgrade living spaces through energy efficient and renewable energy building upgrades if possible.
 - Plant trees and native gardens.
- Stay engaged with the CEEP through participation in the Climate Sustainability Committee and attending future public engagement initiatives.

- Take advantage of municipal, provincial and federal funding support for energy efficiency and GHG emissions reductions.
- Participate in pilot programs from the municipality, local environmental organizations and volunteer for community sustainability events.

3.2 Project Initiation

To make meaningful progress towards its climate goals, the Town should prioritize developing a roadmap which will outline CEEP's implementation. The CEEP provides the building blocks of implementation roadmap:

- Plan objectives and a roster of projects/actions which that are aligned with provincial and federal climate plans, which will help attract funding and partnerships.
- Descriptions and evaluations of each project, including expected energy and emissions impacts, timelines, capital and operating expenses, financial and co-benefits.
- Identification of potential partnership opportunities and existing or expected funding opportunities for specific projects or types of projects.
- Recommended Key Progress Indicators for each action area for monitoring and reporting on progress.

The Town should build upon the themes and recommendations of the CEEP by actioning various feasibility studies and continuing conversations with partners to further develop business cases for projects and bring conceptual plans to “shovel-ready” stages so that they are prepared to action them on an ongoing basis as opportunities present themselves moving forward. It is anticipated that Truro's participation in QUEST Canada's Net-Zero Accelerator program will focus on this crucial next step for Truro's net-zero transition.

3.3 Financing the Plan

A common barrier to widespread climate action is lack of available funding. Ambitious projects that create renewable energy systems, transition community transportation, and dramatically reduce energy consumption and emissions require significant investment in addition to the existing constraints that municipalities face from their existing commitments to supporting community services.

Throughout the CEEP, various actions have identified potential partnerships and external funding sources which could be used to move the plan forward. The plan will also require the Town to develop internal funding mechanisms to support projects across their asset portfolio. Below are details on several viable options that could be used as funding mechanisms moving forward:

Federation of Canadian Municipalities' Green Municipal Fund

FCM's Green Municipal Fund (GMF) was created to help municipalities achieve their goals of becoming resilient and net-zero. The GMF provides grants, loans, innovative financing, leveraged investments, capacity building, and strategic support. The GMF covers everything from feasibility studies and creation of business cases to pilot projects and major capital projects. Many of the actions in the CEEP are aligned with the types of projects GMF funds, making it easier for the Town to get the funding support it needs.

Energy Performance Contracts (EPCs)

Energy performance contracts (EPCs) are contracts between a building owner/operator and an energy service company.

They guarantee that the initial capital costs of an energy retrofit project will be covered by cost savings generated over the course of the contract, typically 15 to 20 years. Since EPCs can use private funding sources, they can ease pressure on capital budgets. Most importantly, EPCs allow for a comprehensive approach to building retrofits, rather than fragmented, small-scale upgrades. Truro has already successfully leveraged energy performance contracts to advance energy and emissions reduction projects across their municipal building portfolio.

Community Solar Projects

As outlined in the community building energy section of the CEEP, a community solar project, built and operated by the Town of Truro along with potential partners like Millbrook and Colchester would provide access to residents who otherwise might not be able to access renewable energy. In addition, customers would avoid paying the federal carbon price which is applied to electricity from Nova Scotia's grid, reducing their energy costs. As an added benefit, the proceeds of a community solar project could be re-invested into other aspects of the CEEP.

Property-Assessed Clean Energy (PACE) Programs

PACE programs have been proven successful in many Nova Scotian communities, including Cozy Colchester and Solar Colchester, which have led to hundreds of successful home retrofit projects. Homeowners are provided low-interest loans to reduce their upfront costs for energy or solar projects. Municipalities and building owners benefit from increased property values, marketability, and economic activity. By linking loans to existing property tax structures, PACE programs are easier to administer and present low risk to the Municipality.

As recommended in the community energy section of the CEEP, Truro should partner with Colchester to expand Cozy Colchester and Solar Colchester to residents of Truro. Startup costs can be shared with Colchester, the Federation of Canadian Municipalities, and even potentially private investors.

Green Revolving Fund

Green Revolving Funds (GRFs) are internal pools of capital from which loans can be made for energy and emissions reductions projects. As loans are repaid, the capital is then reloaned for other projects. Assuming that investments are made into projects with an acceptable rate of return, GRFs can be "evergreen" sources of capital that are recycled repeatedly to fund projects over the length of a climate plan.

Since savings from each project are reinvested into the GRF, green revolving funds have strong potential for growth. They are a relatively inexpensive source of funds that can be available for sustainability projects well into the future and help municipalities achieve their long-term goals. The Town should consider developing a business case for a GRF and applying for provincial or federal seed funding. Once established, a GRF could be supplemented from savings from EPCs, renewable energy production, and avoided carbon pricing for purchased renewable electricity.

Applying a Climate Lens to Capital Planning

Aligning climate and energy projects with existing capital planning and deferred maintenance goals is a strategic approach that can maximize the impact of investments, improve operational efficiency, and support the community's environmental objectives. When planning the implementation of CEEP projects, the Town should consider what assets will require replacement or major repair. Rather than managing separate projects with distinct timelines and budgets, departments can streamline efforts, reducing the complexity of project implementation. This coordination can lead to fewer disruptions, more efficient use of staff time, and better overall project outcomes. Most importantly, applying a climate lens to capital projects will allow the Town to leverage additional funding streams to address critical deferred maintenance priorities.

3.4 Implementation Timeline 2025-2035

Below is a suggested timeline for implementation of the CEEP's 26 main actions, as well as other tasks which are either ongoing or to be accomplished as opportunities arise. Cost estimates are listed for relevant activities. For more details on the actions, including descriptions, justifications, timelines, responsible parties and potential partners, as well as co-benefits, please see Appendix F: CEEP Action Summary Tables.

Table 10: Recommended Implementation Timelines, 2025-2035

| Action | Estimated Cost | Municipal Departments |
|---|--|-------------------------------|
| ONGOING | | |
| Continue to apply goals from Truro's Community Plan in land use and infrastructure development decisions, with focus on infilling and density in Downtown Core. | Staff Time | Planning and Development |
| Continue to implement the Active Transportation Master Plan | TBD by feasibility study | Planning and Development |
| Leverage Clean Foundation's Community Climate Capacity program to support CEEP implementation | Staff Time | Planning and Development |
| Participate in QUEST Canada's Net Zero Accelerator Program to initiate CEEP actions | Staff Time | Planning and Development |
| Monitor savings from Energy and Facilities Renewal Project | Staff Time | Corporate Services |
| Track key progress indicators to monitor CEEP implementation | Staff Time | All Departments |
| 2025-2026 | | |
| Create/Extend Colchester's PACE programs for energy efficiency and solar PV to residents of Truro | \$3.75 million for retrofits, \$500,000 for solar (Annually) | Corporate Services |
| Launch Energy Navigator Pilot Program | \$50,000 | Planning and Development |
| Develop pathway for 50% energy reduction in major municipal buildings by 2035 | \$100,000 -150,000 | Engineering and Public Works |
| Investigate feasibility of renewable energy generation at former landfill or Water Treatment Plant | \$150,000-\$200,000 | Planning and Development |
| Complete feasibility study on regional public transit system options | \$100,000-\$150,000 | Planning and Development |
| Develop a municipal light-duty fleet transition plan | \$60,000-\$70,000 | Corporate Services |
| Establish a community free store or reuse center | Staff Time | Parks, Recreation and Culture |
| Develop a community engagement strategy | Staff Time | Parks, Recreation and Culture |
| Create a micro-grant linked to CEEP priorities | \$10,000 - \$20,000 (Annually) | Parks, Recreation and Culture |
| Launch a neighborhood weatherization program | Staff Time | Parks, Recreation and Culture |
| Create a zero-waste events guide | Staff Time | Parks, Recreation and Culture |

| Action | Estimated Cost | Municipal Departments |
|--|---|-------------------------------|
| Amend the Town's Tree Policy to require no net loss of biomass. | Staff Time | Public Works and Engineering |
| 2027-2030 | | |
| Develop and incentivize Green Development Standards | Staff Time | Planning and Development |
| Begin recommissioning, energy conservation, fuel switching and retrofit projects at core municipal buildings | TBD by feasibility study | Engineering and Public Works |
| Build community solar garden | \$19-\$23 million | Engineering and Public Works |
| Use PPAs to procure renewable electricity for municipal buildings | Utility Cost | Corporate Services |
| Establish public transit system | TBD by feasibility study | Planning and Development |
| Begin installation of 1 MW of solar PV for use by municipal buildings | \$2.5-\$3 million | Engineering and Public Works |
| Pilot zero-waste certification at a municipal building | \$25,000-\$40,000 | Corporate Services |
| Municipal EV charging support for underserved areas | L2: \$10,000-\$15,000 L3: \$75,000-\$100,000 | Engineering and Public Works |
| Pilot mini-forest projects | \$10,000 per project | Engineering and Public Works |
| 2030-2035 | | |
| All new municipal buildings and major retrofits are net-zero energy | 8-10% Capital Cost Premium | Engineering and Public Works |
| Adopt energy step codes for new construction (pending provincial legislation) | TBD | Planning and Development |
| Complete fuel switching at major municipal buildings, continue deep energy retrofits | TBD by feasibility study | Engineering and Public Works |
| All existing buildings use renewable electricity | Utility cost through PPAs | Corporate Services |
| AS OPPORTUNITIES ARISE | | |
| Advocate for Adoption of 2020 National Model Codes | Staff Time | Planning and Development |
| Monitor opportunities for heavy-duty fleet decarbonization | Staff Time | Corporate Services |
| Support deployment of public electric vehicle charging infrastructure | Staff Time | Planning and Development |
| Work with Divert NS to identify waste reduction opportunities in the community | Staff Time | Parks, Recreation and Culture |
| Host zero-waste community events | Staff Time | Parks, Recreation and Culture |
| Engage with the Community to advance the goals of the CEEP | Staff Time | All Departments |

3.5 Monitoring and Reporting on Progress

Below is a suggested framework for an ongoing monitoring and reporting plan. This plan will help ensure that the community stays on track with its goals, makes informed adjustments, and effectively communicates progress to stakeholders. Progress should be tracked by municipal departments assigned responsibilities for various actions, objectives and targets. This should be supported and coordinated through a new CEEP coordinator position.

- **Quarterly:** Internal departmental meetings should review plan progress with status updates from various departments. This data should be reported to the Climate Sustainability Committee for oversight and feedback.
- **Annually:** Report on progress as part of the Town's Annual Year in Review. Provide updates based on key progress indicators (KPIs) and major CEEP milestones. Review at public engagement sessions with support from the Climate Sustainability Committee.
- **Year 1:** Clearly define responsibilities for data collection, analysis and reporting to ensure accountability for monitoring the plan's progress.
- **Year 5:** Mid-term review of CEEP implementation, GHG inventory updates and energy/GHG targets. Mid-term report on progress, lessons learned, updated actions list based on current legal, technical and financial landscape. GHG targets for 2035, 2040, 2050 may be updated based on newly available information.
- **Year 10:** Full CEEP implementation report, including an assessment of the plan's successes and areas for improvement. Creation of a new CEEP for 2035-2045.
- **KPIs:** Below are suggested metrics and milestones for the Town of Truro to track and report on as part of their quarterly and annual reporting process.

Table 11: Key Progress Indicators and Milestones

| Metrics | Milestones |
|---|---|
| GOAL 1: Improve Energy Efficiency in the Built Environment | |
| <ul style="list-style-type: none"> • Number of completed residential retrofits funded through PACE per year. • Average energy and emissions reductions for homes in PACE program. • Total number of green developments approved. • Annual Energy Consumption and GHG emissions from Municipal buildings from utility invoices. • Annual energy and cost savings from municipal energy efficiency projects. | <ul style="list-style-type: none"> • PACE program created. • Energy navigator pilot program launched. • Green development standards created. • 2020 National Building Codes adopted. • First net-zero energy ready municipal building built. • First existing municipal facility to reach net-zero emissions. |
| GOAL 2: Accelerate the Community Transition to Renewable Energy | |
| <ul style="list-style-type: none"> • Number of completed residential solar installations, total solar PV capacity installed through PACE per year. • Total capacity of installed municipal renewable energy systems. • Annual renewable energy production at municipal buildings. • Total annual renewable energy use for municipal buildings. • Total revenue generated from renewable energy systems | <ul style="list-style-type: none"> • Solar PACE program created. • Feasibility study for landfill site completed. • Community solar garden developed. • The municipality reaches 1 MW of solar PV installation. • The municipality procures renewable electricity through a PPA. |
| GOAL 3: Reduce Community Solid Waste Generation | |
| <ul style="list-style-type: none"> • Total annual community vehicle kilometers travelled (VKT) from Google EIE. • Completion % of Active Transportation Master Plan. • Total annual fleet vehicle mileage and fuel cost data. • % of municipal fleet made up of electric or non-emitting vehicles. | <ul style="list-style-type: none"> • Active Transportation implementation plan completed. • Public transit feasibility study completed. • Public transit system launched. • Municipal light-duty fleet electrification strategy created. |
| GOAL 4: Reduce Community Solid Waste Generation | |
| <ul style="list-style-type: none"> • Total quantity of solid waste streams (landfill, compost, recycling) from Colchester Waste Management Facility • Community waste streams (from Divert NS waste audits) • Amount of waste diverted from landfill streams by community initiatives. • Amount of waste avoided from landfills from specific community events. | <ul style="list-style-type: none"> • Community free store or reuse center created. • Zero-Waste/Sustainable event guide created. • The municipality successfully implements a zero-waste policy at one of its buildings. • First zero-waste community waste event hosted. |

| Metrics | Milestones |
|--|---|
| GOAL 5: Enhance Truro's Natural Environment | |
| <ul style="list-style-type: none"> • Number of trees planted. • Number of new developments that create or protect green space. | <ul style="list-style-type: none"> • Tree Policy is amended to require no net loss of biomass. • First urban mini forest is created. |
| Goal 6: Educate and Engage the Community on Energy Efficiency | |
| <ul style="list-style-type: none"> • Number of ICI sector buildings that complete deep energy retrofits. • Renewable energy generated by ICI sector. • Total investment in energy efficiency in ICI sector. • Number of community members engaged through various strategies • Number of events, workshops, and meetings held with community groups, businesses and residents. • Number of volunteers, number of homes reached through weatherization program. • Number of projects funded and total investment through community micro-grants. | <ul style="list-style-type: none"> • Community engagement strategy created. • Weatherization program launched. • CEEP microgrant program launched. • Business partnerships organized with accelerator programs. |

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APPENDIX A

Truro's Greenhouse Gas Emissions Inventory

Truro's Community Energy and Emissions Plan



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Executive Summary

Truro's Community and Corporate Greenhouse Gas (GHG) Inventories were developed to meet the requirements of Milestone 1 of the Partners for Climate Protection (PCP) Program.

Truro's Community Inventory provides an estimate of both energy use and GHG emissions attributable to key activities within the jurisdictional boundary of Truro, as well as specific trans-boundary activities generated as a result of community activities. The Corporate Inventory is a subset of the Community Inventory, and accounts for all activities taken directly by Truro's municipal government. The PCP Program requires Corporate (or Municipal) inventories, so that local governments can identify and manage emissions sources for which they have direct accountability.

The Community Inventory includes emissions from residential, commercial, institutional buildings, on-road transportation and community solid waste. The Corporate Inventory includes emissions from municipal buildings and facilities, fleet vehicles, water and wastewater infrastructure, streetlights and traffic signals, and municipal solid waste. Both inventories have a baseline calendar year of 2021, which aligns with Canada's 2021 Census data, as well as availability of historical data for the Town of Truro. In 2021, the Census population for Truro was 12,954.

Overall, the Town of Truro's Community GHG emissions for 2021 are estimated to be 308,823 tonnes of carbon dioxide equivalent (CO₂e), or approximately 23 tonnes CO₂e per capita. This is significantly higher than the estimated 2021 per capita emissions for both Nova Scotia (14.7 tCO₂e) and Canada (17.5 tCO₂e)¹. However, Truro's emissions are much lower than per capita emissions in Alberta and Saskatchewan (57.6 tCO₂e and 56.8 tCO₂e, respectively).

Truro's municipal operations resulted in an estimated 4,970 tonnes of emissions in the 2021 baseline year. Most corporate emissions came from municipal buildings and facilities (60.5%), followed by energy use by Truro's Water Treatment Plant (WTP) and associated pumping stations (21.9%). Fleet vehicles make up 11.1% of emissions, with streetlights and traffic signals contributing 6.0% and corporate solid waste making up the final 0.7% of corporate emissions.

The PCP Program -compliant GHG inventory totals for the Town of Truro are summarized below:

Table 1: Truro's 2021 Community Emissions by Sector

| Baseline Community GHG Inventory Components | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Community Emissions |
|---|--------------------------------|---|-----------------------------------|
| Residential Energy Consumption | 968,939 | 104,774 | 34.4% |
| Commercial/Institutional Energy Consumption | 1,093,446 | 140,790 | 46.2% |
| Industry/Manufacturing Energy Consumption | 171,679 | 14,048 | 4.6% |
| On-Road Transportation | 549,754 | 37,802 | 12.4% |

¹ NIR 2023.

| | | | |
|--------------|------------------|----------------|------|
| Solid Waste | N/A | 7,275 | 2.4% |
| TOTAL | 2,783,818 | 304,689 | |

Figure 1: Truro's 2021 Community Emissions by Sector

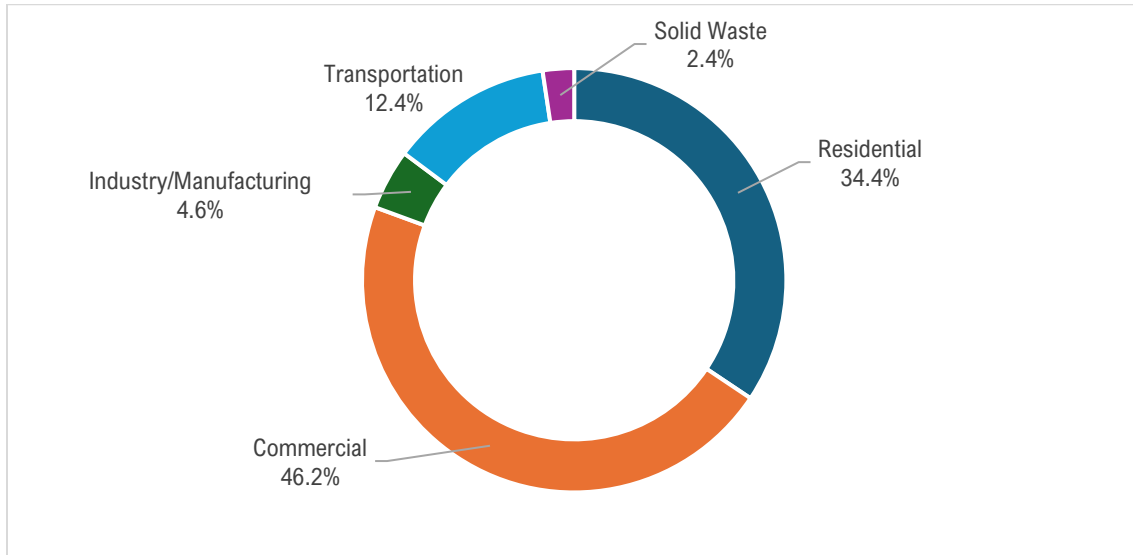
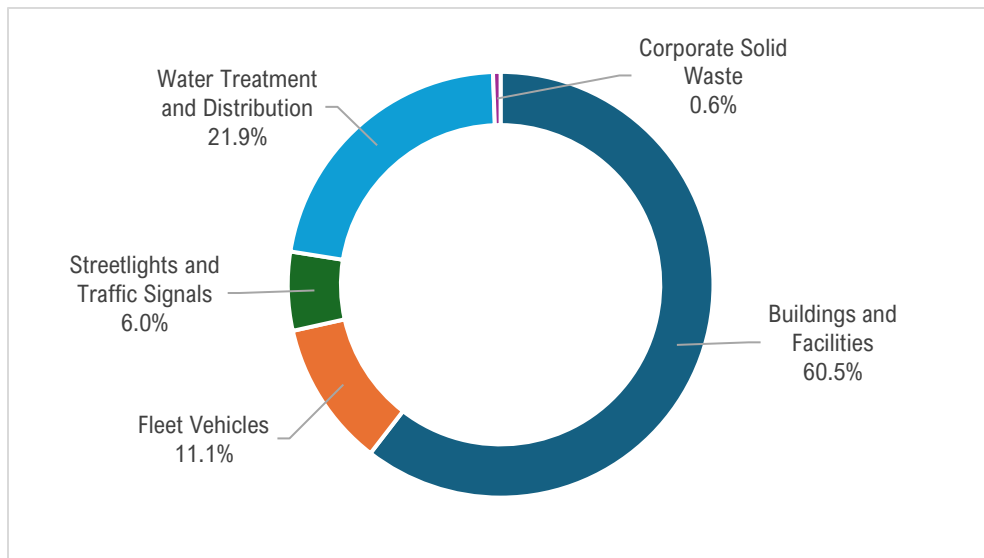


Table 2: Truro's 2021 Corporate Emissions by Sector

| Baseline Corporate GHG Inventory Sectors | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Corporate Emissions |
|--|--------------------------------|---|-----------------------------------|
| Buildings and Facilities | 24,388 | 3,005 | 60.5% |
| Fleet Vehicles | 3,530 | 550 | 11.1% |
| Streetlights and Traffic Signals | 1,811 | 297 | 6.0% |
| Water and Wastewater Infrastructure | 6,643 | 1,090 | 21.9% |
| Solid Waste | | 28 | 0.6% |
| TOTAL | 36,373 | 4,970 | |

Figure 2: Truro's 2021 Corporate Emissions by Sector



1 INTRODUCTION

Located in central Nova Scotia, Truro is the central population center of Colchester County. In 2021, the Town became a member of the Partners for Climate Protection (PCP) Program. The PCP Program consists of a five-step Milestone Framework that guides municipalities to act on rapid climate change by reducing emissions in their communities. Truro's Community and Corporate Greenhouse Gas (GHG) Inventories were developed to meet the requirements of Milestone 1 of the Partners for Climate Protection (PCP) Program. Below is a description of the Municipality of the Town of Truro and its commitment to the PCP Program.

1.1 The Town of Truro

Truro is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People, and is subject to the Treaties of Peace and Friendship. Geographically located in central Nova Scotia, Truro serves as a key hub for the province. The 37.52 km² town is situated at the head of Cobequid Bay, part of the Bay of Fundy, and lies at the junction of major transportation routes, including highways and rail lines. The surrounding area is characterized by the fertile farmlands of the Annapolis Valley to the west and the Cobequid Mountains to the north, with the Salmon River running through the town.

Truro is often referred to as the "Hub of Nova Scotia" due to its central location and significance as a transportation and commercial center. In the broader context of Nova Scotia, Truro plays a crucial role as a regional service center, providing education, healthcare, and retail services to surrounding communities. It maintains strong ties to rural Nova Scotia while also adapting to the changing economic landscape, with efforts to attract new businesses and industries.

As of 2021, Truro had a census population of 12,954 residents (13,875 including Millbrook First Nation). The Town has made active efforts to increase density, with the number of people per square kilometer increasing from 320.5 to 345.3 between 2011 and 2021. Over that same period, the average annual population increased by 0.74% per year (approximately 96 people per year). Between 2016 and 2021 the Town grew by 5.7% while the greater Truro-Colchester region grew by 0.9%. These figures indicate that most of the recent growth in the area has been concentrated in the urban core of Truro. The number of private dwellings in Truro increased by almost 400 units, or 6.3 % from 2011 to 2021, rising from 6,263 dwellings in 2011 to 6,658 dwellings in 2021².

1.2 The Partners for Climate Protection Program

The Partners for Climate Protection (PCP) program is a network of Canadian municipal governments that have committed to reducing GHGs and to acting on climate change. The PCP program is administered by the Federation of Canadian Municipalities (FCM) in partnership with the International Council for Local Environmental Initiatives (ICLEI). Over 450 municipalities have made a public commitment to reduce emissions by joining the PCP. The PCP program consists of a five-milestone framework to guide

² [2021 Census of Population, Truro \(Town\)](#)

municipalities in reducing GHG emissions at both the corporate and community levels. The five-milestone process includes:

- Milestone 1: Creating a greenhouse gas emissions inventory and forecast
- Milestone 2: Setting an emissions reduction target
- Milestone 3: Developing a local action plan
- Milestone 4: Implementing the local action plan or a set of activities
- Milestone 5: Monitoring progress and reporting results

Milestone 1 of the PCP program includes the completion of two GHG emissions inventories. The first is a Community Emissions Inventory, which accounts for emissions generated by all community activities within the jurisdictional boundaries of the Town of Truro. The second inventory is the Corporate GHG Inventory (a subset of the Community Inventory), which estimates the emissions for municipal government operations. This report covers both GHG inventories, in fulfillment of the requirements of Milestone 1.

2 METHODOLOGY

2.1 Standards and Guidelines

The following reference standards were used to develop Truro's Community and Corporate GHG inventories:

- PCP Protocol: *Canadian Supplement to the International Emissions Analysis Protocol (2014)*. The PCP Protocol was used as the primary framework for GHG accounting and reporting guidelines for this GHG inventory.
- Global Protocol for Community-Scale Greenhouse Gas Inventories: *An Accounting Protocol for Cities, Version 1.1 (2021)*. Created by the World Resources Institute, C40 Cities Climate Leadership Group and ICLEI – Local Governments for Sustainability (ICLEI), the GPC Protocol was used to provide further methodological guidance for various aspects of the inventories.

2.2 Baseline Year

The baseline year for both GHG inventories was chosen to be the 2021 calendar year. This facilitated use of publicly available government statistics for 2021, such as Canada's 2021 Census data and Natural Resources Canada's National Energy Use Database (NEUD). Additionally, the Town of Truro had implemented an Energy and Facilities Renewal project between 2019-2021 which resulted in energy and emissions savings in its most energy-intensive buildings and facilities. As part of the project, thorough accounting of the pre- and post- project energy consumption and operating costs of the Town's major municipal buildings were inventoried. This facilitated an accurate accounting of building and facilities-related emissions, which were the largest part of the Town's corporate GHG emissions profile. The 2021 baseline year will be used to project future business-as-usual (BAU) emissions and setting future GHG reduction targets.

2.3 Inventory Boundaries

The inventories account for all community emissions within the Municipality of the Town of Truro, with one notable exception. Millbrook is a Mi'kmaq First Nation located within the geographical boundary of Truro. The Mi'kmaq's traditional territory, Mi'kma'ki, covers the area now known as Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland, the Gaspé peninsula in Quebec, and Northern Maine. This territory has not been ceded and is instead governed by the Treaties of Peace and Friendship. The Municipality of the Town of Truro provides some civic services to Millbrook but does not have jurisdictional authority over Millbrook as a sovereign First Nation.

PCP Protocol guidance states that “a community GHG inventory should aim to capture emissions generated by all significant activities and sources within the jurisdictional boundary of the community.” As such, in respect to Millbrook's sovereignty, Truro's Community Inventory has excluded emissions generated by Millbrook. However, emissions from civic services provided to Millbrook from Truro have been included as cross-boundary emissions. Millbrook is currently developing its own Comprehensive Community Plan, and Truro will continue to work collaboratively with Millbrook to advance the sustainability and climate goals of both communities.

2.4 Operational Boundaries

The Corporate (Municipal) GHG inventory outlines the GHG emissions generated by a local government's operations and services. Its purpose is to identify the emissions within a local government's direct control or influence, and for which the local government is accountable as a corporate entity. This inventory covers facilities and operations over which Truro has direct authority to introduce and implement operating policies.

The community GHG inventory estimates GHG emissions generated within the community, from all significant activities occurring within its jurisdictional boundaries. It is to be expected that municipalities may have only limited control or influence over certain community activities.

There are several points of clarification over elements of Truro's operational control of community activities:

- **Millbrook:** As previously mentioned, the municipality does not have jurisdictional authority over Millbrook First Nation, even though it is located within the Town's geographic boundary. Emissions from activities from within Millbrook have not been included in Truro's community inventory. Municipal services extended to Millbrook have been included in Truro's Corporate Inventory.
- **Solid Waste Collection:** Solid waste collection for the Town of Truro is contracted to Miller Waste Systems. As Truro has significant influence over this service contract, emissions from Miller Waste Systems' fleet service for Truro were accounted for in Truro's GHG inventory.
- **Landfill Emissions:** Colchester Waste Resource Management is responsible for processing recyclables, organics, and garbage generated within Truro and Colchester County, at the Colchester Waste Management Park in Kempton, which is outside of Truro. Since Truro does not own or operate its own solid waste facilities, only the landfill emissions directly linked to Truro's community and corporate solid waste have been accounted for in Truro's community and corporate inventories.

- **Water and Wastewater Management:** Truro’s Victoria Park Water Treatment Plant (WTP) provides drinking water for the Town of Truro, and the WTP and associated pumping stations have been included in the corporate inventory. Wastewater treatment for the Town of Truro occurs at the Central Colchester Wastewater Treatment Facility (CCWWTF), located just outside of Truro. As such, the CCWWTF has been previously included in the GHG inventory for the Municipality of Colchester and excluded from Truro’s inventory.
- **Civic Services:** Truro operates its own Fire and Police Services, and provides winter snow clearing, street and sidewalk maintenance. Associated emissions have been accounted for in its corporate inventory.
- **The Rath-Eastlink Community Centre (RECC):** Located within the Town of Truro, the RECC is a joint owned venture of the Town of Truro and the Municipality of the County of Colchester. Each municipality has a 50% ownership stake, and the facility is operated as an independent not-for-profit society with a board of directors. For the purposes of Truro’s corporate inventory, 50% of the RECC’s energy and emissions were assigned to Truro, as it functionally has 50% operational control of the facility. 100% of the RECC’s emissions were included in Truro’s community inventory as it is within the Town’s boundary.

2.5 Greenhouse Gases and Global Warming Potential

Truro’s GHG inventories track three principal greenhouse gases: carbon Dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O). All three gases have different levels of Global Warming Potential (GWP), which is a measure of how much energy the emission of 1 ton of a gas will absorb over a given period, relative to the emission of 1 ton of CO₂, expressed as a CO₂ equivalent (CO₂e). Using CO₂e as a metric allows simplification of the reporting of GHG emissions. Therefore, in this report, GHG emissions are reported in units of total mass (tonnes of CO₂ e). The Intergovernmental Panel on Climate Change (IPCC) provided the following 100-year GWPs in its Fifth Assessment Report:

| Greenhouse Gas | Formula | Global Warming Potential |
|----------------|------------------|--------------------------|
| Carbon Dioxide | CO ₂ | 1 |
| Methane | CH ₄ | 28 |
| Nitrous oxide | N ₂ O | 265 |

2.6 PCP Requirements for Emissions Inventories

The PCP Program and its associated GHG inventory protocol require specific activities (or sectors) be estimated in both corporate and community inventories. Certain activities are mandatory, while others are optional and can be included if a municipality chooses to track them. Optional categories have not been included in Truro’s inventories due to lack of available data, or lack of activities in optional sectors. Activities captured in Truro’s inventories are shown below:

| Mandatory Corporate Inventory Sectors | Mandatory Community Inventory Sectors |
|--|--|
| Buildings and Facilities | Residential Energy Consumption |
| Fleet Vehicles | Commercial/Institutional Energy Consumption |
| Streetlights and Traffic Signals | Industrial Energy Consumption |
| Water and Wastewater Infrastructure | On-Road Transportation |
| Solid Waste | Local Public Transit Systems |
| | Solid Waste |

2.7 Data Sources

Both the Community and Corporate Inventories were conducted using a spreadsheet developed by EastPoint, based on the PCP Protocol’s guidance for compliant inventories with methodologies and adapted from the [City Inventory Reporting and Information System \(CIRIS\) tool](#). CIRIS is an accessible and easy-to-use Excel-based tool for managing, calculating and reporting community GHG data. Based on the Global Protocol for Community-scale Greenhouse Gas Emission Inventories (GPC) standard, the tool facilitates transparent calculation and reporting of emissions for all sectors. CIRIS was created by C40, a global network of nearly 100 mayors of the world’s leading cities that are united in action to confront the climate crisis. C40’s Knowledge Hub connects people with the information they need to accelerate climate action in cities³.

Whenever possible, activity data was collected by the Town of Truro and supplied to EastPoint for validation. In addition to data on the energy consumption of Truro’s buildings, facilities, fleet vehicles, and other infrastructure, the Town was also able to provide current GIS data detailing square footage of all residential and commercial space types.

Gaps in data were filled through standard assumptions and estimates following the established methodologies in the PCP protocol and the GPC protocol, as needed. Other major sources of information are outlined in the table below.

³ [C40 Knowledge Hub](#)

Table 3: Summary of Data Sources Used to Complete Truro's GHG Inventories

| Data Source | Data Type | Data Use and Assumptions |
|--|---|--|
| Community Inventory | | |
| Canada's 2021 Census of Population, Town of Truro ⁴ . | Demographic and population statistics | Used to model energy consumption and building and transportation sectors. |
| Canada's National Inventory Report (NIR), 1990-2022 ⁵ . | Canada's National GHG emissions inventory contains emissions specific to Nova Scotian sectors as well as commonly used emissions factors for various fuel types | Used to determine standard emissions factors for various sources of GHG emissions. |
| Environment and Climate Change Canada's Greenhouse Gas and Air Pollutant Emissions Projections ⁶ . | Historical and future GHG emissions from provincial electrical grids | <p>ECCC updates Canada's GHG emissions projections annually, reflecting the latest historical data and updated future economic and energy market assumption. For historical emissions, the electricity emissions calculated by the ECCC model are in general alignment with those reported in the NIR but may differ slightly.</p> <p>Since the scope of the inventories included forecast of future emissions in a 10-year business as usual scenario, the ECCC emissions factors for historical and future electricity grid emissions were used for both GHG inventories to allow for consistent comparison of future reductions compared to the baseline.</p> |
| Natural Resources Canada's National Energy Use Database (NEUD) ⁷ | Background analysis for energy and GHG indicators, statistics on energy consumption for various sectors | NUED provided activity data that was otherwise not available at the local level. Any provincial or regional data was downscaled to Truro based on population. |

⁴ [Census Profile, 2021 Census of Population, Truro, Town](#)

⁵ [National Inventory Report 1990 - 2022: Greenhouse Gas Sources and Sinks in Canada](#)

⁶ [ECCC - Canada's Greenhouse Gas and Air Pollutant Emissions Projections, 2023](#)

⁷ [NRCan's National Energy Use Database](#)

| Data Source | Data Type | Data Use and Assumptions |
|---|---|--|
| Community Inventory | | |
| Comprehensive Energy Use Database (CUED)⁸. | Sectoral energy consumption and GHG emissions data for residential, commercial, institutional, and transportation sectors | CUED provided activity data that was otherwise not available at the local level. Any provincial or regional data was downscaled to Truro based on population. |
| Google Environmental Insights Explorer (EIE)⁹. | Vehicle kilometers travelled data | EIE is a freely available data and insights tool that uses exclusive data sources and modeling capabilities to help cities and regions measure emissions sources, run analyses, and identify strategies to reduce emissions. EIE was used to estimate emissions of all trips within city boundaries based on aggregated, anonymized Location History data. Data for Colchester County was downscaled to Truro based on population. |
| Statistics Canada Database, Vehicle Registrations by Type of Vehicle and Fuel Type, 2021¹⁰. | Vehicle registration data for Nova Scotia | Used to estimate on-road transportation fuel consumption |
| Natural Resources Canada's Community Technology Assessment Platform (CTAP)¹¹. | Baseline energy data for Truro's residential sector | A tool developed by NRCan, CTAP was created to assist smaller municipalities, with less than 100,000 residents define a GHG baseline and retrofit programs for their residential building stock greenhouse gas (GHG) reductions. |

⁸ [Comprehensive Energy Use Database](#)

⁹ [Google EIE](#)

¹⁰ [Statistics Canada Vehicle Registration Data Table: 23-10-0308-01](#)

¹¹ [CTAP - Community Technology Assessment Platform](#)

| Data Source | Data Type | Data Use and Assumptions |
|--|---|--|
| Community Inventory | | |
| Nova Scotia’s Landfill Waste Audit 2023 (Divert NS)¹². | Waste stream audits of all provincial landfills, including Colchester Balefill Facility. | Used to determine organic content within solid waste streams (<i>Community and corporate</i>) |
| Town of Truro Geographic information system (GIS) data | Square footage of all residential, commercial/institutional, and industrial properties in Truro. | Used to calculate energy use for various building sectors, as well as the corporate inventory. |
| Corporate Inventory | | |
| Town of Truro Energy and Facility Renewal Report, 2019 | Stationary combustion and electricity consumption data for all major energy-consuming municipal buildings. | Used to calculate building and facility energy consumption for municipal assets, including water treatment plant and pumping stations. Assumed 2019 data as proxy for 2021 baseline building energy consumption. |
| 2021 Municipal Fleet Inventory | Inventory of all light-duty, medium-duty, and heavy-duty model vehicles in Truro’s municipal fleet, including Fire, Police, Admin, Parks and Recreation and Public Works vehicles, along with fuel cost data. | Used to calculate GHG emissions from municipal fleet. Where fuel cost data was not available, assumptions were made for average annual mileage driven based on odometer data or proxy data from CUED average mileage for various vehicles. Assumed 2021 fleet was the same size as 2019 fleet based on purchase dates of vehicles. |
| Streetlight and Traffic Signal Inventory | Inventory of all streetlights and traffic signals, along with associated wattages. | Used to calculate electricity consumption from streetlights and traffic signals |

¹² [Nova Scotia's Landfill Waste Audit, 2023](#)

2.8 Emissions Factors

Once data was collected, industry-standard emissions factors were applied to each energy source to calculate GHG emissions. The primary source of emissions factors was Canada’s National Inventory Report, Part 2, where emissions factors for stationary and mobile combustion emissions were sourced. Grid electricity factors were sourced from Environment and Climate Change Canada’s Greenhouse Gas and Air Pollutant Emissions Projections. ECCC updates Canada’s GHG emissions projections annually, reflecting the latest historical data and updated future economic and energy market assumptions. For historical emissions, the electricity emissions calculated by the ECCC model are in general alignment with those reported in the NIR but differ slightly due to differences in calculation methodologies.

Since the scope of PCP Milestone 1 includes forecast of future emissions in a 10-year business as usual scenario, the ECCC emissions factors for historical and future electricity grid emissions were used for both GHG inventories to allow for consistent comparison of future reductions compared to the baseline.

| Energy Source | Emission Factor |
|-------------------|--|
| Electricity, 2021 | 2021: 590 g/kWh CO ₂ e 2030: 84.6 g/kWh CO ₂ e |
| Heating Oil | Residential (g/L): CO ₂ : 2560 CH ₄ : 0.026 N ₂ O: 0.006 Commercial (g/L): CO ₂ : 2753 CH ₄ : 0.026 N ₂ O: 0.031 Industrial (g/L): CO ₂ : 2753 CH ₄ : 0.006 N ₂ O: 0.031 |
| Propane | Residential (g/L): CO ₂ : 1515 CH ₄ : 0.027 N ₂ O: 0.108 Other: CO₂ (g/L): CO ₂ : 1515 CH ₄ : 0.024 N ₂ O: 0.108 |
| Wood | Residential (g/kg): CO ₂ : 1715 CH ₄ : 0.1 N ₂ O: 0.07 Commercial (g/kg): CO ₂ : 1715 CH ₄ : 0.1 N ₂ O: 0.07 Industrial (g/kg): CO ₂ : 1539 CH ₄ : 12.9 N ₂ O: 0.12 |
| Gasoline | (g / L): CO ₂ : 2316 CH ₄ : 0.32 N ₂ O: 0.66 |
| Diesel | (g / L): CO ₂ : 2690.00 CH ₄ : 0.07 N ₂ O: 0.21 |

2.9 Emissions Quantification Calculation Methodologies

2.9.1 Community Emissions Inventory Methodologies

Below are summaries of the methodologies used to calculate the GHG emissions of various sectors of Truro’s Corporate and Community Inventories.

Table 4: Community Inventory Calculation Methodologies

| Metric | GHG Emissions Calculations | Data Sources |
|--|---|---|
| Residential Energy Consumption | | |
| Emissions From Residential Energy Consumption – Stationary Fuel Combustion | Quantity of fuel consumed multiplied by emissions factors for various fuels | <p>Number of residential units: 2021 Census of Population – Truro (Town)</p> <p>Vintage, Floor Space, Type, EUI of Residential Housing Stock: CUED: Residential Sector, Nova Scotia. Archetypes for Truro developed by NRCan through CTAP tool.</p> <p>Emissions Factors: NIR Annex 6.1, Emissions Factors for Fuel Combustion</p> |
| Emissions from Residential Energy Consumption - Electricity | Quantity of electricity consumed multiplied by provincial grid emissions factor | <p>Electricity Consumption: CTAP: Based on CUED values for Nova Scotian Building Stock and Archetypes for Truro developed by NRCan through CTAP tool.</p> <p>Provincial Emission Factor: Canada’s Greenhouse Gas and Air Pollutant Emissions Projections – Electric Grid Intensities by Province</p> |
| Commercial Energy Consumption | | |
| Emissions From Commercial Energy Consumption – Stationary Fuel Combustion | Quantity of fuel consumed multiplied by emissions factors for various fuels | <p>Square footage of commercial building space: Town of Truro GIS database</p> <p>Energy Usage Intensities of Various Commercial Building Types, Secondary Energy Use by Energy Source: CUED, Commercial/Institutional Sector, Atlantic Region</p> |

| Metric | GHG Emissions Calculations | Data Sources |
|--|--|---|
| | | <p>Emissions Factors: NIR Annex 6.1, Emissions Factors for Fuel Combustion</p> |
| <p>Emissions from Commercial Energy Consumption – Electricity</p> | <p>Quantity of electricity consumed multiplied by provincial grid emissions factor</p> | <p>Square footage of commercial building space: Town of Truro GIS database</p> <p>Energy Usage Intensities of Various Commercial Building Types, Secondary Energy Use by Energy Source: CUED, Commercial/Institutional Sector, Atlantic Region</p> <p>Provincial Emission Factor: Canada’s Greenhouse Gas and Air Pollutant Emissions Projections – Electric Grid Intensities by Province</p> |
| Industrial Energy Consumption* | | |
| <p>Emissions From Industrial Energy Consumption – Stationary Fuel Combustion</p> | <p>Quantity of fuel consumed multiplied by emissions factors for various fuels</p> | <p>Square footage of industrial building space*: Town of Truro GIS database</p> <p>Energy Usage Intensities of Various Commercial Building Types, Secondary Energy Use by Energy Source: CUED, Industrial Sector Atlantic Region</p> <p>Emissions Factors: NIR Annex 6.1, Emissions Factors for Fuel Combustion</p> |
| <p>Emissions from Industrial Energy Consumption – Electricity</p> | <p>Quantity of electricity consumed multiplied by provincial grid emissions factor</p> | <p>Square footage of industrial building space*: Town of Truro GIS database</p> <p>Energy Usage Intensities of Various Commercial Building Types, Secondary Energy Use by Energy Source: CUED, Industrial Sector, Atlantic Region</p> <p>Provincial Emission Factor: Canada’s Greenhouse Gas and Air Pollutant Emissions Projections – Electric Grid Intensities by Province</p> |

| Metric | GHG Emissions Calculations | Data Sources |
|---------------------------------------|--|--|
| On-Road Transportation | | |
| Emissions from on-road transportation | Quantity of fuel used multiplied by emission factor for fuel source | <p style="text-align: center;">Vehicle Kilometers Travelled: Google Environmental Insights Explorer data for Colchester County, NS. Downscaled to Truro based on 2021 Census data for respective populations.</p> <p style="text-align: center;">Vehicle and Fuel Types: Statistics Canada Vehicle registrations, by type of vehicle and fuel type, NS 2021. Downscaled to Truro based on 2021 Census population</p> <p style="text-align: center;">Average fuel consumption for on-road vehicles: CUED, Transportation Sector, NS</p> |
| Community Solid Waste | <p>Methane Commitment Model for landfill gas emissions:</p> $CO_2e = 25 \cdot M \cdot L_0 (1 - f_{rec}) (1 - OX)$ <p>CO₂e = Downstream GHG emission from methane associated with community solid waste sent to landfill</p> <p>L₀ = Methane generation potential (t CH₄/t waste)</p> <p>F_{rec} = Fraction of methane emissions recovered at the landfill</p> | <p style="text-align: center;">Total Waste Landfilled: Total Weight of Solid Waste Received by Colchester Balefill facility, 2021. Downscaled to Truro based on population.</p> <p style="text-align: center;">Degradable Organic Carbon: Divert NS 2023 Waste Audit Results, Colchester Balefill Facility</p> |

* The Town of Truro's GIS data does not differentiate between general commercial building space and industrial building space. Industrial building floor area was defined as "manufacturing industries and construction", and properties assigned to industrial square footage were determined through identification of local businesses with the Town of Truro.

2.9.2 Corporate Emissions Inventory Methodologies

Table 5: Corporate Emissions Calculation Methodologies

| Metric | GHG Emissions Calculations | Data Sources |
|---|---|--|
| Buildings and Facilities | | |
| Emissions from stationary fuel combustion | Quantity of fuel consumed multiplied by emissions factors for various fuels | <p>Fuel Consumption: Utility invoices, Building Energy Report provided by Town of Truro</p> <p>Emissions Factors: NIR Annex 6.1, Emissions Factors for Fuel Combustion</p> |
| Emissions from grid electricity | Quantity of electricity consumed multiplied by provincial grid emissions factor | <p>Fuel Consumption: Utility invoices, Building Energy Report provided by Town of Truro</p> <p>Provincial Emission Factor: Canada's Greenhouse Gas and Air Pollutant Emissions Projections – Electric Grid Intensities by Province</p> |
| Fleet Vehicles | | |
| Emissions from combustion of motor fuels | Quantity of Fuel Used multiplied by various emissions factors | <p>Fuel Consumption: Combination of fuel cost data and assumed mileage for municipal fleet, trip mileage data provided by service provider for solid waste collection</p> <p>Emissions Factors: NIR Table A6.1-15 Emission Factors for Energy Mobile Emissions Sources</p> |
| Water and Wastewater Treatment | | |
| Emissions from stationary combustion | None. Water Treatment Facility and pumping stations have no onsite combustion. Wastewater Treatment Facility Excluded from Inventory. | N/A |

| Metric | GHG Emissions Calculations | Data Sources |
|---|---|---|
| Emissions from grid electricity | Quantity of electricity consumed multiplied by provincial grid emissions factor | <p>Fuel Consumption: Utility invoices, Building Energy Report provided by Town of Truro</p> <p>Provincial Emission Factor: Canada’s Greenhouse Gas and Air Pollutant Emissions Projections – Electric Grid Intensities by Province</p> |
| Corporate Solid Waste | | |
| Emissions from solid waste produced by municipal buildings and facilities | <p>Methane Commitment Model for landfill gas emissions:</p> $CO_2e = 25 \cdot M \cdot L_0 (1 - f_{rec}) (1 - OX)$ <p>CO_2e = Downstream GHG emission from methane associated with community solid waste sent to landfill</p> <p>L_0 = Methane generation potential (t CH₄/t waste)</p> <p>F_{rec} = Fraction of methane emissions recovered at the landfill</p> | <p>Total Waste Landfilled: Total Weight of Solid Waste Received by Colchester Balefill facility, 2021. Downscaled to Truro’s municipal buildings based on ratio of municipal square footage compared to total square footage from GIS data.</p> <p>Degradable Organic Carbon: Divert NS 2023 Waste Audit Results, Colchester Balefill Facility (ICI sector)</p> |

3 COMMUNITY GHG INVENTORY METHODOLOGY AND RESULTS

3.1 Summary

Overall, the Town of Truro’s Community GHG emissions for 2021 are estimated to be 308,823 tonnes of carbon dioxide equivalent (CO₂e), or approximately 23.2 tonnes CO₂e per capita. This is significantly higher than the estimated 2021 per capita emissions for both Nova Scotia (14.7 tCO₂e) and Canada (17.5 tCO₂e)¹³. However, Truro’s emissions are much lower than per capita emissions in Alberta and Saskatchewan (57.6 tCO₂e and 56.8 tCO₂e, respectfully).

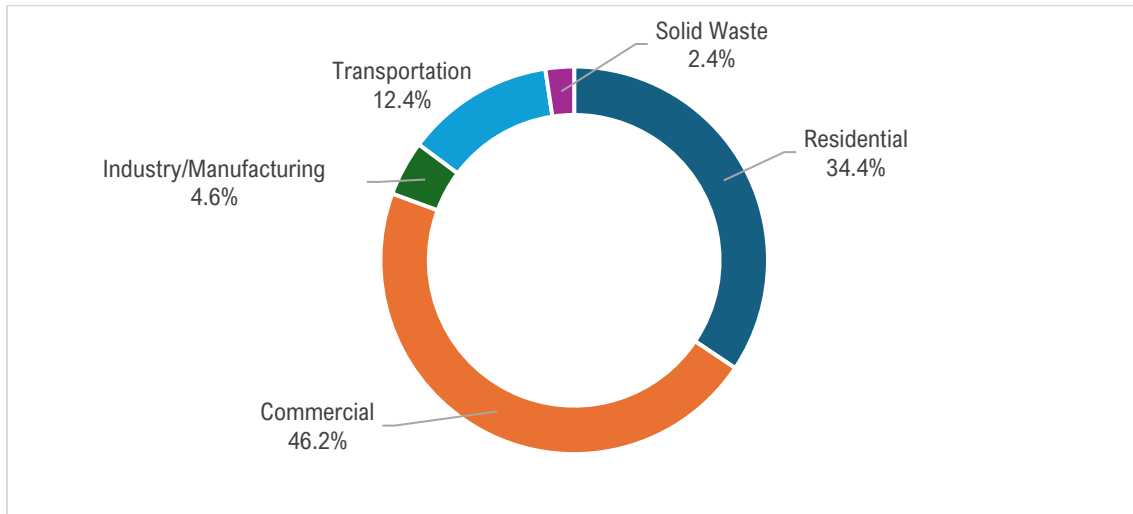
Truro’s GHG emissions per capita being higher than the provincial average is likely due to a combination of factors. One reason is a relative lack of public transit and alternative transportation options in Truro compared to more metropolitan areas like Halifax or other major Canadian cities. Larger cities also benefit from more dense urban centers, which act as a multiplier for reduced on-road transportation emissions and space heating requirements.

Table 6: 2021 Community GHG Emissions by Sector

| Community GHG Inventory Components | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Community GHG Emissions |
|---|--------------------------------|---|---------------------------------------|
| Residential Energy Consumption | 968,939 | 104,774 | 34.4% |
| Commercial/Institutional Energy Consumption | 1,093,446 | 140,790 | 46.2% |
| Industry/Manufacturing Energy Consumption | 171,679 | 14,048 | 4.6% |
| On-Road Transportation | 549,754 | 37,802 | 12.4% |
| Solid Waste | N/A | 7,275 | 2.4% |
| TOTAL | 2,783,818 | 304,689 | |

¹³ [NIR 2023](#).

Figure 3: 2021 Community GHG Emissions by Sector



Electricity is the largest source of Truro’s community GHG emissions (64.5%). This is due to the carbon intensity of Nova Scotia’s electricity grid, which relies heavily on fossil fuels for power generation. Fuel oil is the second largest source of community emissions (14.5%), as Truro does not have access to natural gas for heating. Gasoline is the third largest source of community emissions (10.2%), which is due to the general public’s reliance on personal vehicles for transportation.

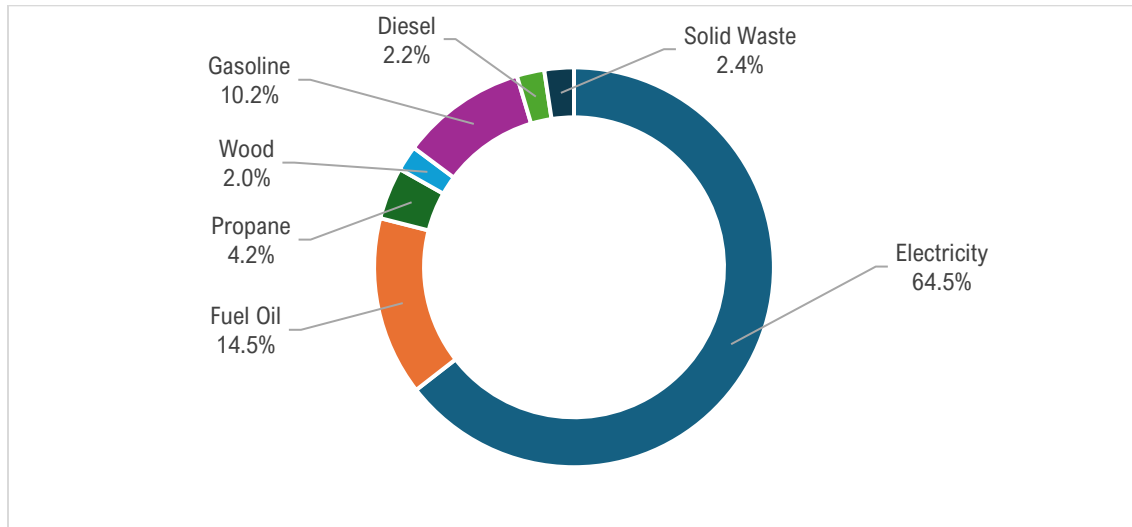
Table 7: 2021 Community GHG Emissions by Source

| Community Emissions Sources | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Community Emissions |
|-----------------------------|--------------------------------|---|-----------------------------------|
| Electricity | 1,197,815 | 196,476 | 64.5% |
| Fuel Oil | 607,376 | 44,093 | 14.5% |
| Gasoline | 462,435 | 31,020 | 10.2% |
| Propane | 212,259 | 12,839 | 4.2% |
| Diesel | 87,320 | 6,782 | 2.2% |
| Wood* | 216,614 | 6,204 | 2.0% |
| Solid Waste** | N/A | 7,275 | 2.4% |
| TOTAL | 2,783,818 | 304,689 | |

*CO₂ emissions associated with biomass (wood, wood residuals, pellets) are a source of biogenic emissions, which are considered carbon neutral in the PCP protocol and are excluded from the community inventory. However, CH₄ and N₂O emissions from biomass combustion are anthropogenic and are included in the inventory.

**Solid waste is not an energy source but does contribute to community GHG emissions.

Figure 4: 2021 Community GHG Emissions by Source



3.2 Residential Sector

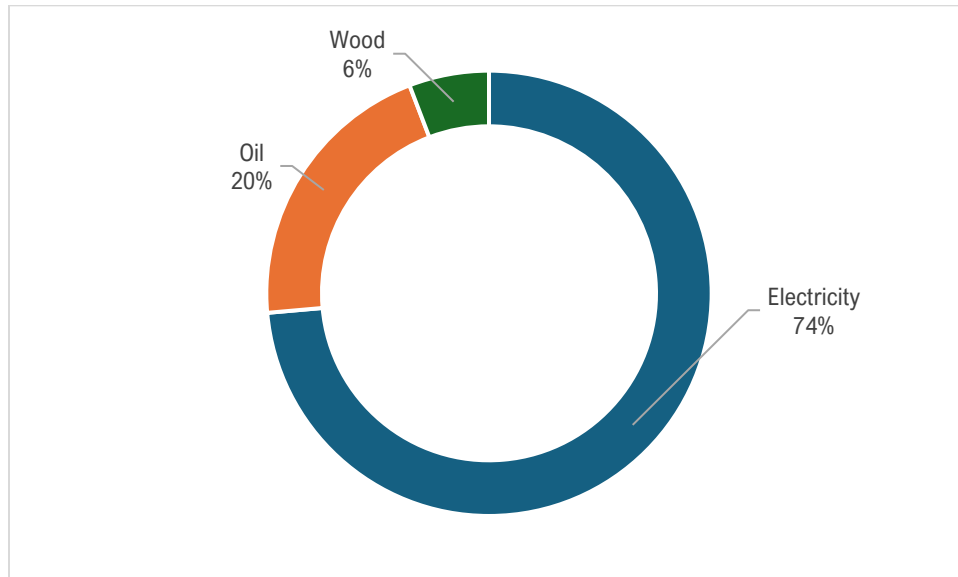
Residential Buildings make up approximately 34% of Truro’s community emissions. There are three main energy sources for the residential sector: electricity, fuel oil, and wood. There is no natural gas pipeline in Truro, unlike other areas of Nova Scotia. Based on CUED data, propane is a minor contributor to residential energy usage (less than 0.2%) and has been excluded from the inventory. CUED data that assigned residential heating to natural gas was instead assigned to fuel oil.

Wood is a significant source of residential energy usage in Truro (21%), as many residents rely on wood as an affordable and relatively reliable source of heat. With regard to the community GHG inventory, CO₂ emissions associated with biomass (wood, wood residuals, pellets) are a source of biogenic emissions, which are considered carbon neutral in the PCP protocol and are excluded from the community inventory. However, CH₄ and N₂O emissions from biomass combustion are considered anthropogenic (originating from human activity) and are included in the inventory.

Figure 5: Residential GHG Emissions by Source

| Residential Energy Source | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Residential Emissions |
|---------------------------|--------------------------------|---|-------------------------------------|
| Electricity | 477,403 | 78,308 | 74% |
| Oil | 290,888 | 20,289 | 20% |
| Wood | 200,648 | 6,177 | 4% |
| TOTAL | 968,939 | 104,774 | 100% |

Figure 6: Residential GHG Emissions by Source



Baseline emissions for the residential sector were calculated using Natural Resources Canada's Community Technology Assessment Platform (CTAP), which was released in March 2024. CTAP was created to assist municipalities with less than 100,000 residents to establish GHG emissions baselines and develop decarbonization strategies for the residential buildings sector. CTAP uses a combination of publicly available data (NUED and CUED database values for provincial housing stock, census data for population and number of private dwellings) along with proprietary NRCan data (GITHUB inventory of over 6800 residential building archetypes over 1.5 million residential energy audits).

CTAP comes pre-populated with default data for 51 regions in Canada, containing building archetypes and weather data for various regions. There are three modeled regions for Nova Scotia, and one of the three regions is based Truro's local climate conditions. The 2021 baseline year was not available for modeling within CTAP, so the final estimates for energy consumption were scaled up by 0.25% to account for increases in housing stock between 2020 and 2021.

CTAP's results were validated through creation of an independent energy modeling analysis by EastPoint which also leveraged NUED, CUED, and 2021 Census data, combined with Truro's GIS mapping data estimates of residential square footage. Average square footage for Truro's residential properties was multiplied by CUED data for gross thermal requirements for various building types, vintages and primary fuel types to calculate estimated secondary energy consumption. All heating that was attributed to natural gas at a provincial level was assigned instead to fuel oil.

When compared to CTAP's results, the quantities were within an acceptable range of each other, with acknowledgement of CTAP's ability to pull local weather data and specific energy modeling data from their building archetype database likely contributing to a more accurate calculation methodology than solely using sectoral data. Therefore, CTAP's estimated energy use for the residential buildings sector was considered acceptable for the purposes of this inventory.

3.3 Commercial and Institutional Sector

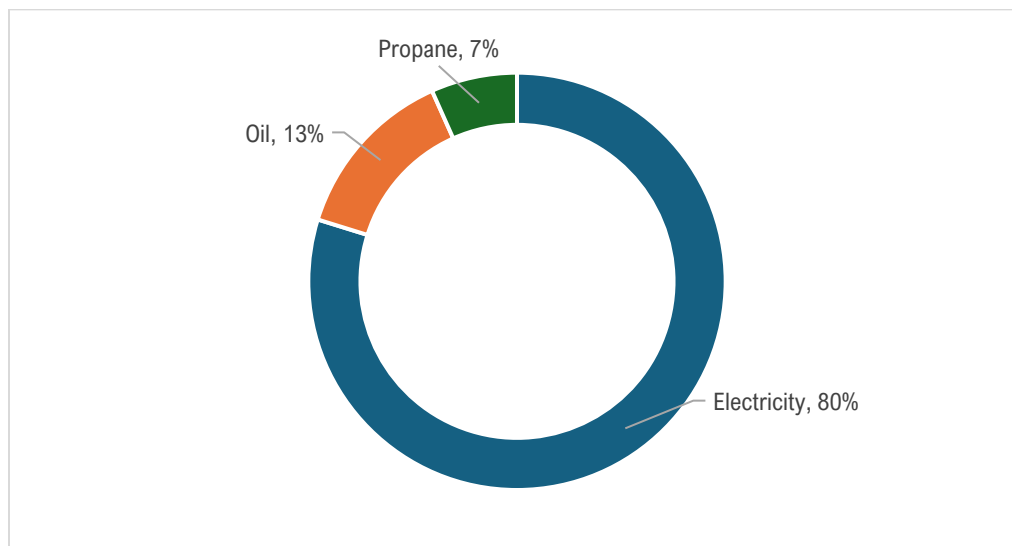
Commercial and Institutional buildings account for the largest contribution to Truro’s community emissions (45.6%). This is consistent with Truro’s GIS data, which shows that commercial and residential square footage is roughly the same within Truro, with commercial buildings having a higher average EUI than residential buildings. Truro is home to a large industrial park with a variety of different business types, as well as the Colchester East Hants Health Centre, several public schools that serve the greater Truro area, and the Truro Campus of Nova Scotia Community College.

The three main energy sources for the commercial and institutional sector: electricity, oil, and propane. Wood is not a statistically significant contributor to commercial and institutional energy use at the Atlantic region level according to CUED statistics, so wood use was excluded from the commercial and institutional category.

Table 8: Commercial and Institutional GHG Emissions by Source

| Commercial Energy Source | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Commercial Emissions |
|--------------------------|--------------------------------|---|------------------------------------|
| Electricity | 685,218 | 112,396 | 80% |
| Oil | 251,335 | 18,905 | 13% |
| Propane | 156,893 | 9,490 | 7% |
| TOTAL | 1,093,446 | 140,790 | 100% |

Figure 7: Commercial and Institutional GHG Emissions by Source



Based on review of industry standard practices, it is typically challenging to estimate commercial sector GHG emissions in Atlantic Canada, since the CUED’s data is aggregated for the entire Atlantic Canadian

region. Square footage and space type data aggregated at a regional level is typically downscaled to a local level based on population, which can lead to high margins of error.

For this project, commercial and institutional energy consumption was modeled based on the GIS data provided by the Town of Truro. GIS data for every property with existing commercial units was sorted into one of eight different space types; this was facilitated by the accuracy of the GIS data which tracked the names or uses of most commercial building entries along with number of commercial units in mixed-use building types. Spot checks were conducted based on addresses throughout the process to ensure that the GIS data accurately reflected current conditions.

Each space type was assigned energy use intensities and secondary energy source shares from the CUED database for the commercial/institutional sector Atlantic Canada. Any secondary energy use that the CUED attributed to natural gas was divided equally between fuel oil and propane. The CUED assigns a high percentage of commercial energy consumption in Atlantic Canada as coming from electricity, which paired with Nova Scotia's carbon-intensive electricity grid leads to electricity consumption being a major source of commercial GHG emissions.

EastPoint noted that since Truro's GIS data tracks gross floor area of the footprint of each building, the calculated square footage for each building potentially overestimates the amount of square footage for buildings with more than one floor. This is because it is unlikely that all floors in a building have the same square footage, especially buildings such as warehouses which typically have mezzanine spaces that only cover a small portion of gross floor area. Given that the GIS data was generally a much more accurate tool to estimate energy consumption, that CUED data aggregated at a regional level, this was considered an acceptable margin of error.

3.4 Industrial Emissions

Industrial emissions make up approximately 4.6% of Truro's community inventory. In similar fashion to commercial building emissions, manufacturing industry and construction square footage was determined through Truro's GIS data. EastPoint worked with the Town of Truro to identify local businesses that fit into the *Manufacturing Industry and Construction* space types (industries that involve the creation of a product or focus on the process of construction).

EastPoint conducted a desktop review of the businesses flagged as industrial in nature to identify how each business used energy and what types of fuel were used onsite. It was determined that both fuel sources and business types did not align well with CUED data on aggregated industrial sector data for the Atlantic region, which are more focused on larger industrial plants and facilities not found in Truro. Instead, EastPoint assigned energy sources based on CUED's data for disaggregated industrial industries at a Canadian level, specific to the type of facility at each location identified by Truro. A sensitivity analysis of estimated energy usage intensity was used to determine appropriate EUIs based on EastPoint's experience with commercial and industrial facilities.

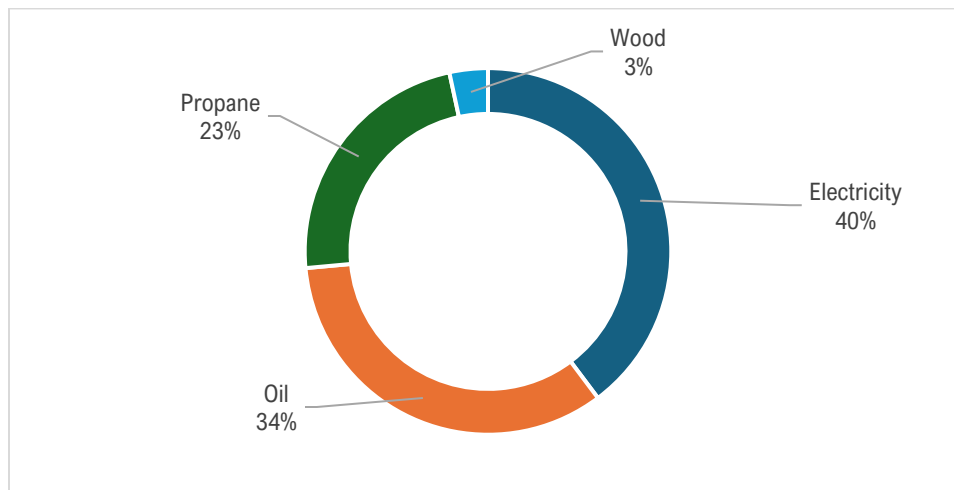
There is a moderate level of uncertainty introduced by assuming representative EUIs for Truro's facilities. In further iterations of the GHG inventory, it is recommended that industrial and manufacturing facilities in the Town be approached directly to better quantify their average annual energy consumption.

Table 9: Industrial GHG Emissions by Source

| Industrial Energy Source | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Industrial Emissions |
|--------------------------|--------------------------------|---|------------------------------------|
| Electricity | 35,194 | 5,773 | 40% |
| Oil | 65,152 | 4,906 | 34% |
| Propane | 55,366 | 3,349 | 23% |
| Wood* | 15,966 | 491.75 | 3% |
| TOTAL | 171,679 | 14,520 | 100% |

*CO₂ emissions associated with biomass (wood, wood residuals, pellets) are a source of biogenic emissions, which are considered carbon neutral in the PCP protocol and are excluded from the community inventory. However, CH₄ and N₂O emissions from biomass combustion are anthropogenic and are included in the inventory.

Figure 8: Industrial GHG Emissions by Source



3.5 Transportation Emissions

Transportation emissions contribute to approximately 13.4% of Truro’s community GHG emissions. Calculation methodology involved leveraging vehicle kilometers travelled (VKT) data from Google’s Environmental Insights Explorer (EIE). EIE uses aggregated anonymous location history data to determine VKT over all local roads in a given jurisdiction and provides an estimate of annual vehicle trips by mode and total vehicle distance traveled for a given year. EIE data is GPC protocol compliant; the data includes all trips within the Town’s boundary, as well as 50% of outbound trips and 50% of inbound trips.

VKT data was not available for the Town of Truro but was available for Colchester County. Regional data for motor vehicle travel was downscaled based on population to provide an estimate of Truro’s VKT. Since the

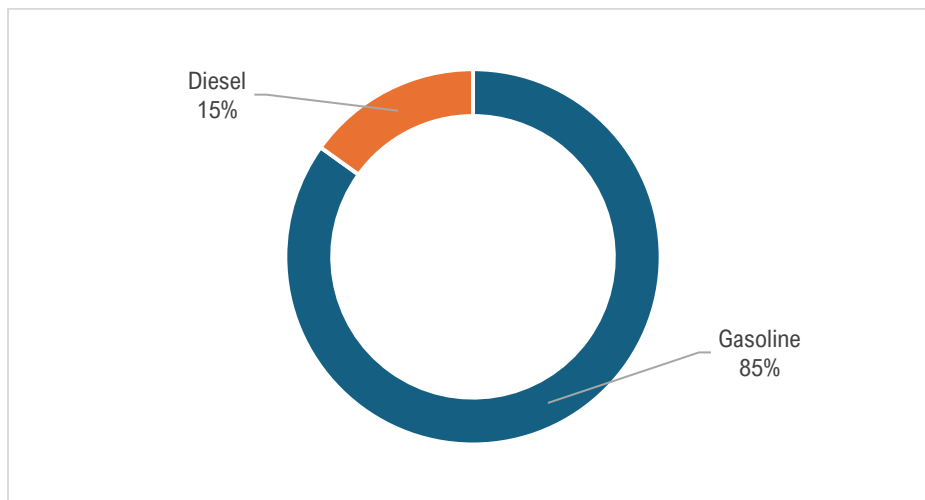
Town’s 2021 baseline year occurred during the COVID-19 pandemic when travel patterns were disrupted, 2023 VKT data was used as proxy data to give a more accurate representation of a typical year. The VKT data was then assigned to various vehicle classes (light-duty vehicles, light duty trucks, heavy duty trucks, motorcycles) and fuel types (gasoline, diesel) based on Statistics Canada data for vehicle registrations in Nova Scotia for 2021. Next, CUED data for average fuel consumption for each vehicle type was used to calculate the estimated amount of fuel required by each vehicle type. Finally, total annual fuel consumption was multiplied by corresponding emissions factors to determine total emissions.

As expected, gasoline contributes most transportation sector emissions. This is because gasoline was the listed fuel source for approximately 93% of vehicles in Nova Scotia in 2021. Any electric vehicle battery charging was assumed to be a small fraction of overall transportation emissions as EVs were less than 1% of the overall NS vehicle stock in 2021. EV charging emissions were assumed to be captured in electricity consumption for the building sector.

Table 10: Community Transportation Emissions by Source

| Transportation Fuel Source | Annual Energy Consumption (GJ) | Tonnes CO ₂ e | Percentage of Transportation Emissions |
|----------------------------|--------------------------------|--------------------------|--|
| Gasoline | 462,435 | 31,020 | 85% |
| Diesel | 87,320 | 6,782 | 15% |
| TOTAL | 549,754 | 37,802 | 100% |

Figure 9: Community Transportation Emissions by Source



3.6 Community Solid Waste

Emissions from decomposition of organics sent to landfill contributed to 2.4% of Truro's baseline community emissions in 2021. When solid waste is landfilled, its organic components decompose over time into simpler carbon compounds by bacteria in an anaerobic (oxygen poor) environment generating CH₄ and CO₂ emissions. The CO₂ emissions associated with the decomposition of the organic waste are of biogenic origin and are excluded from the GHG inventory. Landfill emissions are unique in that solid waste disposed in landfills generates emissions over many years.

Truro does not own or operate its own solid waste facilities. As per the PCP protocol, only the landfill emissions directly linked to Truro's annual community solid waste have been accounted for in Truro's community inventory. Divert NS conducted waste audits at every provincial landfill in 2023, and their waste audit report is a valuable source of information which allows for highly accurate estimation of community solid waste emissions.

Total annual tonnage of solid waste received at the Colchester Balefill facility in 2023 for both residential and ICI waste streams was downscaled to Truro based on population. 2023 data was used as a proxy year for 2021, as it was assumed the total quantity of waste was approximately similar between the two years. Overall landfill waste stream composition from the Divert NS waste audit of the Colchester Balefill facility was used to determine the degradable organic carbon content of the waste stream. This information was used to estimate the emissions from community solid waste using the Methane Commitment Model outlined in the PCP Protocol.

Table 11: Community Solid Waste Emissions by Source

| Community Solid Waste Generated by Truro (Tonnes) | Annual GHG Emissions (Tonnes CO₂e) |
|--|--|
| 4,920 | 7,275 |

4 CORPORATE GHG INVENTORY METHODOLOGY AND RESULTS

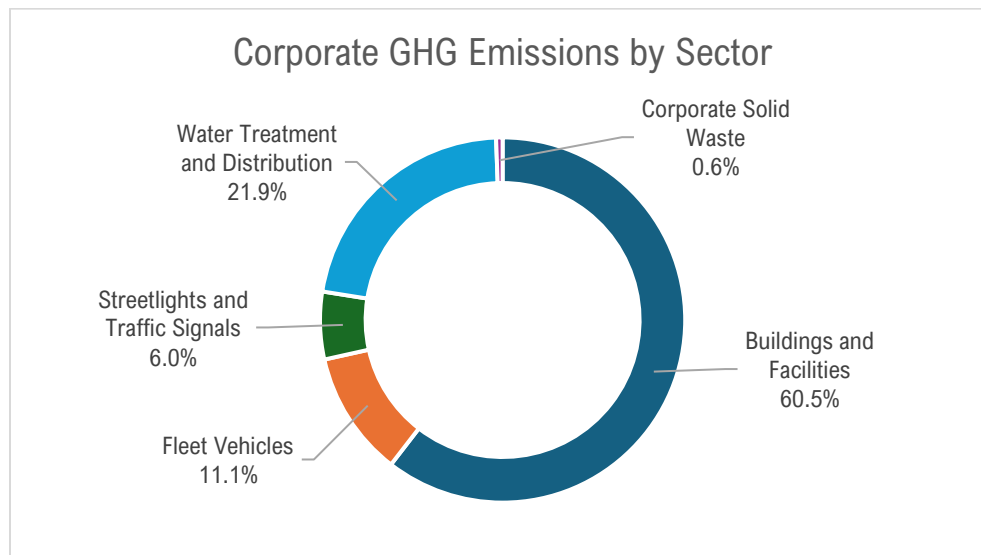
4.1 Summary

Truro's municipal operations resulted in an estimated 4,970 tonnes of emissions in the 2021 baseline year. Most corporate emissions came from municipal buildings and facilities (60.5%), followed by energy use by Truro's Water Treatment Plant (WTP) and associated pumping stations (21.9%). Fleet vehicles make up 13.2% of emissions, with streetlights and traffic signals contributing 6% and corporate solid waste making up the final 0.6% of corporate emissions.

Table 12: 2021 Corporate GHG Inventory by Sector

| Corporate GHG Inventory Sectors | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Corporate Emissions |
|-------------------------------------|--------------------------------|---|-----------------------------------|
| Buildings and Facilities | 24,388 | 3,005 | 60.5% |
| Fleet Vehicles | 3,530 | 550 | 11.1% |
| Streetlights and Traffic Signals | 1,811 | 297 | 6.0% |
| Water and Wastewater Infrastructure | 6,643 | 1,090 | 21.9% |
| Solid Waste | | 28 | 0.6% |
| TOTAL | 36,373 | 4,970 | |

Figure 10: 2021 Corporate GHG Inventory by Sector



The largest source of corporate emissions is electricity consumption (71.7%), because the Town's most energy-intensive buildings and systems, including its water treatment plant and the Rath-Eastlink Community Centre) are fully electrified. This is encouraging in terms of emissions reductions planning, as Truro's corporate emissions should drop significantly as the Nova Scotian electricity grid is decarbonized.

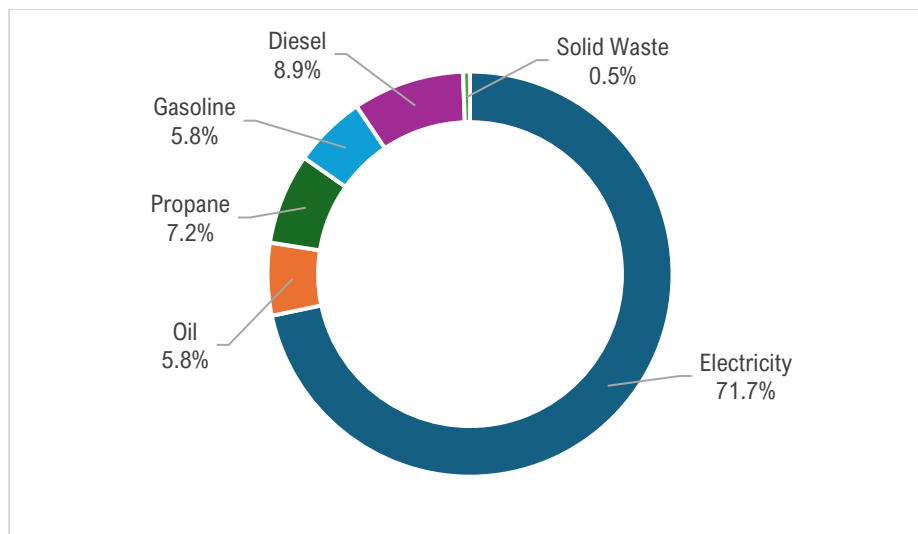
The next largest source of emissions is diesel fuel (8.9%), which is primarily used by medium- and heavy-duty fleet vehicles in Truro’s Public Works fleet as well as by contracted solid waste collection. Propane contributes to 7.2% of corporate emissions, notably the Town has converted several buildings (Colchester Legion Stadium, Douglas Street Recreation Centre, Public Works Building) to high-efficiency propane boilers in recent years, which reduced emissions associated with heating oil use substantially. Gasoline and heating oil both contribute approximately 5.8% of corporate emissions, with corporate solid waste contributing 0.5%.

Table 13: 2021 Corporate GHG Emissions by Source

| Corporate Emissions Sources | Annual Energy Consumption (GJ) | Annual GHG Emissions (Metric Tonnes of CO ₂ e) | Percentage of Corporate Emissions |
|-----------------------------|--------------------------------|---|-----------------------------------|
| Electricity | 22,663 | 3,717 | 71.7% |
| Oil | 3,983 | 300 | 5.8% |
| Propane | 6,196 | 375 | 7.2% |
| Gasoline | 3,096 | 225 | 5.8% |
| Diesel | 435 | 325 | 8.9% |
| <i>Solid Waste*</i> | | 28 | 0.5% |
| TOTAL | 36,373 | 4,970 | |

*Solid waste is not an energy source but does contribute to community GHG emissions.

Figure 11: Corporate GHG Emissions by Energy Source



4.2 Buildings and Facilities Emissions

Truro's municipal buildings and facilities are responsible for 58% of Truro's corporate emissions. As the municipality operates several large facilities and buildings that provide essential public services and recreation opportunities to its residents, emissions from stationary combustion and electricity consumption at municipal facilities will be a primary focus of any future decarbonization efforts.

Community Recreation Facilities produce approximately 56% of total emissions in this sector. The largest contributor is the Rath-Eastlink Community Centre (RECC), which accounts for approximately 43% of Truro's building sector emissions. As noted in Section 2.4: Operational Boundaries, Truro shares joint-ownership of the RECC with the Municipality of Colchester, so 50% of its emissions have been assigned to Truro's corporate inventory. Since the RECC was built with a geothermal ground-source heat pump system, its heating and cooling is fully electrified and its GHG emissions are expected to decline over time as Nova Scotia's grid is decarbonized.

The next largest source of municipal building emissions is the Colchester Legion Stadium at 16%. The Legion Stadium has recently had a new propane heating system installed and as of 2024 is currently having a new refrigeration plant installed. Finally, the Douglas Street Recreation Center is a former school that has seen significant investment in energy efficiency since the Town took it over and contributes approximately 5% of corporate building emissions. The Truro Amateur Athletic Club Grounds accounts for less than 1% of emissions.

A group of municipal buildings located at or near Truro's Civic Square on Prince Street (Police Station, Fire Station, Public Library, Farmer's Market, and Town Hall) combine to produce approximately 35% of corporate building emissions.

Other remaining core municipal buildings, including the Public Works building in Truro's industrial park produce 8.4% of emissions, with accessory buildings contributing less than 0.5% of emissions in this sector.

Figure 12: Corporate GHG Emissions by Source

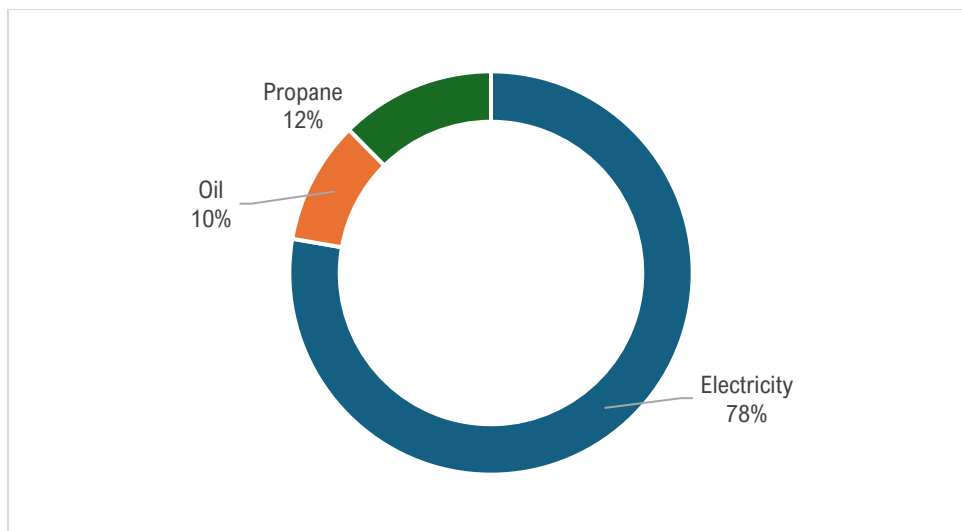
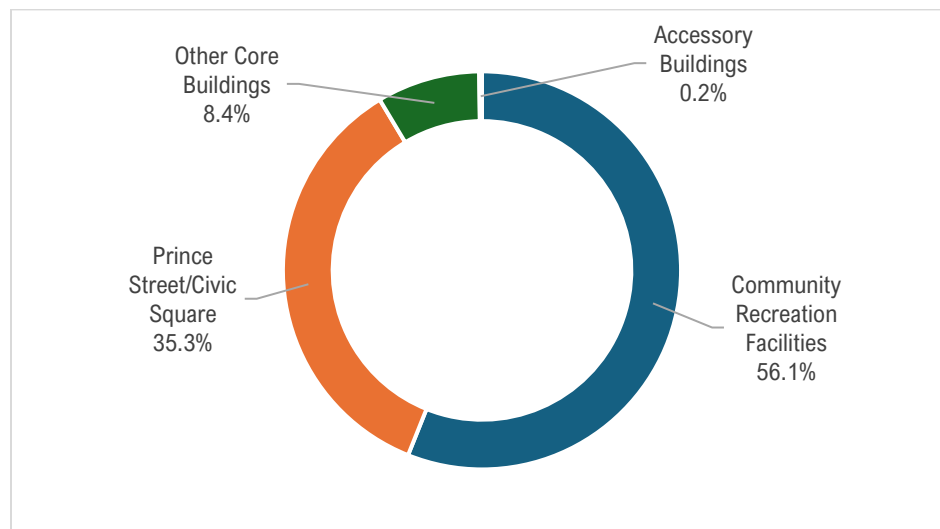


Table 14: 2021 Baseline Energy Consumption and GHG Emissions for Truro's Core Municipal Buildings

| Facility | Electricity Use (kWh) | Fuel Oil (L) | Propane (L) | Total GHGs | Percentage of Building Sector Emissions |
|------------------------------|-----------------------|----------------|----------------|--------------|---|
| Town Hall | 222,825 | 14,322 | - | 171 | 5.7% |
| Police Station | 242,360 | 27,123 | - | 218 | 7.3% |
| New Fire Hall | 125,040 | 23,625 | - | 139 | 4.6% |
| TAAC Building | 9,993 | 4,097 | - | 17 | 0.6% |
| Willow Street Warehouse | 9,917 | - | - | 6 | 0.2% |
| Old Fire Hall - Market | 70,320 | 2,407 | 3,519 | 54 | 1.8% |
| Library (Old Normal College) | 262,260 | 35,331 | - | 252 | 8.4% |
| Welcome Centre | 21,250 | - | - | 13 | 0.4% |
| New Public Works | 113,400 | - | 73,046 | 179 | 6.0% |
| Douglas Recreation Centre | 61,840 | - | 68,664 | 142 | 4.7% |
| Colchester Legion Stadium | 562,700 | - | 97,858 | 482 | 16.1% |
| Rath Eastlink CC | 4,327,200 | - | - | 2,555* | 42.6% |
| Victoria Park Pool | 72,450 | - | - | 43 | 1.4% |
| Accessory Buildings | 9,044 | - | - | 5 | 0.2% |
| Total | 3,946,999 | 106,906 | 243,086 | 2,360 | |

*Only 50% of the RECC's GHG emissions have been attributed to Truro's Corporate Inventory

Figure 13: Corporate Inventory Building Emissions



The calculation of emissions from municipal buildings and facilities was based on Truro's GIS data as well as electricity and fuel use collected as part of a recent energy project. As part of an Energy Performance Contract (EPC) to improve energy efficiency and reduce emissions in 2019, a utility map was created that listed all utility accounts and electrical meters at Truro's most energy intensive sites. While creating the community GHG inventory, these buildings and Facilities were deemed Truro's "Core" building stock, which are estimated to account for the majority of municipal building energy consumption. The data used for the Core building stock's baseline was from January – December 2018. This was determined to be an accurate source of representative baseline building performance data for two reasons:

- Data for 2020 and 2021 was not representative of normal operations due to the impact of the COVID-19 pandemic.
- Since the EPC project was not completed until 2022, it was assumed that the guaranteed savings from the project would not be fully realized until after 2021.

Therefore, the EPC's project's baseline data for 2018 was assumed to be representative proxy data for the GHG inventory's baseline year of 2021. However, some corrections to the data were made to ensure an accurate GHG emissions baseline. Some municipal buildings underwent changes in heating fuel between 2018 and 2021. Notably, the Colchester Legion Stadium and the Public Works buildings had older fuel oil boilers replaced with new high-efficiency propane boilers. Heating fuel energy consumption was assigned to the new fuel source based on the differences in efficiency between the older and newer heating systems. This allowed for a more accurate representation of the fuel mix of Truro's buildings in the 2021 baseline.

Truro also owns a portfolio of smaller accessory buildings located throughout the Town, for which energy consumptions data was unavailable. Space types included storage facilities, outdoor shelters, sheds, and public gazebos. These accessory buildings were assumed to be fully electric. The total square footage of these facilities was captured from Truro's GIS data, and a general commercial EUI was applied to estimate energy consumption. Overall, this part of Truro's building portfolio is estimated to be less than 1% of their overall energy consumption.

4.3 Corporate Fleet Emissions

Truro's corporate fleet is responsible for approximately 11.1% of corporate emissions. Truro's fleet consists of light, medium and heavy-duty vehicles which support day-day operations of its administrative office, Parks and Recreation Department, Police and Fire Services, and its Public Works Department. The Public Works Department uses heavy-duty trucks and equipment to support municipal street and sidewalk work and snow clearing activities. The Parks and Recreation Department also uses smaller off-road vehicles for maintenance of public recreation areas such as Victoria Park.

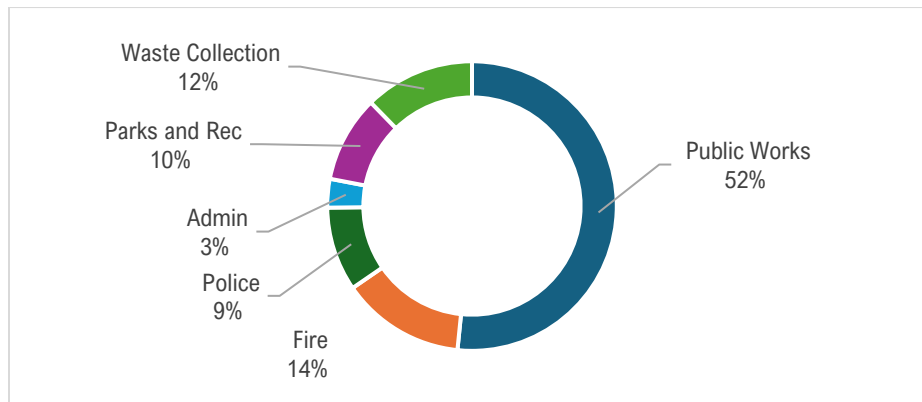
Fleet vehicle emissions were calculated through provided fuel cost data and fleet vehicle inventories from the Town of Truro's various departments. Fuel cost data was prorated to estimated fuel consumption by using average annual fuel costs for Nova Scotia in 2021. Where fuel cost data was not available, proxy data and average annual mileage data from Statistics Canada and the CUED was used to fill in any gaps.

The Public Works Department fleet is the largest contributor to corporate fleet emissions, which is due to the heavy-duty vehicles and equipment it uses to provide its services. Fire services and contracted solid waste collectors also use heavy-duty vehicles, which is reflected in the overall emissions of their fleets. As a result of heavy-duty vehicle use, diesel fuel is the main source of corporate fleet emissions.

Table 15: Corporate Fleet Vehicle Emissions by Fleet Division

| Fleet Vehicles | Gas | Diesel | GHG Emissions (tCO ₂ e) | Percentage of Fleet Emissions |
|----------------------|------------------|-------------------|------------------------------------|-------------------------------|
| Public Works | 33,792.94 | 76,925.78 | 285.65 | 52% |
| Fire Service | 11,780.55 | 18,113.64 | 76.15 | 14% |
| Police Service | 21,555.90 | - | 50.12 | 9% |
| Administration | 7,335.69 | - | 17.06 | 3% |
| Parks and Recreation | 22,161.00 | - | 51.52 | 10% |
| Waste Collection | - | 25,686.37 | 69.15 | 12% |
| TOTAL | 96,626.08 | 120,725.79 | 549.64 | |

Figure 14: Corporate Fleet Vehicle Emissions by Fleet Division



4.4 Corporate Solid Waste

Emissions from decomposition of landfilled organics in corporate solid waste are approximately 0.7% of corporate emissions. Historically, Truro operated a landfill inside Town limits, located off Young Street, near the current site of the Railyard Mountain Bike Park and Water Treatment Plant. This site was closed in 1997 and there is limited information available about the length of the site's operation or quantity of solid waste received. The expected lifecycle of landfill gas generation indicates that peak gas production usually occurs 5 to 7 years after waste is dumped, and almost all gas is produced within 20 years¹⁴. Based on the date of the site's closure, the expected production of landfill gas is estimated to be minimal. Due to a lack of data on the size of the landfill site and volume of waste generated, potential GHG emissions from the site have been excluded from the corporate inventory.

¹⁴ <https://www.epa.gov/lmop/basic-information-about-landfill-gas>

Truro does not own or operate its own solid waste facility. All community solid waste is processed through Colchester Resource Waste Management, and the Colchester Waste Management Park is located in Kemptown, which is outside of Truro’s town boundaries. According to the PCP Protocol, since Truro does not own or operate its own solid waste landfill, its corporate inventory must estimate GHG emissions based on the amount of solid waste collected from corporate waste bins during the baseline inventory year.

Data on total solid waste received from the Town of Truro was provided by Colchester Waste Management Park, along with waste stream data specific to the ICI (Institutional, Commercial, Industrial) sector in Truro. This data was used to estimate the average annual quantity of solid waste generated in Truro’s ICI sector. This average value was then multiplied by the total square footage of the Town’s Core building portfolio to estimate total quantity of solid waste generated by the Town’s facilities in 2021. Estimated annual methane emissions resulting from organic waste decomposition in solid waste generated by Truro’s corporate buildings were calculated using the methane commitment model method as described in the PCP protocol.

Table 16: Corporate Solid Waste Emissions

| Corporate Solid Waste Generated by Truro (Tonnes) | Annual GHG Emissions (Tonnes CO _{2e}) |
|---|---|
| 139 | 28 |

4.5 Streetlights and Traffic Signals

Streetlights and traffic signals contribute 6.8% of Truro’s corporate emissions. Overall, 79% of emissions in this category are from streetlight operation, as the town has 1587 streetlights with an average annual electricity consumption of 251 kWh/year per fixture, while there are 398 traffic lights with an average annual electricity consumption of 263 kWh/year per fixture. It is expected that energy demand will increase over time as the city expands and creates new neighbourhoods and transportation routes, but overall GHG emissions are expected to decrease as the electricity grid becomes less carbon-intensive over time.

The Town of Truro’s Engineering and Public Works Department provided a current inventory of all traffic signals and streetlights. Data provided included total fixture count and wattage (kW) of all fixtures. Conservative annual operating schedules were assumed for traffic signals (24hr operation) and streetlights (12 hours operation per day) to estimate total annual electricity demand. All traffic signals and most streetlights use LED fixtures.

Table 17: Corporate Streetlights and Traffic Signal Emissions

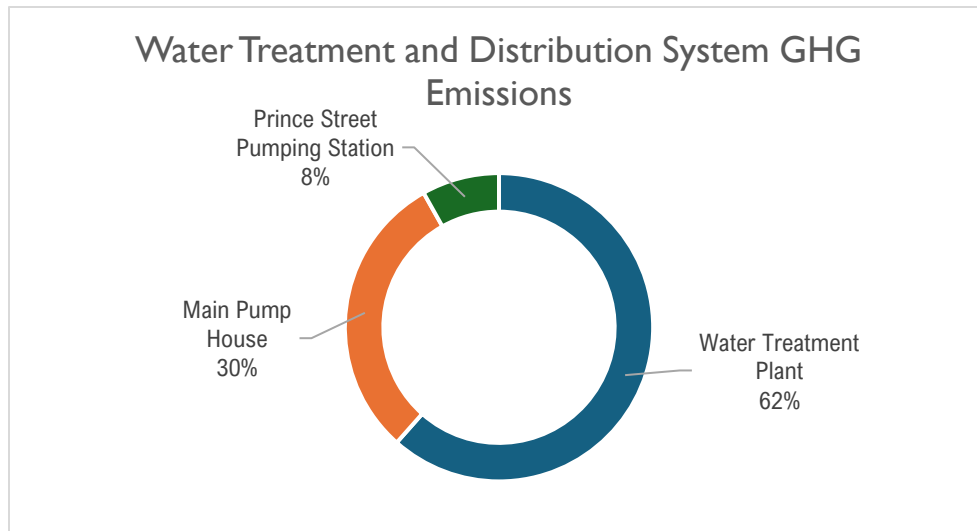
| | Annual Energy Consumption (GJ) | Annual GHG Emissions (Tonnes CO _{2e}) | Percentage of Sectoral Emissions |
|-----------------|--------------------------------|---|----------------------------------|
| Traffic Signals | 377 | 62 | 21% |
| Streetlights | 1,434 | 235 | 79% |
| Total | 1,811 | 297 | |

4.6 Water and Wastewater

The water and wastewater category tracks energy consumption associated with the use of energy by municipal water and wastewater infrastructure. According to the PCP protocol, GHG emissions from infrastructure owned or operated by regional authorities or other municipalities can be excluded from the Corporate Inventory. While Truro operates its own water treatment plant and associated pumping stations, Truro's wastewater is treated at the Central Colchester Wastewater Treatment Facility (CCWWTF), which is owned and operated by Colchester County. Therefore, emissions from wastewater treatment have been excluded from Truro's Corporate Inventory.

Truro's water treatment and distribution systems represent 25.1% of Corporate GHG emissions. Truro's main source of emissions in this category is the Water Treatment Plant, located next to the Town's reservoir, near Victoria Park. The facility is heated electrically and houses equipment for producing potable water for the Town. The Main Pump House for the Treatment Plant is located approximately 500m away and houses large pumps that supply the water to the Plant. The Town also operates a Pumping Station on Prince Street which contains three large pumps for water distribution. Associated energy consumption is expected to scale proportionally with community growth, while emissions are expected to decrease gradually over the next 10 years as Nova Scotia's electricity grid becomes less carbon intensive.

Figure 15: Corporate Water Treatment and Distribution Emissions



5 BUSINESS AS USUAL (BAU) FORECAST

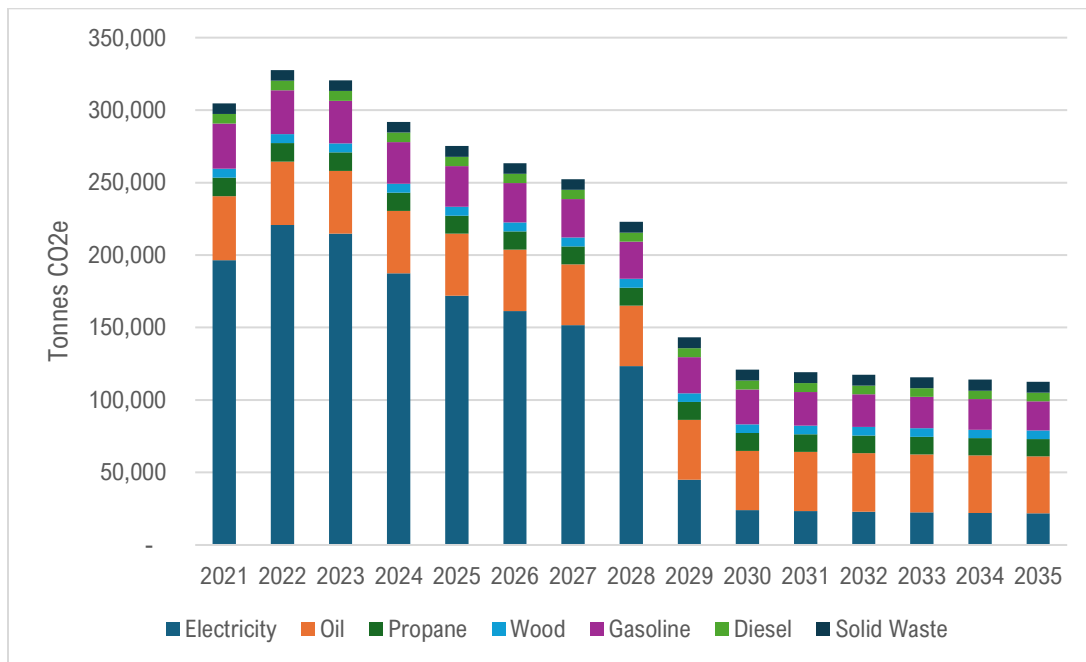
The PCP program requires a Business as Usual (BAU) forecast for approximately 10 years beyond the community’s baseline. Since a goal of Truro’s CEEP was a 10-year implementation plan with a timeline of 2025-2035, it was decided to forecast BAU emissions in 2035, which is 14 years past Truro’s baseline year of 2021. Forecasting out to 2035 provides the Town of Truro an estimation of what their energy consumption and GHG emissions would look like if the Town took further mitigation measures are taken beyond their 2021 baseline. The BAU forecast represents emissions reductions likely to occur without municipal or local action. The main factors contributing to the BAU projection include gradual increases in population, decarbonization of the provincial electricity grid, increased fuel efficiency standards for new vehicles, and federally mandated electric vehicle sales.

Based on the forecast, if Truro takes no further action, community emissions are estimated to decrease by approximately 60% by 2035. This is largely due to legislated targets for grid electricity decarbonization, which Nova Scotia setting goals of 80% renewable electricity and no coal-fired power production by 2030.

Figure 16: 2021 Baseline Energy and Emissions Compared to Estimated 2035 Values

| Year | Energy Use (kWh) | GHG Emissions (tCO ₂ e) |
|------|------------------|------------------------------------|
| 2021 | 2,783,818 | 304,689 |
| 2035 | 2,628,759 | 112,619 |

Figure 17: GHG Forecast to 2035 based on Business as Usual (BAU) Scenario



| BAU Modeling Assumptions | | |
|--|--|---|
| Metric | Assumption | Source |
| Population Growth | 0.3% per year | 2021 Truro-Colchester Housing Needs Assessment |
| Rate of Deep Energy Retrofits | 0.8% of homes each year | 2023 Efficiency NS Whitepaper – Deep Energy Retrofits in Nova Scotia |
| Rate of Residential and Commercial Solar | 0.5% of buildings in 2021, scaling to 2% by 2035 | 2023 Canadian Market Outlook for Behind the Meter Solar |
| Vehicle Fuel Efficiency | 0.35% Improvement each year | Based on past trends |
| Electricity Grid Intensity | 2021: 590.5 gCO ₂ e/kWh 2030: 84.6 gCO ₂ e/kWh 2030-2035 Held Constant | ECCC Electricity Grid Intensity Projections, 2024 Nova Scotia Climate Plan |
| Electric Vehicle Adoption | 2026 - 20% of new sales 2030 – 30% of new sales 2035 – 100% of new sales | Federal EV sales targets |
| New Construction | 2% more efficient every 5 years | Based on current trends, assumes new national building codes are not adopted in Nova Scotia by 2035 |

APPENDIX B

Climate Profile: Town of Truro
Provided by ClimAtlantic

Truro's Community Energy and Emissions Plan



Climate Profile: Town of Truro

The information below shows historical and future climate information for the community. All data is from the national climate data portal, ClimateData.ca.



Temperature and precipitation data represent an average year across four periods of time, using the latest median results from international models (CMIP6). Results for the end of the century (2071-2100) are shown for both low emission (SSP2-4.5) and high emission scenarios (SSP5-8.5). Sea level rise (CMIP5) is shown for each decade, using the range of model results (5th-95th percentile) for a high scenario only (RCP8.5).

Temperature

| Climate Index | 1981-2010 | 2011-2040 | 2041-2070 | 2071-2100 [low] | 2071-2100 [high] |
|----------------------------------|-----------|-----------|-----------|-----------------|------------------|
| Average temperature: Spring (°C) | 4.3 | 5.7 | 7.4 | 7.4 | 9.2 |
| Average temperature: Summer (°C) | 17.5 | 18.8 | 20.6 | 20.7 | 23.4 |
| Average temperature: Fall (°C) | 8.9 | 10.1 | 12.0 | 12.0 | 14.4 |
| Average temperature: Winter (°C) | -4.7 | -3.0 | -0.8 | -0.9 | 1.3 |
| Hottest day (°C) | 30.7 | 32.0 | 33.6 | 34.2 | 36.2 |
| Extremely hot days (> 29°C) | 5 days | 11 days | 28 days | 27 days | 57 days |
| Coldest day (°C) | -25.7 | -22.7 | -19.0 | -18.7 | -14.3 |
| Extremely cold days (< -15°C) | 24 days | 15 days | 6 days | 6 days | 1 day |
| Ice days (entire day below 0°C) | 54 days | 41 days | 27 days | 26 days | 14 days |
| Heating degree days | 4314 | 3880 | 3335 | 3337 | 2822 |
| Cooling degree days | 126 | 204 | 349 | 346 | 652 |

Precipitation

| Climate Index | 1981-2010 | 2011-2040 | 2041-2070 | 2071-2100 [low] | 2071-2100 [high] |
|------------------------------------|-----------|-----------|-----------|-----------------|------------------|
| Total precipitation: Spring (mm) | 269 | 290 | 302 | 303 | 310 |
| Total precipitation: Summer (mm) | 256 | 272 | 280 | 273 | 281 |
| Total precipitation: Fall (mm) | 318 | 330 | 335 | 332 | 338 |
| Total precipitation: Winter (mm) | 326 | 344 | 364 | 365 | 396 |
| Wet days (more than 1 mm) | 144 days | 145 days | 144 days | 145 days | 142 days |
| Very wet days (more than 20 mm) | 13 days | 15 days | 16 days | 16 days | 18 days |
| Maximum one-day precipitation (mm) | 51 | 55 | 58 | 57 | 64 |

Sea level rise

| Year | 2010 | 2020 | 2030 | 2040 | 2050 | 2060 | 2070 | 2080 | 2090 | 2100 |
|---|------|------|------|------|------|------|------|------|------|------|
| Minimum (5 th percentile, cm) | 3 | 5 | 9 | 13 | 19 | 24 | 28 | 34 | 41 | 44 |
| Median (50 th percentile, cm) | 7 | 11 | 19 | 24 | 34 | 42 | 50 | 61 | 72 | 81 |
| Maximum (95 th percentile, cm) | 12 | 17 | 29 | 36 | 49 | 59 | 73 | 88 | 103 | 119 |

Glossary

Average temperature: Describes the average temperature for the 24-hour day. The average temperature is an environmental indicator with many applications in agriculture, engineering, health, energy management, recreation, and more.

Hottest day: Describes the warmest daytime temperature. In general, the hottest day of the year occurs during the summer months. When temperatures are very hot, people – especially the elderly – are much more likely to suffer from heat exhaustion and heat stroke. Many outdoor activities become dangerous or impossible in very high temperatures.

Extremely hot days: Describes the number of days where the daytime high temperature is warmer than 29°C. This temperature threshold is the typical criteria for issuing a heat warning in Nova Scotia.

Coldest day: Describes the lowest nighttime temperature. In general, the coldest day of the year occurs during the winter months. Cold temperatures affect our health and safety, determine what plants and animals can live in the area, limit or enable outdoor activities, define how we design our buildings and vehicles, and shape our transportation and energy use.

Extremely cold days: Describes the number of days where the lowest temperature of the day is colder than -15°C. This index gives an indication of the number of very cold days.

Ice days: Describe the number of days where the warmest temperature of the day is not above 0°C. In other words, this index indicates the number of days when temperatures have remained below freezing for the entire 24-hour period. This index is an indicator of the length and severity of the winter season.

Heating degree days: Gives an indication of the amount of space heating (e.g., from a furnace) that may be required to maintain comfortable conditions in a building during cooler months. When the daily average temperature is colder than the threshold temperature (18°C), heating degree days accumulate.

Cooling degree days: Gives an indication of the amount of space cooling (air conditioning) that may be required to maintain comfortable conditions in a building during warmer months. When the daily average temperature is hotter than the threshold temperature (18°C), cooling degree days accumulate.

Total precipitation: Describes the total amount of precipitation (rain and snow combined) that falls. Precipitation significantly impacts water availability, agricultural practices, electricity generation and wildfire suppression.

Wet days: Describes the number of days where at least 1 mm of precipitation falls. This index generally captures every day when there is measurable precipitation.

Very wet days: Describes the number of days where at least 20 mm of precipitation falls. Short duration, high intensity rainfall events may lead to flash flooding; heavy snowfall events disrupt transportation.

Maximum one-day precipitation: Describes the largest amount of precipitation that typically falls within a single 24-hour day. This index is commonly referred to as the average wettest day of the year.

Sea level change: The change in ocean level relative to land. Attributed to thermal expansion of water and meltwater from glaciers, ice caps, and ice sheets, along with vertical motion of the land. Projected sea level change is relative to 1986-2005 conditions.

APPENDIX C

Community Engagement Results

Truro's Community Energy and Emissions Plan



Community Engagement Results

Organizational sessions, interviews, workshops and a public survey were conducted to capture a diversity of community perspectives to shape understanding and ground planning efforts. This information is helping to shape plan goals, principals, strategies and the assessment of strategies.

One-hour sessions were organized with local organizations. A background document and presentation were sent in advance of the sessions. This information provided ideas on potential plan strategies to start the discussion. Notes were taken and sent back to the organization representative for confirmation. Sixteen organizations were contacted for sessions. Sessions were held with representatives of eleven organizations. Survey information was sent to all organizations. Notes were analyzed for themes (Table 1).

- Living Earth Council – Met and forwarded the survey
- BGC Truro & Colchester – Met and forwarded the survey
- Truro and Colchester Partnership for Economic Prosperity - Met and forwarded the survey
- Truro Housing Outreach Society – Met and forwarded the survey
- United Way of Colchester County - Met and forwarded the survey
- Steps on Arthur - Met and forwarded the survey
- Dal AC - Met and forwarded the survey
- Downtown Truro Business - Met and forwarded the survey
- Truro Farmers Market - Met and forwarded the survey
- Confederacy of Mainland Mi'kmaq - Met and forwarded the survey
- Millbrook First Nation planning staff - Met

Information on specific strategy options was gathered through focussed interviews/meetings.

- AREA
- Municipality of Colchester
- Roswall
- Efficiency One
- NS District Health Authority

- Climatlantic
- Departmental staff at Town of Truro

A Steering Committee with Town staff, Councillors and community members was created to provide advice on the Plan and planning process. Committee members provided guidance on groups to connect with, strategy ideas, and communications.

Town staff and planning team members attended the Low Carbon Leadership Conference in June to workshop strategy ideas around transportation management and learn and engage with participants working on similar planning efforts.

Table 1. Key Themes from Organizational Sessions

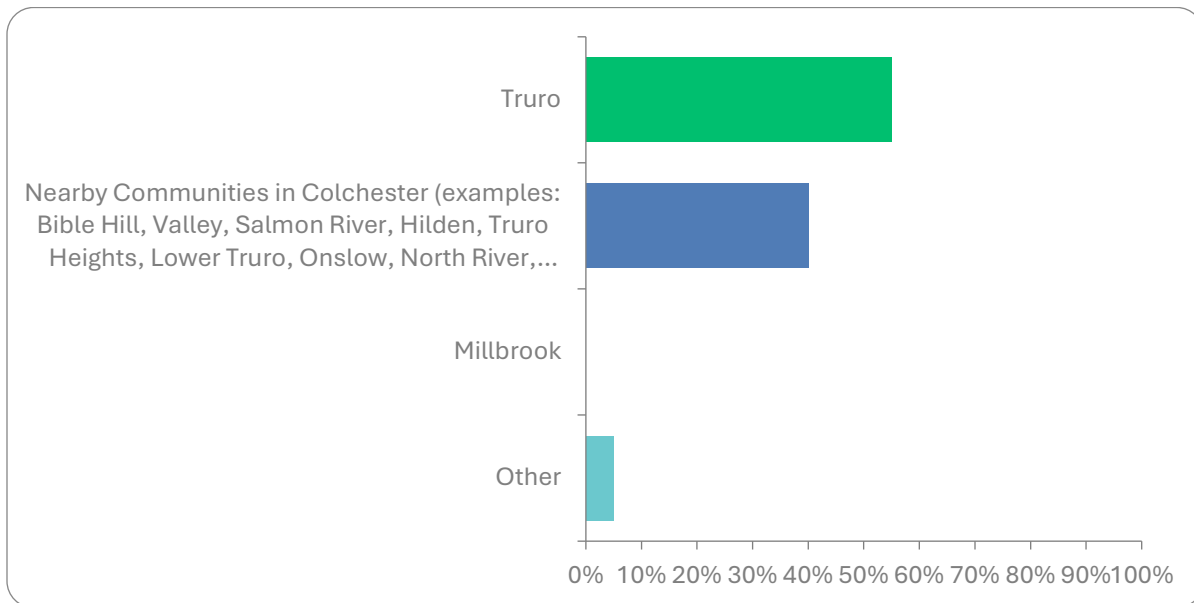
| Plan Elements | Key Themes |
|----------------------------|--|
| Goals and Targets | <ul style="list-style-type: none"> • Affordability is top of mind. Policies and programs should not drive-up costs. Those most vulnerable will be impacted the greatest. • Targets need to be meaningful and outline practical action to get there. More substance less flash. • More education is important for individuals (such as navigating programs) and community-based initiatives such as social enterprises and volunteer efforts. • Connecting to community and active transportation plan goals make sense along with subsequent carbon goals. |
| Principals | <ul style="list-style-type: none"> • Affordability and energy equity were identified the most. • Other principles mentioned included collaboration, leadership, accountability, fairness, equity, diversity and inclusion, synergy and action. One comment was made that Collaboration shouldn't be at all costs. |
| Strategies: Buildings | <ul style="list-style-type: none"> • Rebates, grants and subsidies, community and contractor education, social enterprises and volunteer programs with a focus on equity were mentioned the most. • Other strategies identified by some included space utilization, green building standards, green revolving fund concept, incentives for meeting standards such as green space, density, affordability and environmental performance, renewables, and small district energy. |
| Strategies: Transportation | <ul style="list-style-type: none"> • Transit and safe, accessible and connected cycling and pedestrian infrastructure were the top mentions. Reasons were affordability, equity, and fair access. |

| Plan Elements | Key Themes |
|------------------------------------|--|
| | <ul style="list-style-type: none"> • Transit and cycling were mentioned as providing commuter, living, health, recreational, and environmental benefits. Cycling is seen to be more accessible with e-bikes. • Few mentions for EV charging for business benefits. |
| Strategies: Natural Environment | <ul style="list-style-type: none"> • Some top mentions included urban tree planting for flooding, food, absorbing carbon, beauty, cooling, and biodiversity. • Other mentions included the tree replacement policy and developer incentives to save green space. • Indigenous Protected and Conserved Areas are an important strategy for the protection of the environment and cultural areas. |
| Strategies: Waste | <ul style="list-style-type: none"> • Free store was mentioned as a top strategy along with other activities to promote and expand programs for the reuse of items and recovery of food. • Some other mentions included sustainable procurement, promoting local farmers, using clean organics for farm fertilizer as opposed to mixed in with general waste, and more education. |
| Implementation | <ul style="list-style-type: none"> • Having staff and resources were listed as the most mentioned strategy. • Concerns that permit fees and other fees would impact affordability. • Some mentions that parking fees in certain areas could help fund transportation initiatives potentially. |

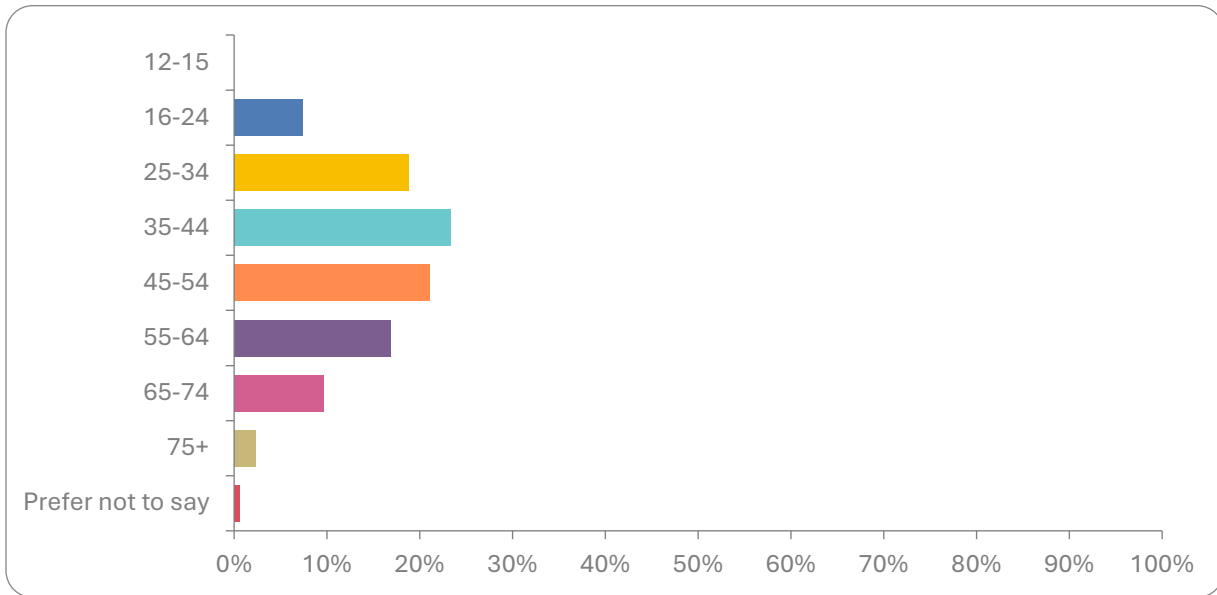
Public Survey Results

A public survey was promoted from June 3rd to June 23, 2024 through social media, organizations, and town promotional efforts. 485 Responses were received with 55% from Truro, 40% from nearby communities; and 5% from other locations. Participants provided feedback on their knowledge, concern and strategy ideas. Survey results confirmed trends seen in organizational meetings while offering some additional insights.

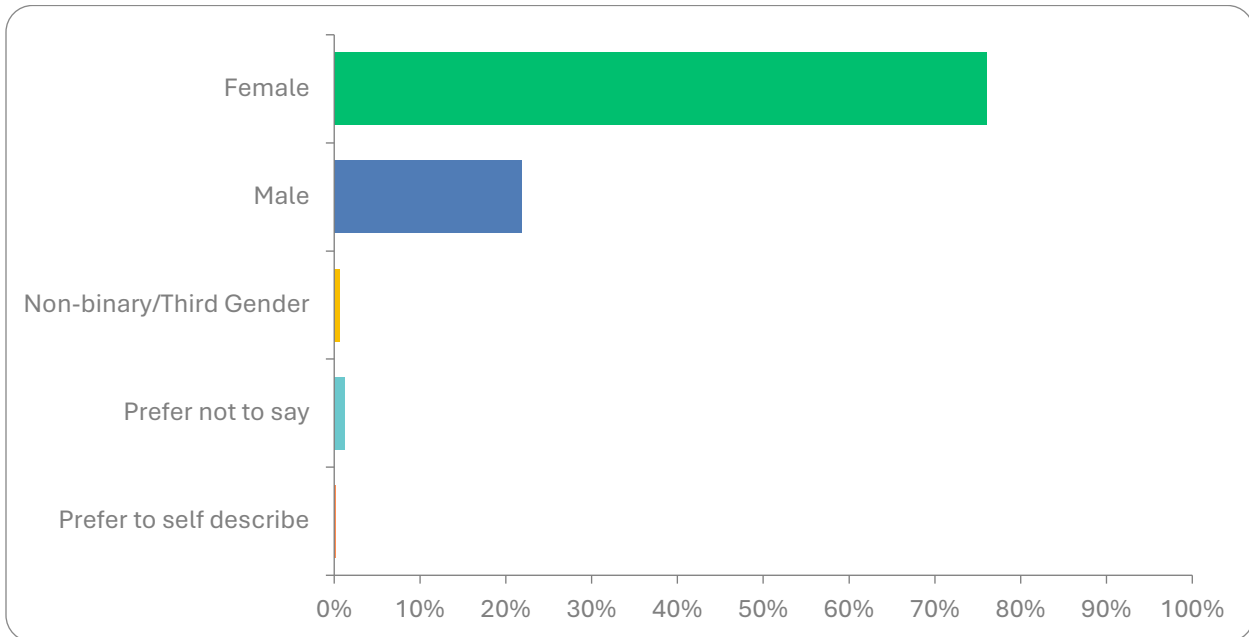
Q.1: Where Do You Live



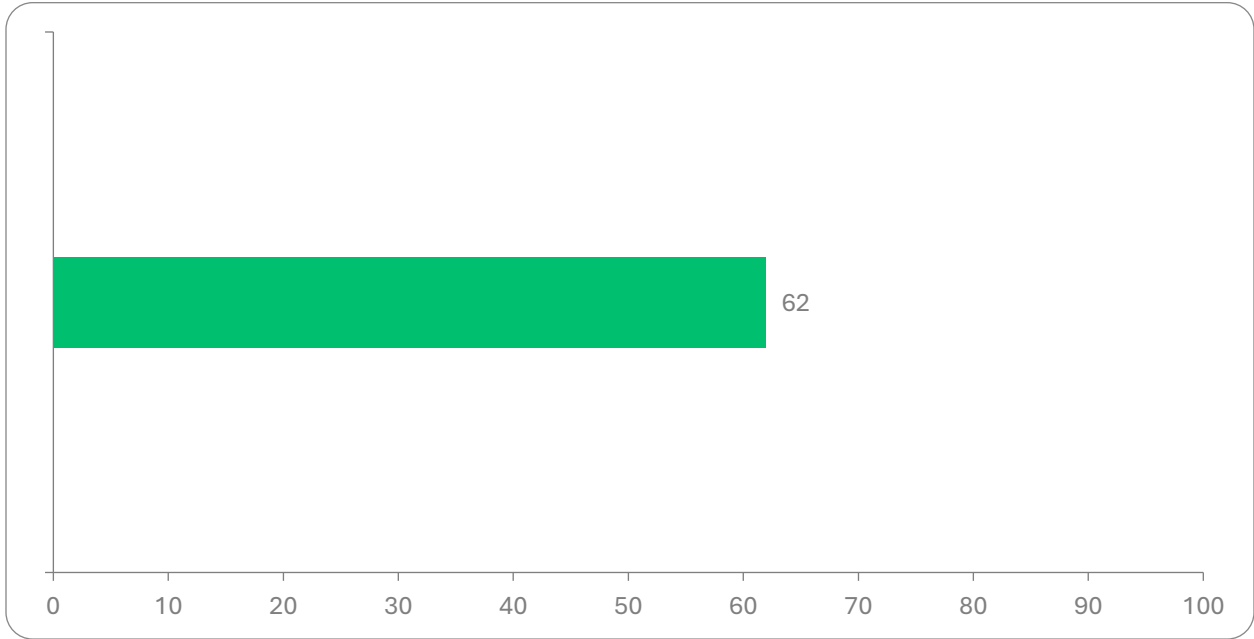
Q.2: What is your age?



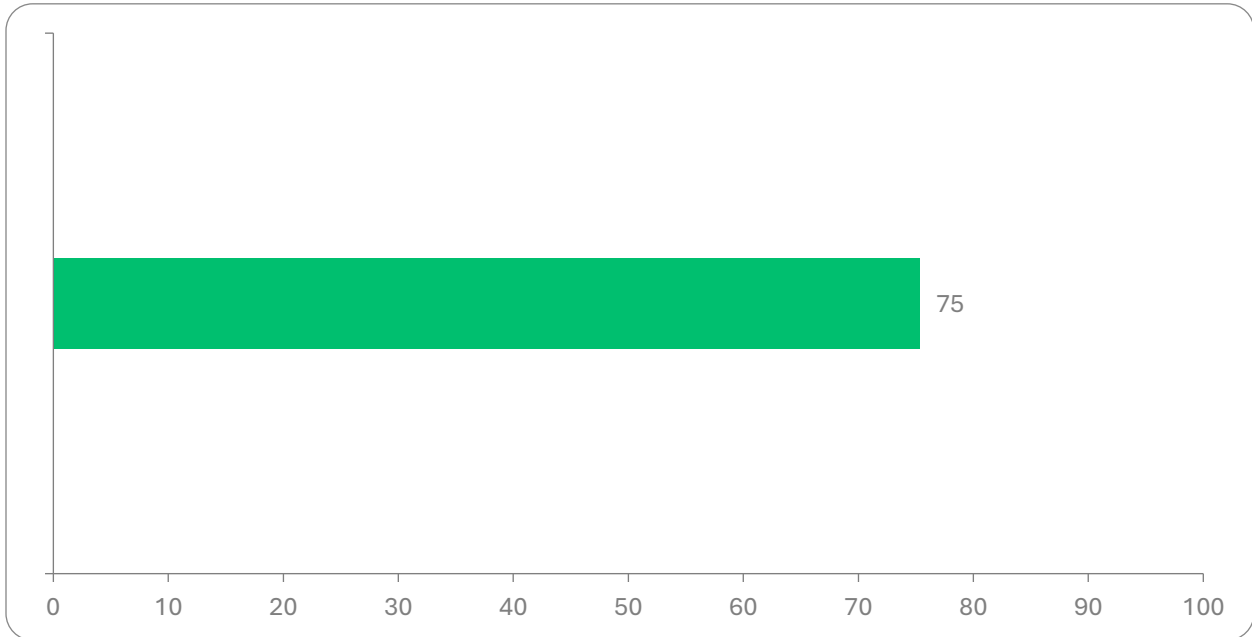
Q.3: What is your gender?



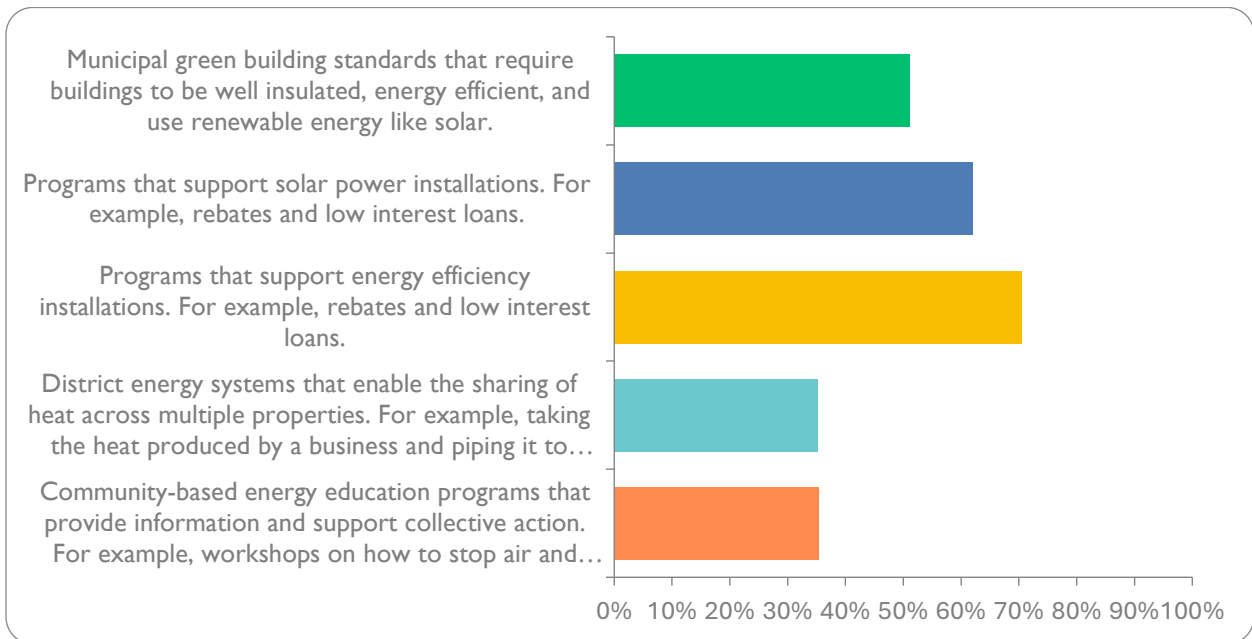
Q4: How would you describe your knowledge of climate change?



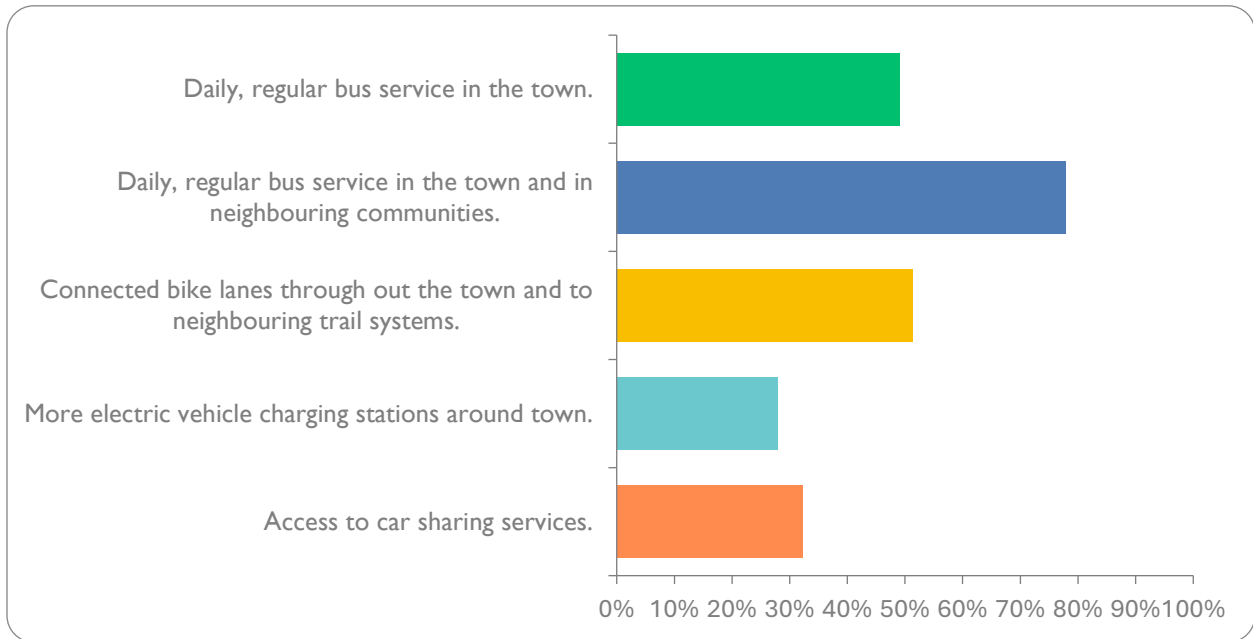
Q5: How would you describe your concern about climate change?



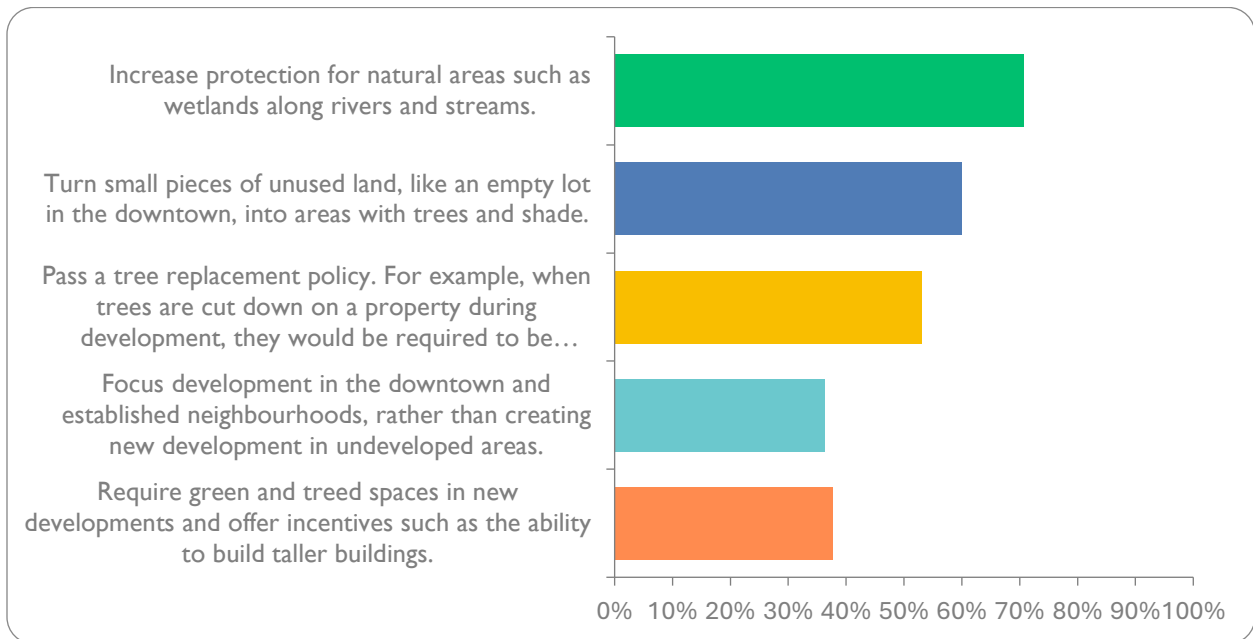
Q6: Buildings: Which actions are most important to you? [Check your top three.]



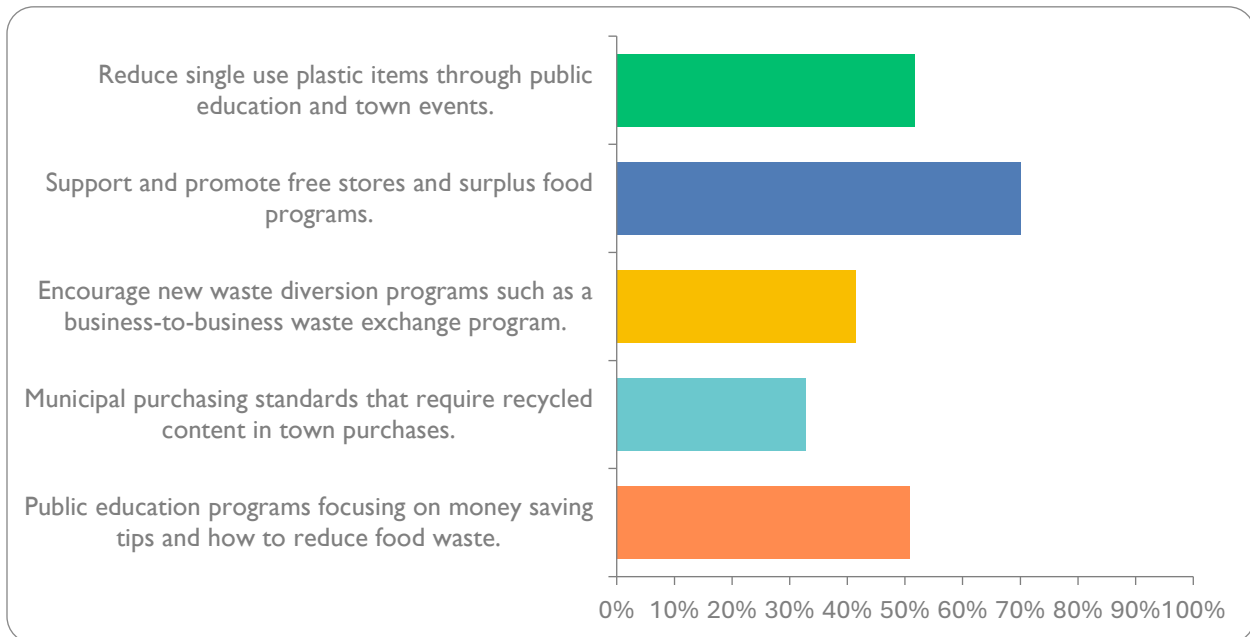
Q7: Transportation: Which services would be most important to you? [Check your top three.]



Q8: Land Use: Which actions are most important to you? [Check your top three.]



Q9: Waste: Which actions are most important to you? [Check your top three]



For Questions 6-9 some participants provided additional comments. Key themes included:

Buildings:

- More attractive rebates, interest free loans, and free energy assessments for individuals/non-profit.
- Business and industry need to act in proportion to their emissions and make reductions.
- Resources and programs for tenants who want to access energy saving measures. Truro/Colchester has a high rental population. Strategies like energy efficient appliances, weatherization and heat pumps. Rent control.
- More green spaces like green roofs, community gardens, edible fruit trees.
- Municipal driven standards, solar installations, district energy systems with waste wood and lower emissions fossil fuel use.

Transportation:

- Commuter rail and bus to Halifax and surrounding areas.
- Safer and enhanced infrastructure for walking, cycling and drivers including road maintenance. Complete streets approach prioritizing the most vulnerable road users.
- Car share services.
- Policies/programs that reduce vehicle congestion in the downtown.
- Affordability strategies for commuters of all types.

Land Use:

- Increase affordable housing.
- Make developments green including trees, pocket parks, natural buffer areas around areas like the reservoir, and shared spaces for food and recreation.
- Increase housing density and diversify– apartments, towers in denser areas, townhouses, semi- detached or small single-family homes with green spaces as well.
- Reuse unused buildings for residential living and affordable housing.
- Building and landscapes changes that are resilient to address extreme weather such as flooding and winds.
- Landscapes that support shared transportation such as car share spots and cycling infrastructure.
- Municipality - focus on existing stock.

Waste:

- More education about buying less, waste diversion and proper recycling/composting.
- More public waste diversion bins in Truro and surrounding area.
- Limit food waste through better diversion from stores and restaurants to those who need it.
- Bylaws and enforcement that deal with industrial pollution and support backyard and community food production.
- Different approaches – using land fill, recycling, landscape waste for heat generation; waste hauling price reductions for better diversion and affordability; have another truck to pick up reusable items at the curb and bring this to non-profits.

APPENDIX D

Modelling Scenario Assumptions

Truro's Community Energy and Emissions Plan



| | Baseline (2021) | BAU | Ambitious | Transformational |
|---|---|---|---|---|
| Growth Factor (Used as proxy to model increases in activity over time) | 0.3%/Year | 0.3%/Year | 0.3%/Year | 0.3%/Year |
| Building Deep Energy Retrofits (Residential, commercial, industrial) | 0% Baseline energy usage for various building types derived from NRCan's National Energy Use Database. | 0.8%/Year (Deep energy retrofit includes: 50% energy reduction, fuel switching to heat pumps if applicable) | 0.8%/Year in 2021 Rises to 2%/Year by 2030 Remains constant 2030-2050 | 0.8%/Year in 2021 Rises to 4%/Year by 2030 Achieves retrofits at 100% of existing buildings by 2050 |
| New Building Construction Standards | No changes | New construction energy efficiency increases over time | New construction is net-zero energy <i>ready</i> by 2035 (80% better than current code requirements) | New construction is net-zero energy by 2035 (80% better than code, install or purchase renewable energy to get to net zero) |
| Vehicle Efficiency | No changes | New vehicle fuel efficiency improves over time (0.35%/year) | New vehicle fuel efficiency improves over time (0.35%/year) | New vehicle fuel efficiency improves over time (0.35%/year) |
| Electricity Grid Decarbonization | 2021: 590.5 g/kWh | Nova Scotia's Electricity Grid Achieves its targets of 80% renewable power generation by 2030, then grid intensity | Nova Scotia's Electricity Grid Achieves its targets of 80% renewable power generation by 2030, then grid intensity remains constant at that level until 2050. | Nova Scotia's Electricity Grid Achieves its targets of 80% renewable power generation by 2030, then continues to decarbonize at rates projected by ECCC. |

| | Baseline (2021) | BAU | Ambitious | Transformational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|---|--|--|--|------|----------------|-------|--------------------------|---|--|------|------|------|------------------|-------|-------|-------|----------------|------|-------|-------|----------------|-------|-------|-------|---|--|------|------|------|------------------|-------|-------|-------|----------------|------|-------|-------|----------------|-------|-------|-------|
| | | remains constant at that level until 2050. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solid Waste Diversion | Diversion Rates from Divert NS 2023 Waste Audit | No change from baseline. | Organics and paper are 100% diverted from landfill by 2050 | Organics and paper are 100% diverted from landfill by 2050 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Transportation Mode Share | <p>Mode share was assumed to be consistent with Truro's 2021 Census:</p> <table border="1"> <tr> <td>Private Vehicles</td> <td>87.5%</td> </tr> <tr> <td>Public Transit</td> <td>0.0%</td> </tr> <tr> <td>Active Transit</td> <td>12.5%</td> </tr> </table> | Private Vehicles | 87.5% | Public Transit | 0.0% | Active Transit | 12.5% | No change from baseline. | <table border="1"> <tr> <td></td> <td>2035</td> <td>2040</td> <td>2050</td> </tr> <tr> <td>Private Vehicles</td> <td>81.5%</td> <td>70.0%</td> <td>70.0%</td> </tr> <tr> <td>Public Transit</td> <td>6.0%</td> <td>15.0%</td> <td>15.0%</td> </tr> <tr> <td>Active Transit</td> <td>12.5%</td> <td>15.0%</td> <td>15.0%</td> </tr> </table> | | 2035 | 2040 | 2050 | Private Vehicles | 81.5% | 70.0% | 70.0% | Public Transit | 6.0% | 15.0% | 15.0% | Active Transit | 12.5% | 15.0% | 15.0% | <table border="1"> <tr> <td></td> <td>2035</td> <td>2040</td> <td>2050</td> </tr> <tr> <td>Private Vehicles</td> <td>81.5%</td> <td>70.0%</td> <td>65.0%</td> </tr> <tr> <td>Public Transit</td> <td>6.0%</td> <td>15.0%</td> <td>20.0%</td> </tr> <tr> <td>Active Transit</td> <td>12.5%</td> <td>15.0%</td> <td>15.0%</td> </tr> </table> | | 2035 | 2040 | 2050 | Private Vehicles | 81.5% | 70.0% | 65.0% | Public Transit | 6.0% | 15.0% | 20.0% | Active Transit | 12.5% | 15.0% | 15.0% |
| Private Vehicles | 87.5% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Public Transit | 0.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Active Transit | 12.5% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2035 | 2040 | 2050 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Private Vehicles | 81.5% | 70.0% | 70.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Public Transit | 6.0% | 15.0% | 15.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Active Transit | 12.5% | 15.0% | 15.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2035 | 2040 | 2050 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Private Vehicles | 81.5% | 70.0% | 65.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Public Transit | 6.0% | 15.0% | 20.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Active Transit | 12.5% | 15.0% | 15.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Electric Vehicle Adoption | 2021: EVs make up less than 1% of new vehicle sales | In line with current federal targets for light-duty vehicles: 10% of sales by 2025 30% of sales by 2030 100% after 2030 | In line with current federal targets for light-duty vehicles: 10% of sales by 2025 30% of sales by 2030 100% after 2030 | In line with current federal targets for light-duty vehicles: 10% of sales by 2025 30% of sales by 2030 100% after 2030 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rooftop Solar PV Installation | 0.5% of buildings | 2021: 0.5% of buildings. Scales so that 1 in 12 buildings have rooftop solar by 2050 | Scales so that 1 in 9 buildings have rooftop solar by 2050 | Scales so that 1 in 3 buildings have rooftop solar by 2050 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Community Solar PV | None | None | 7.5 MW | 7.5 MW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Data | Source |
|---|--|
| Truro's Anticipated Population Growth | Affordable Housing Needs & Supply Study Truro-Colchester, Nova Scotia 2021 Turner Drake and Partners Ltd. |
| Truro's Transportation Mode Share | Census Profile, 2021 Census of Population Truro, Town 2021 |
| | |
| Current Rate of Deep Energy Retrofits, Nova Scotia | Deep Energy Retrofits in Nova Scotia EfficiencyOne and HRM 2023 |
| Rooftop solar PV installations | Behind-the-Meter Solar: Canadian Market Outlook Prepare by Dunsky Energy + Climate Advisors for the Canadian Renewable Energy Association 2023 |
| Sales Of Light-Duty Electric Vehicles | Canada's Electric Vehicle Availability Standard (regulated targets for zero-emission vehicles) Environment and Climate Change Canada |
| Solid Waste Diversion Rate, Colchester Solid Waste Facility | Nova Scotia's Landfill Waste Audit, 2023 March 2024 Divert NS |

APPENDIX E

Action Selection Methodology

Truro's Community Energy and Emissions Plan



Action Identification and Selection Methodology

Throughout the initial phase of the project, the project team collected ideas and concepts for projects, policies, and programs that could be assessed for inclusion in the CEEP. Potential energy and emissions reductions “actions” Truro to take for energy and emissions reductions were identified through four main strategies:

| Strategies | Summary |
|------------------------|---|
| Situational Analysis | <ul style="list-style-type: none"> Review of existing Federal, Provincial and Municipal Policies. Meetings with existing municipal and potential partners. |
| Best Practice Review | <ul style="list-style-type: none"> Review of 20+ climate plans from Canadian Cities and Municipalities, as well as existing Climate Planning Guidance from Nova Scotia and other Canadian jurisdictions. Review of academic papers and reports on municipal climate planning Attendance of industry events on climate planning in a municipal context. |
| Community Engagement | <ul style="list-style-type: none"> Community meetings, interviews, survey responses, Steering Committee Feedback. Identifies which actions and co-benefits are important and desirable within the local context. |
| Situational Analysis | <ul style="list-style-type: none"> Review of existing Federal, Provincial and Municipal Policies. Meetings with existing municipal staff and potential partners. |
| Baseline GHG Inventory | <ul style="list-style-type: none"> The GHG inventory provides insight into major sources of emissions in the municipality, which facilitates analysis of opportunities for GHG emissions reductions. |

Once a list of all potential actions was generated, a series of screening questions were asked to test the actions for alignment with the strategic direction of the CEEP. These questions were intended to sort out actions that would not fit within the strategic vision of the Plan. If actions received an answer of yes, they were screened out. Questions included:

- *Does this action increase emissions, directly or indirectly?*
- *Does this action lead to increased vulnerability to climate change, directly or indirectly?*
- *Could this action result in negative impacts to people/communities?*
- *Would this action impede other opportunities to reduce emissions?*

After the initial screening, a short list of the most strategically aligned actions were evaluated in further detail. The framework for action selection methodology was adapted from C40 Cities' Climate Leadership Action Selection and Prioritization Process (ASAP) tool¹. The ASAP tool was designed to support communities in prioritizing climate actions through a comparison of benefits and technical challenges to implementation. Along with ASAP, C40 Cities created a process guide, which was adapted to suit the scope of this project. The three main factors used to prioritize actions for Truro's CEEP were: **primary benefits (energy and emissions reductions), community co-benefits, and feasibility**. Below, the action of creating a Property Assessed Clean Energy (PACE) program is used to demonstrate the action selection and prioritization process.

¹ (C40 Cities Climate Leadership Group, 2024)

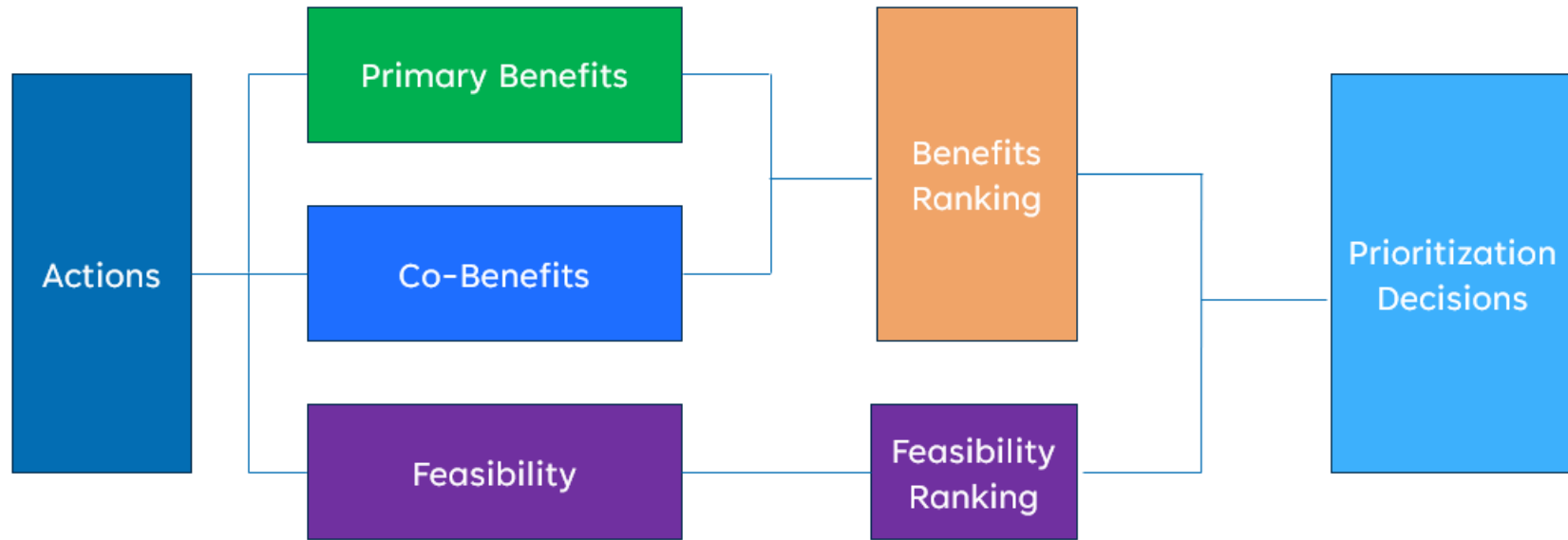


Figure 1: A Visualization of the Project's Action Selection Methodology

Primary Benefits

Energy efficiency and emissions reductions are often the core goals of the CEEP. Prioritizing these ensures that actions directly contribute to mitigating climate change, which is typically the main driver behind the plan. Energy use and emissions can also be measured and tracked over time. This allows for a clear assessment of progress toward targets, providing accountability and demonstrating the effectiveness of our actions. The following criteria were used to evaluate the primary benefits of potential actions:

- **Extent:** How widespread or scalable an action could be.
- **GHG Reduction Potential:** The overall opportunity for the action to generate GHG emissions reductions.
- **Uptake:** The rate or likelihood of adoption by stakeholders.
- **Impact:** The measurable effect on energy, emissions or cost reductions.

Table 1: Primary Benefits Assessment of a Home Energy Retrofit PACE Financing Program.

| Primary Benefits: Home Energy Retrofit PACE Financing | |
|---|--|
| Extent | Retrofit financing available to 100% of homeowners, potentially targeted towards lower-income households. |
| GHG Reduction Potential | 30 - 50% energy use reduction in homes, fuel switching away from oil to heat pumps has high impact on GHGs for individual homes. |
| Uptake | Currently 0.8% of homes per year receive deep energy retrofits. This rate increased in 2022 when the Canada Greener Homes Program offered expanded Federal grants and loans. |
| Impact | Direct decrease in heating fuel consumption, increase in electricity consumption. Lowers cost of living for homeowners. |

Feasibility

A core principle of CEEP development was creating a plan that focuses on tangible, realistic actions that Truro can take given current legal, technological, and financial constraints. Once potential actions were evaluated for direct and co-benefits, the feasibility of implementing the actions was assessed so that only the most feasible actions were ultimately selected. Feasibility considerations included:

- **Municipal Sphere of Influence:** The extent to which the municipality can directly implement or influence the action.
- **Support and Partners:** The presence of community support, and potential partners who can help drive the action.
- **Financing and Funding:** The availability of financial resources or funding mechanisms to support the action’s implementation.
- **Technological Readiness:** Whether the necessary technology is readily available, scalable, and proven for the proposed action.

Table 2: Feasibility Assessment of a Home Energy Retrofit PACE Financing Program.

| Feasibility: Home Energy Retrofit PACE Financing | |
|--|--|
| Municipal Sphere of Influence | Truro can offer a program, promote and educate homeowners, but cannot force homeowners to renovate. |
| Support and Partners | Many Nova Scotian municipalities run successful PACE programs. Colchester already offers a successful PACE program (Cozy Colchester) which could be expanded to Truro. |
| Financing and Funding | FCM’s Green Municipal fund provides up to \$10 million through a combination of grants and loans. |
| Technological Readiness | Uses readily available and proven technologies (heat pumps, insulation, LEDs). |

Co-Benefits

Once actions are shown to meet the goals of the CEEP, co-benefits provide a way to assess added value. Many energy or emissions reduction actions can also improve public health, equity, local economic development, and other social or environmental outcomes. Some co-benefits are challenging to quantify, as they cannot be tracked as objectively as energy or emissions without surveys, interviews, or case studies to capture community perceptions and values. However, as potential actions were evaluated, potential impacts on co-benefit categories covered in Section 3.2 Community Co-Benefits were assessed:

Affordability and Cost of Living

Implementing energy efficiency measures and transitioning to renewable energy sources can lower utility costs for residents and businesses. This reduction in energy costs directly translates to more affordable living, as households spend less on electricity, heating, and cooling.

Access to Renewable Energy

By increasing access to renewable energy sources such as solar, wind, and geothermal, these plans ensure that all community members can benefit from clean, reliable, and sustainable energy. Local renewable energy production also provides resiliency from price shocks that occur when communities are dependent on commodities such as fossil fuels that rely on global supply chains.

Accessibility

A focus on sustainable transportation options, such as public transit, cycling, and walking infrastructure, can improve mobility and accessibility within the community. These initiatives reduce reliance on personal vehicles, leading to lower greenhouse gas emissions and a reduction in traffic congestion. Improved public transit and active transportation infrastructure also make it easier for all residents, including those without cars, to access essential services, work, and recreation.

Public Health

Reducing emissions and transitioning to cleaner energy sources have direct health benefits. Lower levels of air pollution reduce the incidence of respiratory and cardiovascular diseases, leading to a healthier population. Additionally, initiatives that promote active

transportation and green spaces contribute to physical and mental well-being, making the community a more vibrant and healthier place to live.

Social Equity

A well-designed CEEP should address social equity by ensuring that all residents benefit from energy efficiency programs and clean energy initiatives, regardless of income level. By focusing on inclusive community engagement and equitable access to resources, these plans can help bridge gaps in energy access and reduce gaps in environmental quality, ensuring that vulnerable populations are not left behind in the transition to a net-zero future.

Preservation of the Natural Environment

By reducing reliance on fossil fuels and promoting sustainable land use practices, these plans help preserve local biodiversity, protect water resources, and reduce the community's overall ecological footprint. This not only enhances the natural environment but also ensures that future generations can enjoy the benefits of a healthy and thriving ecosystem.

Climate Change Adaptation

By enhancing infrastructure resilience, decentralizing and diversifying energy sources, protecting and restoring natural ecosystems, reducing energy demand, and fostering local energy ownership, CEEPs can equip communities with the tools they need to withstand and thrive in the face of a changing climate.

Table 3: Co-Benefits Assessment of a Home Energy Retrofit PACE Financing Program.

| Co-Benefits: Home Energy Retrofit PACE Financing | |
|---|---|
| Affordability | PACE programs make energy-efficient upgrades more accessible to households that might not have the capital to invest in costly improvements. Over time, energyretrofits reduce energy bills, improving long-term affordability for homeowners by lowering energy consumption. |
| Access to Renewable Energy | By incorporating renewable energy into retrofits, homeowners can reduce reliance on fossil fuels, cut energy costs, and increase resilience to energy price fluctuations. |
| Accessibility | By providing equitable financing options and potentially offering grants or incentives for underserved groups, PACE can help overcome traditional barriers to retrofits. |
| Public Health | Health benefits include fewer respiratory issues, better temperature control, and improved overall well-being, particularly for elderly residents and children. |
| Social Equity | By prioritizing underserved or disadvantaged communities for retrofits, the program can help close the gap in energy costs and access to clean energy. It can also create jobs in these communities through energy retrofit projects. |
| Preservation of the Natural Environment | Deep energy retrofits help reduce overall energy consumption, which in turn lowers the demand for fossil fuels and decreases GHG emissions. |
| Climate Change Adaptation | Energy retrofits can make homes more resilient to extreme weather conditions, improving insulation, storm proofing, and energy systems' capacity to cope with climate events like heatwaves or storms. |

Once actions were evaluated for primary benefits, co-benefits, and feasibility, a selection matrix was used to help identify which actions should be prioritized in the CEEP. Actions were plotted on a chart based on two key criteria—**Feasibility** (x-axis) and **Benefits to Truro** (y-axis):

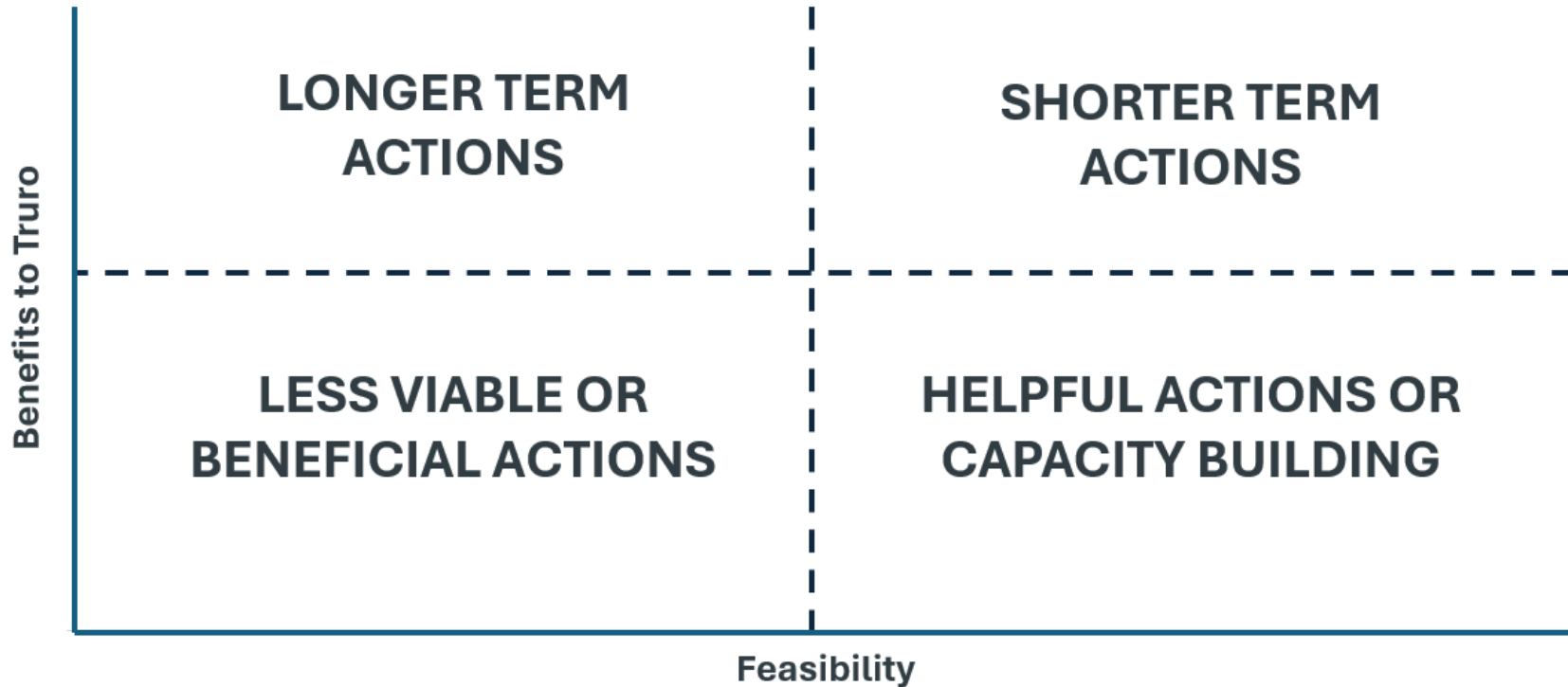


Figure 2: Action Prioritization Chart

1. Shorter-Term Actions (Top-Right Quadrant):

- **High Feasibility & Highly Beneficial:** Actions that fall into this quadrant are both easily implementable and highly beneficial to the municipality. These are the “quick wins” in terms of energy and emissions reductions and should be prioritized. Examples might include energy efficiency upgrades, community awareness campaigns, or quick-to-implement public transportation improvements.
- **Application:** These actions would typically be scheduled for immediate (1-2 years) or short-term (3-5 years) execution as they offer the most immediate return on investment and impact.

2. Longer-Term Actions (Top-Left Quadrant):

- **Low Feasibility & Highly Beneficial:** These actions promise significant benefits to Truro but may be more difficult or costly to implement in the near term. Such actions could include major infrastructure changes like district energy systems or large-scale renewable energy installations.
- **Application:** These could be medium-term (5-10 years) to long-term (10+ years) goals. If actions were deemed to be longer term, they were screened out of inclusion in the 10-year action plan. The municipality might focus on building capacity or securing funding and partnerships to make these actions more feasible over time. These actions may also require more detailed planning or feasibility studies before moving forward.

3. Helpful Actions or Capacity Building (Bottom-Right Quadrant):

- **High Feasibility & Low Benefits:** Actions in this quadrant are easy to implement but have relatively lower immediate benefits in terms of energy and emissions reductions. They may include capacity-building initiatives, small-scale pilot programs, or efforts that lay the groundwork for larger initiatives in the future.
- **Application:** While these actions may not produce large-scale emissions reductions right away, they can serve as important foundational steps. Capacity building, public engagement, or early-stage policy developments can be scheduled early on, as they are cost-effective and can support larger, more complex actions later.

4. Less Viable or Beneficial Actions (Bottom-Left Quadrant):

- **Low Feasibility & Low Benefits:** Actions in this quadrant are neither easy to implement nor particularly beneficial to Truro in the context of energy and emissions reductions. These might include technologies or policies that are not yet fully developed or cost-effective for the community.
- **Application:** These actions are the lowest priority and may not be included in the CEEP. The municipality might choose to revisit these actions if conditions change or if new funding opportunities make them more feasible or beneficial.

A municipality-led PACE program to help homeowners finance deep energy retrofits would be evaluated as highly feasible and highly beneficial, and therefore be placed in the “Shorter-Term Actions” quadrant and included in the CEEP.

APPENDIX F

CEEP Action Summary Tables

Truro's Community Energy and Emissions Plan



Community Actions

Financial Key

\$ = \$0 - \$100,000

\$\$ = \$100,000 - \$1,000,000

\$\$\$ = \$1,000,000 - \$10,000,000

\$\$\$\$ = \$10,000,000 +

| # | ACTION | DESCRIPTION | JUSTIFICATION | TIMELINE | RESPONSIBLE PARTIES | COST IMPACTS | CO-BENEFITS |
|--|---|--|---|-----------|---|------------------|--|
| Goal 1: Improve Energy Efficiency in the Built Environment | | | | | | | |
| Target: Double the current pace of deep energy retrofits, targeting 2% of buildings per year by 2030. | | | | | | | |
| 1 | Partner with Colchester to expand their retrofit PACE Program (Cozy Colchester) to Truro. | Homeowners are provided low-interest loans to reduce their upfront costs for energy projects. | The Residential Sector accounts for approximately 34% of community emissions. | 2025-2026 | Corporate Services Colchester, FCM, Municipalities, NSF, Clean Foundation | \$\$ Annually | Affordability Equity Adaptation |
| 2 | Pilot an Energy Navigator Program | Expert advice and guidance for homeowners to navigate home energy retrofits. | Accelerate the rate of retrofits or raise the average total energy savings of homes in the program. | 2025-2026 | Planning and Development Colchester, FCM, Municipalities, NSF, Clean Foundation | \$ | Affordability Equity Adaptation |
| Target: By 2035, all new construction is net-zero energy ready. | | | | | | | |
| 3 | Advocate for adoption of 2020 National Model Codes. | Advocate for the adoption of the 2020 National Model Codes to accelerate the energy efficiency | 2020 codes provide a pathway to make all new buildings consistent with | Ongoing | Planning and Development Province, NSF | Staff Time | Adaptation Environment Accessibility |

| # | ACTION | DESCRIPTION | JUSTIFICATION | TIMELINE | RESPONSIBLE PARTIES | COST IMPACTS | CO-BENEFITS |
|--|---|--|--|-----------|---|------------------|-----------------------------------|
| | | standards of new construction projects. | national net zero goals. | | | | |
| Goal 2: Accelerate the Community Transition to Renewable Energy | | | | | | | |
| Objective: Reduce barriers for residents to access renewable electricity. | | | | | | | |
| 4 | Develop a community solar garden to provide community access to renewable electricity. | Provide renewable energy to residents at an affordable cost. | Electricity is currently the largest source of Truro's GHG emissions | 2027-2030 | Engineering and Public Works Planning and Development Corporate Services Province, FCM | \$\$ | Access Equity Adaptation |
| 5 | Investigate Feasibility of renewable energy generation at former landfill site and Water Treatment Plant. | Adaptive reuse of a brownfield site for renewable energy production. | Reclaim space that is otherwise not suitable for development | 2025-2026 | Planning and Development Engineering and Public Works | \$\$ | Environment Adaptation |
| Target: Install residential solar at a pace of 25 homes per year starting in 2026 | | | | | | | |
| 6 | Partner with Colchester to expand their solar PACE Program (Solar Colchester) to residents of Truro | Homeowners are provided low-interest loans to reduce their upfront costs for solar projects. | Support community transition to renewable energy | 2025-2026 | Corporate Services Planning and Development Colchester, FCM, Municipalities, NSF, Clean Foundation | \$\$ Annually | Access Equity Affordability |
| Goal 3: Reduce Emissions from Community Transportation | | | | | | | |
| Objective: Provide Supports for Low-Emission Transportation Choices | | | | | | | |
| 7 | Feasibility Study for Regional Public Transit System | Investigate feasibility, business case for public transit | Transportation is one of the largest sources of | 2025-2026 | Planning and Development | \$\$ | Accessibility Health Equity |

| # | ACTION | DESCRIPTION | JUSTIFICATION | TIMELINE | RESPONSIBLE PARTIES | COST IMPACTS | CO-BENEFITS |
|--|--|---|---|-----------|--|------------------|--|
| | | | greenhouse gas emissions in Canada | | Province, FCM, Colchester, Millbrook, CTCL | | Affordability |
| 8 | Establish a Regional Public Transit System | Launch a public transit system for Truro in partnership with surrounding communities | There are increasing levels of support for rural transit systems at both provincial and federal levels. | 2027-2030 | Planning and Development Province, FCM, NSFM, CTCL, Debert, Millbrook | \$\$ | Accessibility Health Equity Affordability |
| 9 | Implement Active Transportation Master Plan | Continue to implement the Active Transportation Plan | Create a transportation system that serves everyone, protects the environment, and supports a thriving, resilient economy | Ongoing | Engineering and Public Works Planning and Development Province, Colchester, Millbrook | \$\$ Annually | Accessibility Health Equity Affordability |
| 10 | Support Deployment of Electric Vehicle Charging Infrastructure | Enable and coordinate private sector investment, set policies and standards, and ensure equitable access to EV charging infrastructure. | Plan and prepare for adoption of EVs at a national level | Ongoing | Corporate Services Planning and Development Engineering and Public Works Province, FCM, NSFM | \$ Annually | Accessibility Equity |
| Goal 4: Reduce Community Solid Waste Generation | | | | | | | |
| Target: Reduce community organic waste in landfill stream 10% by 2035 | | | | | | | |
| 11 | Work with Divert NS and other partners to identify waste reduction opportunities in the community. | Collaborate with local food banks, nonprofits, and businesses to create or expand food rescue programs that | Organics decompose in landfills to produce methane, a powerful GHG. | Ongoing | Parks, Recreation and Culture Divert NS, Second Harvest | \$ | Environment |

| # | ACTION | DESCRIPTION | JUSTIFICATION | TIMELINE | RESPONSIBLE PARTIES | COST IMPACTS | CO-BENEFITS |
|----|---|---|--|-----------|---|--------------|-----------------------------------|
| 15 | Launch a neighbourhood weatherization program | Partner with community organizations to provide financial assistance, materials, education, and technical support to homeowners | Helps homeowners make small home improvements to reduce energy consumption, save on utility costs, and improve the comfort of their homes. | 2025-2026 | Parks, Recreation and Culture Community groups, Clean Foundation, Efficiency NS | \$ | Affordability Equity Access |

CORPORATE ACTIONS

| # | ACTION | WHAT? | WHY? | WHEN? | WHO? | COST | CO-BENEFITS |
|---|---|--|--|--|--|---------------------|--|
| GOAL 1: Improve Energy Efficiency in the Built Environment | | | | | | | |
| Target: Use existing municipal facilities as demonstration projects for GHG reduction, achieve net-zero emissions by 2040. | | | | | | | |
| 1 | Develop and implement a pathway to achieve 50% reduction in GHG emissions in Truro's major municipal buildings by 2035. | Conduct a feasibility study to identify the most cost-effective pathway to achieve a minimum 50% reduction in GHG emissions across its building portfolio by 2035. | Showcase the benefits of sustainable practices, inspire broader community adoption, and lead by example. | Study: 2025-2026 Implement: 2027-2035 | Engineering and Public Works Province, FCM, NSFM, BTZx | \$\$\$\$ | Adaptation Affordability |
| 2 | Develop and incentivize Green Development Standards. | Voluntary measures which encourage developers and builders to use sustainable design principles. | Drive industry to adapt new design and construction techniques, building the workforce of tomorrow. | 2025 - 2026 | Planning and Development Colchester, HRM | Staff Time | Adaptation Accessibility Equity Environment Adaptation |
| 3 | All new municipal buildings and major retrofits after 2030 are designed to be net-zero energy | A net-zero energy (NZE) building can produce as much clean energy as it consumes. | Prevent future carbon emissions from new municipal buildings. | 2030 | Engineering and Public Works FCM, NSFM, Province | \$\$ Per project | Adaptation Accessibility Equity Environment Adaptation |

| # | ACTION | WHAT? | WHY? | WHEN? | WHO? | COST | CO-BENEFITS |
|--|---|---|---|-----------|--|--------------------------------|---------------------------------------|
| Goal 2: Accelerate the Community Transition to Renewable Energy | | | | | | | |
| Target: Municipal buildings use 100% renewable electricity by 2035. | | | | | | | |
| 4 | Use power purchase agreements to procure 100% renewable electricity from local sources to offset Municipal electricity emissions. | Purchase energy directly from renewable energy providers at a predetermined rate. | Shift the cost of renewable energy from capital to operational cost | 2027-2030 | Corporate Services Province Renewal | \$ Added Utility Cost | Affordability Access |
| 5 | Install 1 MW of net-metered and behind the meter solar PV for use by municipal buildings. | Integrate renewable electricity into municipal operations. | Reduce emissions from electricity, operating costs. | 2027-2030 | Engineering and Public Works Corporate Services FCM, Province, ENS | \$\$\$ | Access Affordability Adaptation |
| Goal 3: Reduce Emissions from Community Transportation | | | | | | | |
| Target: Convert Municipal fleet to non-emitting vehicles by 2040 | | | | | | | |
| 6 | Develop a Municipal Light-Duty Vehicle Electrification Strategy | A phased approach to transitioning municipal fleet to EVs | Reduce emissions from fleet vehicles | 2025-2026 | Corporate Services Engineering and Public Works FCM, Province | \$ | Affordability |
| 7 | Monitor opportunities for electrification of medium- and heavy-duty municipal fleet vehicles | Look out for opportunities to decarbonize larger vehicles and equipment | New technologies are emerging | Ongoing | Corporate Services Engineering and Public Works | Staff Time | Affordability |

| # | ACTION | WHAT? | WHY? | WHEN? | WHO? | COST | CO-BENEFITS |
|--|---|---|---|-----------|---|----------------|-----------------------------------|
| Goal 4: Reduce Community Solid Waste Generation | | | | | | | |
| Target: Reduce corporate organic waste in landfill stream 20% by 2035 | | | | | | | |
| 8 | Create a zero-waste events guide and host sustainable community events. | Create a publicly accessible zero-waste event guide | Foster a culture of sustainability for its businesses and community organizations | 2025-2026 | Parks, Recreation and Culture Divert NS | Staff Time | Environment Adaptation |
| 9 | Pilot zero-waste certification at a municipal building. | Zero-waste means achieving greater than 90% diversion through waste reduction, reuse, recycling and composting. | demonstrate leadership in waste management culture at municipal facilities | 2027-2030 | Corporate Services Divert NS | \$ | Environment Adaptation |
| Goal 5: Enhance Truro's Natural Environment | | | | | | | |
| Objective: Protect and Expand Tree Canopy and Green Spaces | | | | | | | |
| 10 | Amend the Town's Tree Policy to require no net loss of biomass | If trees are disturbed, they should be transplanted or replaced to retain the same amount of net biomass. | Due to their many benefits to both mental and physical health, as well as their role in sequestering carbon | 2025-2026 | Engineering and Public Works Parks, Recreation and Culture | \$ Annually | Environment Adaptation |
| Goal 6: Educate and Engage the Community | | | | | | | |
| Objective: Collaborate with local businesses and homeowners to improve energy efficiency in the building sector | | | | | | | |
| 11 | Create a community micro-grant program to support community innovation | Award small funding grants to project proposals that help solve existing issues, accelerate implementation of the CEEP, or drive community engagement around energy efficiency. | Supports innovative creators and local champions who have big ideas | 2026 | Parks, Recreation and Culture Community groups, Clean Foundation, Efficiency NS | \$ | Affordability Equity Access |

Abbreviations

Colchester: Municipality of the County of Colchester

FCM: Federation of Canadian Municipalities

NSFM: Nova Scotia Federation of Municipalities

Province: Province of Nova Scotia

BTZx: Building to Zero Exchange

HRM: Halifax Regional Municipality

Renewall: Renewall Energy

ENS: Efficiency NS

Millbrook: Millbrook First Nation

CTCL: Colchester Transportation Cooperative Limited