

THE MUNICIPALITY OF WEST HANTS

BACKGROUND STUDY ON ACTIONS TO REDUCE GHG EMISSIONS IN WEST HANTS

FEBRUARY 24, 2020



FINAL REPORT



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1 INTRODUCTION

The Partners for Climate Protection (PCP) program is a network of Canadian municipal governments that have committed to reducing greenhouse gases (GHGs) and to act on fighting climate change. PCP is administered by the Federation of Canadian Municipalities (FCM) in partnership with the International Council for Local Environmental Initiatives (ICLEI). Since its inception, over 250 municipalities have joined PCP, making a public commitment to reduce emissions. The program consists of a framework to guide municipalities in reducing GHG emissions at both the corporate and community levels. This framework is comprised of five-milestones which include:

- 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

The GHG Inventory Report and Forecast, completed in 2019, meets Milestone 1 of the PCP program. The outcome of this Background Study was originally intended to deliver on Milestone 2 and 3 – to set a reduction target and developing a Local Action Plan for West Hants. Given the imminent consolidation with the neighbouring Town of Windsor, West Hants has decided to use this report as a Background Study to help inform the future Local Action Plan and emission reduction targets for the new municipal Council and staff of the Municipality of The Region of Windsor and West Hants Municipality.

This report outlines a series of actions from which the newly amalgamated Municipality can choose from to meet the goal for GHG reduction (to be set by the Regional Council). A description of each available action is also provided along with three GHG reduction scenarios that have also been provided to help to inform decision-making by the future Council.

This report is presented in the following five sections:

- 1** Introduction
- 2** Background Study Development
- 3** Recommended Goals and Actions
- 4** GHG Reduction Scenarios
- 5** Future Funding Options

It should be noted that the intent of Section 5 is not to create an exhaustive list of all funding streams, but to assist the future Municipality in implementing some of the actions suggested under this plan as well as build external partnerships that may help the Regional Municipality implement many of the longer-term actions presented in this report.

2 BACKGROUND STUDY DEVELOPMENT PROCESS

2.1 MUNICIPAL STAFF ENGAGEMENT

On the morning of November 12, 2019, Senior Municipal Staff were gathered for a workshop in West Hants Council Chambers to talk about opportunities and challenges in developing and implementing a Local Action Plan in Green House Gas reduction for the Municipality of West Hants. Participants included directors and managers from the Municipality of West Hants. An important consideration for the Municipality at this time is the upcoming consolidation with the Town of Windsor, slated to take place in April 2020. As such, some directors from the Town of Windsor and the future municipality were also invited to this workshop. A complete list of those invited and in attendance is included in Appendix A.

Participants were presented with the results of the Green House Gas (GHG) Inventory results produced by WSP previous to this Background Study and reviewed the current status of emissions at the corporate and community level. Staff then participated in a facilitated discussion on actions that could be taken to help reduce emissions at the corporate level.

Several themes emerged from this workshop, including:

- Decreasing the use of electricity in municipally-owned buildings by taking actions such as educating staff on how to reduce energy consumption and retrofitting old lightbulbs and appliances with energy efficient versions.
- Performing detailed energy audits of all municipal buildings and major equipment to prioritize the retrofitting or replacement of buildings or systems.
- Exploring the electrification of the corporate vehicle fleet and creating more efficient systems to deal with work orders, which could reduce duplication of GHG emissions.
- Exploring renewable energy sources that may help to reduce the municipal GHG emissions.
- Taking initiative, as the local government, to set an example of efforts to reduce GHG emissions and fight climate change within the Municipality.

The opportunities and actions which emerged through this workshop were used to inform the actions and goals found in this Background Study.

2.2 COMMUNITY STAKEHOLDER ENGAGEMENT

2.2.1 WORKSHOP FOR STAKEHOLDERS

Community stakeholders were invited on November 12, 2019 to participate in a workshop to speak to their experiences and goals for the Municipality in reducing GHG emissions. A complete list of those who attended this workshop is included in Appendix A. These stakeholders represent groups that work in the Climate Change, Energy, Local Food, Environmental, and other relevant sectors on either a local level or a provincial level.

Participants were also introduced to the results of the Community GHG Inventory and Forecast Report. This inventory showed that the greatest level of GHG emissions were related to residential activities (largely electricity use in homes) and road transportation. Following this presentation, participants were welcomed to highlight and have a discussion on opportunities that the Municipality could pursue which, based on their experience and/or their knowledge of West Hants, they felt would be positive steps in reducing community GHG emissions. Themes from this discussion included:

- Building partnerships with Efficiency Nova Scotia (and others who sponsor home energy retrofits) to better educate homeowners on available funding options for home energy upgrades.

- Investing in infrastructure for electric vehicles that could help both the corporate fleet and the community (i.e. charging stations, community car share, etc.).
- Encouraging land-use planning that fosters ‘complete communities’ and more walkable/bikeable communities that are close to amenities and schools.
- Advocating to the Province to reduce the percentage of energy that comes from fossil fuels and work towards further greening the power grid.
- Explore funding assistance programs and/or incentives for people in the municipality to reduce their GHG emissions.
- Making it easier for food and goods producers in the Municipality to sell their products and encouraging people in the Municipality to shop and eat local more often.

The opportunities and actions which emerged through this workshop were also used to inform the actions and goals found in this Background Study.

2.2.2 PRESENTATION OF DRAFT TO STAKEHOLDERS

Following the development of the first draft of this Background Study, stakeholders were invited to attend a presentation and discussion on January 29, 2020. A complete list of stakeholders in attendance has been included in Appendix A of this report.

The purpose of this meeting was to review the proposed Goals and Actions for GHG emission reduction and to collect stakeholder feedback on each of the specific actions. This feedback has been accounted for in this version of the Background Study. Broadly, feedback received from stakeholders included:

- The various organizations represented at the stakeholder table had information on partnerships and data access that the Municipality would have access to once the Goals and Actions are determined by the Regional Council.
- The report emphasized sustainable travel but more reference to Active Transportation (AT) was needed, especially if the Municipality hopes to access some of the sustainable transportation funding available from Provincial and Federal government levels.
- The idea of combining sustainable transportation actions (i.e. actions associated with car share, electric vehicles, active transportation, etc.) at a spatial location (i.e. a “Transportation Hub”) was favoured amongst the group of stakeholders, due to its visibility and convenience.
- Some stakeholders suggested solutions to energy efficiency issues that are being experienced in some of the Municipality’s buildings. These suggestions included ‘quick fixes’ that may be inexpensive but could have a larger impact.
- Marketing, outreach, and communication will be important to successfully implement the proposed Actions.

In addition to the general comments expressed above, stakeholders recommended further specific changes and adjustments to the proposed Actions to improve their effectiveness or to provide additional clarity.

2.3 MUNICIPAL CLIMATE CHANGE ACTION PLAN (MCCAP) COMMITTEE MEETING

Following the development of the first draft of this Background Study, the Municipal Climate Change Action Plan (MCCAP) Committee, along with some additional staff directors, were invited to a meeting to discuss the proposed actions.

Feedback collected from the MCCAP Committee spoke specifically to the suggested actions based on the experience of members of the Committee and staff. Information collected included:

- More information may be required on the Brooklyn Fire Centre, and it is recommended that an energy assessment be conducted to understand what further actions may help reduce the energy consumption of the building.
- It was noted that Solar P.V. payback period for the Water and Wastewater treatment plants is a long period.

- There are still some questions about the Corporate Car Sharing program and specifically, how that might work based on the Municipality's insurance for the corporate fleet. It was noted that this model has been successfully implemented in Quebec, but that Nova Scotia does not yet have any examples. Determining the insurance model would likely be up to the first Municipality who chooses to implement Corporate Car Sharing.
- It was noted that EfficiencyOne may have programs that could help fund the salary of a Climate Change-focused employee.
- There is some concern about the procedure for including estimated GHG emission impacts in Municipal Staff Reports to Council, specifically regarding how estimates might be made for multi-faceted projects, such as Land Use regulation amendments.
- It was recommended that Goal 7, which refers to Local Procurement, should be expanded beyond 'local food' to also include language referencing local goods and services as well.
- There was concern about whether the Municipality should be operating farmers markets, which was one interpretation of Action 7.4. It was noted that this is not something the Municipality is interested in becoming involved in, and therefore that language should be clarified in this Action to express that the Municipality would be supportive of their facilities being used by private entities for farmers markets and other local goods vending.
- There were questions surrounding the inclusion of transitioning to Electric Vehicles (EVs) in the Actions, specifically on whether the emissions savings of operating the EVs are significant given that there are emissions associated with production of the vehicles.
- It was noted that transitioning to an electric fleet might be more favourable if it was done in partnership with another municipality, or if another Nova Scotia municipality was to make the switch first.

3 RECOMMENDED GOALS AND ACTIONS

3.1 INTRODUCTION

The following sections highlight the recommended goals and actions that the Municipality of West Hants should consider to reduce corporate GHG emissions as well as to encourage practices amongst residents to help lower emissions produced by residents in the broader community.

A total of seven goals have been presented as part of this Background Study. Under each of the seven goals, a list of recommended actions has been provided. The Municipal Council, once amalgamated and elected, will have the opportunity to review the recommended goals and actions and define their Local Action Plan to reduce GHG Emissions.

GOAL 1 – REDUCE ENERGY CONSUMPTION FOR MUNICIPAL BUILDINGS

- 1.1 Perform internal building condition survey (i.e. ASHRAE Level 1 Energy Audit)
- 1.2 Consider performing detailed energy audits for the water and waste water treatment plants
- 1.3 Assessment of the Brooklyn Fire Station and Civic Center
- 1.4 Promote and celebrate Energy Efficient Buildings
- 1.5 Introduce a Behavioral Energy Efficiency Program (i.e. educate staff about how to reduce personal energy consumption)
- 1.6: Office Building location review

GOAL 2 – INTRODUCE RENEWABLE ENERGY TO MUNICIPAL BUILDINGS

- 2.1 Investigate fuel switching - heat pumps
- 2.2 Investigate renewable energy opportunities - solar PV for the water and waste water treatment plants
- 2.3 Consider Green Energy Purchasing (e.g., Bullfrog Power) OR investing in own renewables
- 2.4 Investigate partnerships for renewable energy provision

GOAL 3 – DEFINE A GREEN FLEET PROGRAM

- 3.1 Create a ‘fleet management program’ that introduces EVs over a multi-year timeline
- 3.2 Consider introducing carpool and bicycle incentives for work travel
- 3.3 Investigate ‘bulk’ purchase of electric vehicles and/or EV charging stations
- 3.4 Explore a corporate Car Sharing program

GOAL 4 – INVEST IN EDUCATION FOR THE COMMUNITY AND STAFF

- 4.1 Partner with Efficiency N.S. to educate public on home renovation programs/incentives, overall reduced cost of living, etc.
- 4.2 Train WH staff about Efficiency N.S. programs to integrate into their day-to-day work and interaction with citizens.
- 4.3 Consider hiring a dedicated Climate Change/Energy Efficiency employee

GOAL 5 – CREATE OPPORTUNITIES FOR WH TO SUPPORT THE COMMUNITY AND LEAD BY EXAMPLE

- 5.1 Integrate GHG reduction strategies to HR policies (i.e. introduce home-working and flex days)
- 5.2 Investigate optimizing business/work-order travel
- 5.3 Explore options on P.A.C.E. Programming
- 5.4 Promote desired actions, policies and incentives to the Provincial government (i.e. greening of grid would help municipalities achieve emission targets)
- 5.5 Consider adopting land-use policies that mandate or encourage efficient/sustainable growth models (i.e. creating walkable neighbourhoods or smaller lots, etc.)
- 5.6 Make renewable energy investments and sustainability practices (current and future) ‘visible’ and known to the community
- 5.7 Explore options to include anticipated GHG Emissions in staff reports for Council and committees

GOAL 6 – MAKE WEST HANTS MORE ELECTRIC VEHICLE AND ACTIVE TRANSPORTATION FRIENDLY

- 6.1 Explore potential partnerships for EV charging stations
- 6.2 Explore funding for EV charging stations on municipal property
- 6.3 Explore opportunities to create a ‘transportation hub’
- 6.4 Integrate active transportation considerations into Land Use Planning decisions

GOAL 7 – MAKE IT EASIER TO BUY FROM LOCAL VENDORS AND EAT LOCAL FOOD

- 7.1 Create food education programs in partnership with community and schools, including waste reduction
- 7.2 Review and amend policies to promote small-scale local agriculture
- 7.3 Local procurement policies
- 7.4 Make Municipal facilities available to local food and goods vendors

3.2 GOALS AND ACTIONS

The following section reviews each of the seven goals provided to the Municipality as well as the related actions that could be taken to achieve each goal. The following information has been provided for each action:

- 1** Action Description
- 2** Outcome/ Performance Target
- 3** Anticipated Impact (low, medium, high)
- 4** Authority Responsible for Action
- 5** Contributors / Stakeholder Groups
- 6** Implementation Period or Priority
- 7** Monitoring Process
- 8** Cost/ Level of Effort*

*Please note that Cost/Level of Effort are high-level estimates which have been determined by WSP professionals with experience in the field and based on 2019 cost models. The cost estimates account for capital costs and exclude internal Municipal staff time. Costs listed are not guaranteed and further investigation will be required by the Municipality when Actions are being pursued.

GOAL 1: REDUCE ENERGY CONSUMPTION FOR MUNICIPAL BUILDINGS

Energy use in Municipally-owned buildings accounted for 36% of the total GHG emissions produced in the corporate emissions report. Taking actions to reduce this energy consumption would be a significant step in reducing overall corporate GHG emissions. Some of the actions related to this goal are to establish baselines for how different buildings are performing or what ‘quick fixes’ might exist to improve energy consumption. Other actions are associated with anticipated replacements of systems as well as focusing efforts or staff building occupant education and outreach. Some actions can be quantified with estimated GHG reductions and/or targets, while others are associated with outcomes and performance targets that are not possible to measure numerically, but have other performance targets.

ACTION 1.1: PERFORM INTERNAL BUILDING CONDITION SURVEY

Description/
Detail of Actions

A condition survey, or ASHRAE Level 1 energy audit, is a walking tour conducted by internal staff to identify obvious opportunities for energy savings that can be implemented with minimal capital investment (repair or maintenance work) or even replacement of equipment that does not require in-depth technical analysis (e.g. inefficient lighting or windows, air leakage, smart metres etc.). It also makes it possible to identify areas that warrant further examination for potential energy savings opportunities or GHG reduction opportunities, such as fuel switching for heating systems. Natural Resources Canada has developed an Energy Savings Toolbox where checklists are provided to help in-house building condition auditing¹.

Condition surveys, if completed on buildings with electric heating and cooling systems, may be eligible for support from Efficiency Nova Scotia.

Condition surveys could be conducted for all buildings, but based on the GHG inventory, the following buildings should be prioritized:

- Brooklyn Fire Station and Civic Center
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¹ NRCan (2018). Conducting an energy audit. <https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-industry/energy-management-industry/conducting-energy-audit/20401>

ACTION 1.1: PERFORM INTERNAL BUILDING CONDITION SURVEY

	<ul style="list-style-type: none">- Municipal Building – 76 Morrison Dr.- Hants County Courthouse – 240 King St.- Town Hall – 20 Main St.- Hantsport Fire Department – 5 Oak St.- Public Works Shed – 19 Chittick Ave- Police Station – 3 Oak St.
Outcome / Performance Target	Typical savings associated with energy audits range from 5% to 20%. For a simple condition survey (ASHRAE Level 1 energy audit), the suggested reduction target is 5%, or 27.5 tCO2e.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	Municipality of West Hants, Department of Public Works
Contributors / Stakeholders	Efficiency Nova Scotia, QUEST Canada (funding or partnership), Nova Scotia Power (for Smart Metres)
Priority	Short-term
Monitoring Process and Period	Energy consumption should be tracked for each building that was audited and maintained or upgraded. Consumption should be compiled on a quarterly basis and compared (seasonally) to historical data to demonstrate energy savings.
Cost / Effort	Cost is equivalent to the time for internal staff to perform the audits. Alternatively, an outside consultant could be retained to audit the buildings. Cost for maintenance and upgrades to be identified based on audit findings.

ACTION 1.2: DETAILED ENERGY AUDITS FOR THE WATER AND WASTE WATER PLANTS

Description/ Detail of Actions	<p>Detailed (ASHRAE Level 2) energy audits are used to investigate capital-intensive energy conservation measures and energy saving opportunities. This type of analysis requires technical skills and is typically conducted by experts.</p> <p>For West Hants, detailed energy audits should be conducted for the drinking water and wastewater treatment plants, as well as the water distribution system, which have some of the highest rates of electricity consumption amongst municipal assets.</p> <p>Condition surveys could be conducted for all buildings, but based on the GHG inventory, the following locations should be prioritized:</p> <ul style="list-style-type: none">- Falmouth Sewer Plant - 48 Falmouth Connector Road- Falmouth Water Plant - 242 Eldridge Street- Water Treatment Plant - 2160 Bishopville Road
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ACTION 1.2: DETAILED ENERGY AUDITS FOR THE WATER AND WASTE WATER PLANTS

Outcome / Performance Target	Typical savings associated with energy audits range from 5% to 20%. For a detailed energy audit (ASHRAE Level 2 energy audit), the suggested reduction target is 15%, or 109.62 tCO2e.
Anticipated Impact (low, medium, high)	High
Responsible Authority	Municipality of West Hants, Department of Public Works
Contributors / Stakeholders	Engineering consultant
Priority	Long-term
Monitoring Process and Period	Electricity consumption should be tracked for each building that was audited and maintained or upgraded. Consumption should be compiled on a quarterly basis and compared (season) to historical data to demonstrate energy savings.
Cost / Effort	Budget cost of approximately \$12,000 / audit, however costs vary depending on requirements of audit and service provider. Cost for maintenance and upgrades to be identified based on audit findings.

ACTION 1.3: ASSESSMENT OF BROOKLYN FIRE STATION AND CIVIC CENTER

Description/ Detail of Actions	The Brooklyn Fire Station and Civic Centre was noted as the most energy intensive asset of the Municipality's portfolio. This was surprising to many, since it is a LEED Certified building which was commissioned in 2012. However, even buildings with energy efficient systems fall out-of-tune as buildings age and adjustments are made without fully considering energy impact. It is recommended that an assessment be completed to understand whether the building performance is meeting its original LEED standard and evaluating the building against other, similarly-sized buildings in Nova Scotia.
	Optimizing the performance and operation of a building's system is known as re-commissioning. NRCan is a leading advocate of recommissioning in Canada, as CanmetENERGY developed a guide to successfully use recommissioning (RCx) as a cost-effective method of improving performance and saving energy through a more rational operation of institutional and commercial buildings ² . Recommissioning begins with an in-depth investigation of existing system design, controls and as-operated performance. The resulting optimization recommendations (typically related to control adjustments, maintenance, and minor equipment retrofits) are then implemented. It was also suggested at the stakeholder meeting that small adjustments, such as automatic doors for the fire department

² Natural Resources Canada, 2012, ecoENERGY Efficiency for Buildings,
https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeo/pdf/Publications/commercial/pdf/CxRCx_eng.pdf

ACTION 1.3: ASSESSMENT OF BROOKLYN FIRE STATION AND CIVIC CENTER

	(through which heat is often lost) could be ‘quick fixes’ that may have a big impact.
Outcome / Performance Target	A Lawrence Berkeley National Laboratory survey reported median energy savings of 15% for an existing building sample with a median construction date of 1978. ³ For the Brooklyn Fire Station and Civic Center, this translates into a reduction of 23 tCO _{2eq} .
Anticipated Impact (low, medium, high)	High
Responsible Authority	Department of Public Works
Contributors / Stakeholders	Engineering consultant
Priority	Long-term
Monitoring Process and Period	Electricity consumption should be tracked for this specific building. Consumption should be compiled on a quarterly basis and compared (season) to historical data to demonstrate energy savings.
Cost / Effort	Budget cost estimate of \$25,000 / audit, however costs vary depending on requirements of audit and service provider. Cost for maintenance to be identified based on audit findings.

ACTION 1.4: PROMOTE AND CELEBRATE ENERGY EFFICIENT BUILDINGS

Description/ Detail of Actions	The corporate GHG inventory showed that some of the Municipality’s buildings are performing with high energy efficiency. This efficiency should improve and extend to other buildings as some of the actions associated with the Local Action Plan (GHG reductions) are implemented. West Hants should work to promote and celebrate energy efficient buildings in an effort to normalize energy efficiency as a positive action and to make energy efficiency more visible in the Municipality. This could be accomplished by including updated information about building efficiency within the buildings, using pamphlets or posters. Information should be clear and simple, for example, the lights in this building are LEED, which use 75% less energy than a regular, incandescent lighting. Another tactic, as noted at the stakeholder meeting, is to show ‘How easy it is’ to transition a building and make it more energy efficient. The Municipality could take other actions, such as hosting tours of energy efficient buildings or promoting energy efficient actions by those using the buildings (i.e. encouraging people to take shorter showers at the gym, etc.). It was noted at the stakeholder meeting that promoting energy efficiency in Municipal buildings may also give the Municipality the opportunity to
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³ Evan Mills et al. 2005, The Cost-Effectiveness of Commissioning New and Existing Commercial Buildings: Lessons from 224 Buildings, https://www.bcx.org/ncbc/2005/proceedings/19_Piette_NCBC2005.pdf

ACTION 1.4: PROMOTE AND CELEBRATE ENERGY EFFICIENT BUILDINGS

highlight local builders/tradespeople who can perform renovations and upgrades to make homes more efficient. Such lists already exist province-wide, as provided by Efficiency Nova Scotia and Nova Scotia Power. The Municipality could make this list readily available to people in West Hants.	
Outcome / Performance Target	Increased awareness/literacy on the actions West Hants is taking to reduce GHG emissions, and increased literacy on energy efficiency that individuals can apply at home.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	Planning & Development
Contributors / Stakeholders	Opportunity for a Planning intern to begin and/or operate this project
Priority	Short-term
Monitoring Process and Periodicity	Questions on building efficiency can be included in Community GHG reduction surveys – using baseline data from survey completed in 2019 about energy efficiency literacy. Survey should be updated to meet current needs and circulated annually.
Cost / Effort	The cost for printing promotional/celebratory materials upfront. Recurring every two-years as materials become outdated.

ACTION 1.5: BEHAVIORAL ENERGY EFFICIENCY PROGRAM

Description/ Detail of Actions	<p>Energy consumption in office buildings is often as important when the building is not in use, as lighting, temperature control, and equipment are still in use. An awareness program can help boost employees' contributions to energy savings by doing simple zero-cost measures, such as ensuring that equipment is turned off when not in use. Another opportunity to influence employee behaviour is to encourage people to choose active modes of transportation where possible, when making trips for work. Ways to do this may include providing employees with an internal bike share program, providing bicycle parking at office locations, and allowing employees to take extra time out of their day to arrive at meeting locations.</p> <p>As with any other management system, tracking and reporting of results is important to sustain the motivation of employees.</p> <p>The awareness program can be developed and tailored to West Hants' needs by a summer student. There is plenty of material online to get inspiration:</p> <ul style="list-style-type: none">- BC Hydro - Employee awareness (2019)- Carbon Trust - Employee awareness and office energy efficiency (2019)- NRCan - Implementing an energy efficiency awareness program (2012).
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ACTION 1.5: BEHAVIORAL ENERGY EFFICIENCY PROGRAM

Outcome / Performance Target	Offer a first-time awareness session to 100% of the municipal employees. Offer a yearly refresher when presenting the yearly energy consumption.
Anticipated Impact (low, medium, high)	Low
Responsible Authority	Department of Planning; MCCAP Committee
Contributors / Stakeholders	University Student Interns
Priority	Medium-term
Monitoring Process and Periodicity	Electricity consumption should be tracked for this specific building. Consumption should be compiled on a quarterly basis and compared (season) to historical data to demonstrate energy savings.
Cost / Effort	No capital cost; staff time required.

ACTION 1.6: OFFICE BUILDING LOCATION REVIEW

Description/ Detail of Actions	The location of an office building can help to influence an employee's decision on what mode of transportation they might choose. For instance, if an office is located in a 'walkable' neighbourhood, which is within walking distance of residential areas and other commercial destinations, and has access to active transportation facilities like sidewalks, then employees are more likely to choose active transportation to get to work. It was noted by stakeholders that there is an opportunity during the consolidation process to consider transportation choices and walkability when determining the siting of the new Region of Windsor and West Hants Municipality Municipal office.
Outcome / Performance Target	New Municipal office located within a walkable area, close to other amenities and residential neighbourhoods.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	Municipal Council (Staff TBD)
Contributors / Stakeholders	n/a
Priority	Short-term
Monitoring Process and Periodicity	One-time decision. However, walkability and proximity to other destinations could be a consideration of all Municipal buildings, when recapitalization or the need for a new building is being considered.
Cost / Effort	No capital cost; staff time required.

GOAL 2: INTRODUCE RENEWABLE ENERGY TO MUNICIPAL BUILDINGS

While Goal 1 aims to achieve efficiencies and reduce the amount of energy consumed by municipal buildings, Goal 2 is focused on the energy profile of the remaining energy needs for municipal buildings. Goal 2 focuses on switching to renewable energy sources. The following actions present options for switching to renewables and switching away from back-up energy that comes from non-renewable energy sources.

ACTION 2.1: FUEL SWITCHING - HEAT PUMPS

Description/ Detail of Actions

Facilities consume energy in many forms. In West Hants some facilities consume multiple fuels such as electricity, light fuel oil or propane. Fossil fuels such as light fuel oil emit GHGs as they are consumed.

Converting heating equipment to use renewable fuels can be an attractive option for reducing GHG emissions. The greater the carbon load of the current fuel used, the more beneficial it is to switch to renewable energy.

Fuel switching can also involve the replacement of oil-fired heating furnaces, boilers, and distributed equipment with high-efficiency electric heat pump alternatives, predominantly ground-sourced heat pumps, air-sourced heat pumps, variable refrigerant flow (VRF) heat pumps, etc. As Nova Scotia's electricity grid gets cleaner, electric heat pumps will offer significant carbon reduction potential.

Highly-efficient electric heat pump operation is effective at most times of year but must be supplemented either with conventional electric resistance or combustion-based heating during times of extreme cold weather. Such hybrid systems are becoming relatively common.

For West Hants, a technical and economic analysis for heat pumps should be completed for the following buildings:

- Hants County Courthouse – 240 King St.
- Hantsport Fire Dept – 5 Oak St.
- Public Works Shed – 19 Chittick Ave
- Police Station – 3 Oak St.

Outcome / Performance Target

Thermal exchange is considered to eliminate fossil fuel consumption, replaced instead by electric-powered air, ground or water-sourced heat pumps at each building. The conversion for the four buildings noted, would result in an immediate reduction of approximately 16 tCO₂e per year.

Anticipated Impact (low, medium, high)

Medium

Responsible Authority

Department of Public Works

Contributors / Stakeholders

Engineering consultant

Priority

Medium-term

Monitoring Process and Periodicity

Electricity consumption should be tracked for this specific building. Consumption should be compiled on a quarterly basis and compared (seasonally) to historical data to demonstrate energy savings.

ACTION 2.1: FUEL SWITCHING - HEAT PUMPS

Cost / Effort	For air-source heat pumps, average costs are \$2,400/ton or \$65/m ² . This is WSP's estimate based on RSMeans Cost Books. This gives rise to a capital cost estimate of approximately \$310,000.
	This system is not expected to result in any change in maintenance costs relative to the hot-water systems.

ACTION 2.2: INVESTIGATE RENEWABLE ENERGY OPPORTUNITIES - SOLAR PV FOR THE WATER AND WASTE WATER TREATMENT PLANTS

Description/ Detail of Actions	Solar PV generation refers to the installation of solar PV panels and ancillary equipment (inverters, racking, etc.) on site to produce renewable alternating current (AC) electricity for use at the facility. Small-scale systems are typically grid-connected without battery storage, with net metering available to "balance" hourly differences between facility electricity demand and system generation.
	For West Hants, there are a couple of options that could be considered. 1) a ground mounted solar PV system on the waste water treatment plant site (48 Falmouth Connector Road); or 2) "Floatovoltaic" systems, solar PV panels mounted on a floating rack system, for the Falmouth Water Treatment reservoirs at French Mill Lake and Davidson Lake.
	The ground mount and floatovoltaic systems are both scalable, meaning that they can start small and be expanded upon.
Outcome / Performance Target	From one site to another, variables like solar availability, utility rates, shading, and access to NSP distribution will all play a role in determining the capital cost and lifetime performance of a system. The site-specific viability of the property must be further assessed as a next step towards implementing this to the action plan. The potential GHG reductions are 244 tCO ₂ e for the ground mount PV system (13 ground mounted two-axis trackers, each supporting 50 PV panels) at the waste water treatment plant, and 300 tCO ₂ e for a floatovoltaic system, consisting of 1000 PV panels mounted on a floating racking system, installed on either French Mill Lake or Davidson Lake (note, this could scale up to 11,700 tCO ₂ e if both lakes were practically covered with solar PV panels).
Anticipated Impact (low, medium, high)	High
Responsible Authority	Department of Public Works
Contributors / Stakeholders	Engineering consultant
Priority	Medium-term
Monitoring Process and Periodicity	Feasibility study
Cost / Effort	1) \$557,700 for 650 panels, and 13 two-axis trackers (\$2,285/tCO ₂ e) 2) \$858,000 for 1000 panels on floating racking system (\$2,860/tCO ₂ e)

ACTION 2.2: INVESTIGATE RENEWABLE ENERGY OPPORTUNITIES - SOLAR PV FOR THE WATER AND WASTE WATER TREATMENT PLANTS

*Please note that the average cost per solar panel is between \$900-\$1,100 based on 2019 estimates. However, the cost per solar panel is reduced when ‘buying in bulk’. Likewise, the cost of installation for the system remains relatively equivalent whether purchasing 10 or 1000 solar panels.

ACTION 2.3: CONSIDER GREEN POWER PURCHASING

Description/ Detail of Actions

Some Municipalities in Nova Scotia, in an effort to reduce their GHG emissions, have chosen to invest in renewable energy. This can be done in one of two ways: the first is to build and/or buy a portion of a renewable energy production facility like a solar field or a wind farm, as addressed above. The second option is green energy purchasing. In the latter scenario, providers own renewable energy production facilities and will put a customer’s desired amount of renewable energy onto the electrical grid to offset the non-renewable sources. This allows the Municipality to offset their use to the extent that they desire. It was suggested that, instead of waiting for Nova Scotia Power to ‘Green the grid’, taking initiative would both help to reduce the Municipality’s GHG emissions more quickly, could give the Municipality more energy-independence, and could help to set a strong example and create momentum for green initiatives within the community.

Nova Scotia Power, when consulted as stakeholders, did note that in terms of reducing GHG emissions through green power, the preferable method is a ‘community solar garden’. This entails a centrally-located Solar Photovoltaic (PV) system that provides electricity to participating subscribers and can sell ‘extra’ energy to the public energy grid.

Outcome / Performance Target	Transition the Municipality to a 50% renewable energy by 2022.
Anticipated Impact (low, medium, high)	High
Responsible Authority	All departments; CAO’s office
Contributors / Stakeholders	Green Energy Purchasing provider
Priority	Long term
Monitoring Process and Period	Aim to achieve goal within 1.5 years
Cost / Effort	<p>The incremental cost is \$0.0015 to \$0.025 per kWh, depending upon where the renewable energy certificate is purchased from. The corporate electricity consumption for buildings, street lights and water and waste water infrastructure is 1,979,427 kWh (2018-2019). If green power was purchased to offset 100% of the emissions corresponding to all electricity consumed by the corporate Municipality, the additional annual cost be \$3,000 to \$49,500, depending upon where the renewable energy certificate is purchased.</p> <p>If goal is to achieve an offset of 50% by 2022, the anticipated maximum cost annually would be approximately \$25,000.</p>

ACTION 2.4: INVESTIGATE PARTNERSHIPS FOR RENEWABLE ENERGY PROVISION

Description/ Detail of Actions	Some Municipalities and organizations in Nova Scotia have already invested in renewable energy. There may be an opportunity to connect with these entities to either build a stronger understanding of investing in renewables for Municipal energy, or even partnering with these entities to purchase, build, or invest in renewables. Key organizations that provide programming for GHG reduction strategies include the Clean Foundation of Nova Scotia, Nova Scotia Power and EfficiencyOne, and the Nova Scotia Department of Energy and Mines.
Outcome / Performance Target	Build connections with others that may lead to partnerships for renewable energy production.
Anticipated Impact (low, medium, high)	Low
Responsible Authority	Planning & Development Department
Contributors / Stakeholders	n/a
Priority	Short-term
Monitoring Process and Period	Revisit option for partnerships every 3-5 years
Cost / Effort	No capital cost

GOAL 3: DEFINE A GREEN FLEET PROGRAM

A Green Fleet Program is comprised of several options and are based on the purchase of electric vehicles by the Municipality. Switching away from gas vehicles to electric vehicles can help a municipality to reduce the GHG emissions caused by their municipal vehicle fleet. However, it has been accurately pointed out that unless the Municipality invests in renewable energy production, or the Provincial energy grid is more quickly transitioned away from GHGs, electrifying the fleet likely will not have as significant of an impact in lowering GHG emissions.

ACTION 3.1: CREATE A 'FLEET MANAGEMENT PROGRAM' THAT INTRODUCES EVS OVER A MULTI-YEAR TIMELINE

Description/ Detail of Actions	It was suggested that a longer-term Fleet Management Program could help the Municipality to plan for the future, which would see traditional gasoline vehicles being phased out and electric vehicles being phased in. This Management program would track the maintenance and operational costs and determine yearly capital funding needed to transition to EVs.
	In addition to the reduction of GHGs, one of the biggest benefits to introducing EVs is the reduced refueling costs, electricity being far cheaper than fuel at the pump. Fleet managers will identify and select the lowest carbon options which will continue to meet their operation needs. Once done, it will be possible to establish a vehicle replacement schedule. When fleet managers have an accurate understanding of the type and quantity of zero-emission vehicles they intend to purchase over the long

**ACTION 3.1: CREATE A ‘FLEET MANAGEMENT PROGRAM’ THAT INTRODUCES EVS OVER A MULTI-YEAR
TIMELINE**

term, they can model the infrastructure needed to support the operation of these vehicles.

The Clean Foundation has a program called ‘Next Ride’ that the Municipality may want to participate in prior to undertaking their fleet management program. Next Ride team members will visit the Municipality and bring electric vehicles with them to allow individuals to test drive and learn more about EV ownership and maintenance. This could help increase literacy about EVs amongst staff and could also help those managing the fleet to have an opportunity to ask questions and review concerns with knowledgeable individuals.

It was noted by stakeholders that in some instances, having a private car share company located in the Municipality can be a good, lower-cost opportunity for the Municipality to use these cars for non-work-order related business travel. An agreement with a Municipality for a certain level of service can encourage a car share company to locate in the Municipality, and this also helps to provide an additional transportation option to residents in West Hants.

Replace municipal vehicles with electric vehicles that meet operational needs, when available. Anticipated reduction in energy consumption between a conventional vehicle and an electric vehicle has been estimated based on the 2020 Grid Intensity of the Nova Scotia Power energy profile, and the 2030 estimated Grid Intensity used in the West Hants GHG Emissions Inventory. The following table compares Gas and Diesel vehicles of different sizes to their electric counterparts and represents the anticipated reduction in GHG emissions per vehicle. These numbers can be used to estimate the anticipated reductions of a Fleet Management Program, based on the targets and goals set in the Program for replacement of conventional vehicles to electric vehicles.

Nova Scotia	2020	2030
Gas --> Electric	kg CO_{2e}/km	kg CO_{2e}/km
Passenger Car	-0.071	-0.073
Passenger Truck	-0.090	-0.092
Light Commercial Truck	-0.074	-0.080
Diesel --> Electric	kg CO_{2e}/km	kg CO_{2e}/km
Passenger Car	-0.073	-0.060
Passenger Truck	-0.215	-0.237
Light Commercial Truck	-0.186	-0.199

Outcome / Performance Target

Please note that this reduction has not been accounted for in the Scenario calculations under Section 4 of this Plan, due to the variability of targets and goals in the Fleet Management Program.

Anticipated Impact
(low, medium, high)

Medium

**ACTION 3.1: CREATE A ‘FLEET MANAGEMENT PROGRAM’ THAT INTRODUCES EVS OVER A MULTI-YEAR
TIMELINE**

Responsible Authority	Procurement
Contributors / Stakeholders	Electric Vehicle Dealer
Priority	Long-term
Monitoring Process and Period	Yearly with the municipal budget.
Cost / Effort	Capital cost of acquiring an EV when the fleet needs a replacement. Basic electric vehicles for non-work-order staff travel cost approximately \$30,000, based on 2019 numbers.

ACTION 3.2: CONSIDER INTRODUCING CARPOOL AND BICYCLE INCENTIVES FOR WORK TRAVEL

Description/ Detail of Actions	<p>Transportation is on average the second largest expense for Nova Scotia households. In West Hants, there are few incentives to carpool although a high portion of the population work daily in HRM. The Municipality could play a leading role to promote carpooling. Additionally, many lots around the Municipality have the potential to function as carpool lots. While influencing residents in the Municipality to carpool may be a longer-term goal complete with providing more carpooling lots and investigating rapid bus transit to HRM, there is an opportunity to influence Municipal Staff behaviour in the meantime.</p> <p>Municipal Staff themselves could receive incentives to carpool to work or for work trips. Such incentives to carpool – like more flexible arrival times to work or increased re-imbursement rates for carpooling for a work trip instead of taking individual – would encourage more frequent carpooling. Additionally, it was noted that while employees get reimbursed for work travel in their personal vehicles, the same is not true for personal bicycles. The Municipality could introduce a ratio like that for car travel, so as to encourage employees to choose an active mode of transportation and pay them a small stipend for making this choice.</p> <p>In addition to carpooling and AT incentives, it was mentioned by stakeholders that programs like ‘guaranteed ride home’ have helped to shift employee travel choices in other Municipalities. These programs guarantee employees who carpool an allotted number of taxi chits, which, in case of emergency or change in circumstance, they won’t be ‘stranded’ without a car. It was noted that these programs can help alleviate the anxiety of not having a personal vehicle at work.</p>
Outcome / Performance Target	Increase of carpooling among the community and Municipal Staff – eliminating redundant trips by two people traveling to and from the same location.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	CAO

ACTION 3.2: CONSIDER INTRODUCING CARPOOL AND BICYCLE INCENTIVES FOR WORK TRAVEL

Contributors / Stakeholders	Public Works, Finance
Priority	Long-term
Monitoring Process and Period	Changes made during HR policies review. Twice-yearly review of program uptake to help estimate GHG reductions.
Cost / Effort	Capital costs associated with increasing staff reimbursement rate for work travel.

ACTION 3.3: INVESTIGATE ‘BULK’ PURCHASE OF ELECTRIC VEHICLES AND/OR EV CHARGING STATIONS

Description/ Detail of Actions	<p>As demand grows for electric vehicles, maintaining supply has been difficult for producers and the vehicles remain expensive in upfront cost in comparison to their gasoline counterparts. Most EV charging currently takes place in the home. In order for EVs to gain widespread consumer adoption, it is critical for an infrastructure of electric vehicle supply equipment (EVSEs) to exist outside the home; at work as well as at population destination points. The cost of installing a charger varies with its power capacity. Although higher power chargers can provide a quicker charge, they are also more expensive. Costs may sometimes fall if chargers are installed in bulk (such as for apartment complexes), although this depends on available power capacity on the site.</p> <p>It is possible that West Hants could take part in a bulk purchase of EVs and EV charging stations, in partnership with interested individuals from the Municipality. This could help to ‘kick-off’ the presence of EVs in West Hants and make them more affordable. Municipal Staff would have to investigate that avenue. It was noted that currently, there are no EV charging stations located in West Hants. For a full list of publicly-available charging stations in Nova Scotia, visit the Nova Scotia Power website.</p>
Outcome / Performance Target	Staff Report on the financial implications of purchasing in bulk EV and/or EV charging stations to inform Council.
Anticipated Impact (low, medium, high)	Low
Responsible Authority	Procurement
Contributors / Stakeholders	Finance, CAO
Priority	Short-term
Monitoring Process and Period	Annual reporting
Cost / Effort	No capital cost for the investigation. Exact cost to be determined by staff report.

ACTION 3.4: EXPLORE A CORPORATE CAR SHARING PROGRAM

<p>The SAUVéR program allows municipalities to share with their partners and citizens the use of vehicles. It is a tool that combines cost-cutting targets and provides alternative mode of public transportation for communities using greener vehicles (all-electric vehicles, plug-in hybrid vehicles, hybrid vehicles).</p>	
Description/ Detail of Actions	During business hours, the vehicles are used as the municipal fleet. Outside business hours, the cars are made available to a public car-sharing program. While optimizing the use of fleet vehicles among employees and other potential users, provide a public transit service tailored to specific needs. Staff need to explore the feasibility of this project in terms of liability and insurance.
Outcome / Performance Target	It was noted by stakeholders that the Clean Foundation's 'Next Ride' program may offer a model for insurance, since that program allows multiple drivers to test ride vehicles owned by the Clean Foundation.
Anticipated Impact (low, medium, high)	Staff Report on the implications of implementing a corporate car sharing program to inform Council. Performance target is to normalize and popularize car-sharing and electric vehicles, while providing sustainable transportation options to people of all income levels.
Responsible Authority	Public Works, Procurement
Contributors / Stakeholders	Finance, YHC Environment
Priority	Medium term
Monitoring Process and Period	Annual Reporting
Cost / Effort	Based on preliminary research based on 2019 numbers, the costs for electric vehicles range from around \$30,000 at the lower end for smaller models like the Nissan Leaf or the Chevrolet Bolt, to \$70,000 at the higher end for larger models like the Tesla Model X. A corporate car-sharing program itself is not anticipated to add costs to having an electric Municipal Fleet. FCM offers funding through its Municipalities for Climate Innovation Program.

GOAL 4: INVEST IN EDUCATION FOR THE COMMUNITY AND STAFF

An important element of making investments that will reduce GHG emissions is coupling these efforts with education that will make the actions more sustainable and better supported on a long-term basis. This goal aims to facilitate actions that will empower municipal staff and the community in the Municipality to make decisions or take actions that collectively can help to reduce GHG emissions. Such suggested activities under this Goal included the public ‘open streets’ days where education can take place, in addition to the suggested Actions under this Goal. The following actions do not have numeric values of the GHG reduction associated with them, however as the programming grows out of these actions, numeric values will likely be appropriate and can contribute to the GHG reduction in the Municipality.

ACTION 4.1: PARTNER WITH EFFICIENCY N.S. TO EDUCATE PUBLIC ON HOME RENOVATION PROGRAMS/INCENTIVES, OVERALL REDUCED COST OF LIVING, ETC.

Description/ Detail of Actions	<p>It was suggested that while programs exist from Efficiency NS, Nova Scotia Power, and the Clean Foundation that might help residents of West Hants retrofit their homes for energy efficiency, many members of the community are unaware of them. The Municipality could work together with these service/program providers to expand the information available to the West Hants community on these programs and how home renovations that promote efficiency can save them significant amounts of money, long-term.</p> <p>This promotion could be through existing avenues that Efficiency NS, Nova Scotia Power, and Clean Foundation already use, like brochures and posters, in key locations around the Municipality.</p>
Outcome / Performance Target	More uptake on Efficiency NS programs in West Hants
Anticipated Impact (low, medium, high)	High
Responsible Authority	Planning & Development Department
Contributors / Stakeholders	Efficiency Nova Scotia (EfficiencyOne), Nova Scotia Power, Clean Foundation of Nova Scotia
Priority	Short-term
Monitoring Process and Period	Tracking the number of homeowners in WH who have used the program annually
Cost / Effort	Estimated capital costs include cost of printing and other promotional activities. Staff time should also be accounted for.

ACTION 4.2: TRAIN WH STAFF ABOUT EFFICIENCY N.S. PROGRAMS TO INTEGRATE INTO THEIR DAY-TO-DAY WORK AND INTERACTION WITH CITIZENS.

Description/ Detail of Actions	Complimentary to educating the public on programs that are available for home efficiency improvements is educating Municipal staff, during their interactions with the community, to be able to speak helpfully about various programs that may be available. West Hants staff, especially Planning & Development staff, speak to individuals and developers who are developing or renovating houses frequently and as such, there is an opportunity for them to make suggestions about how greater energy efficiency may be achieved through participation in one of the Efficiency NS, Nova Scotia Power, or Clean Foundation programs.
Outcome / Performance Target	This action would have WH staff trained on these programs with the help of program administrators from the respective organization, and then encouraging staff when interacting with the public and developers on projects, permitting, and things pertaining to home and business ownership, to share the potential to take advantage of these programs.
Anticipated Impact (low, medium, high)	Low
Responsible Authority	Planning & Development Department
Contributors / Stakeholders	Efficiency Nova Scotia (EfficiencyOne), Nova Scotia Power, Clean Foundation of Nova Scotia
Priority	Short-term
Monitoring Process and Period	Tracking the number of homeowners in WH who have used the program annually.
Cost / Effort	No capital cost anticipated, however staff time and training would be required.

ACTION 4.3: CONSIDER HIRING A DEDICATED GHG REDUCTION EMPLOYEE

Description/ Detail of Actions	During the staff stakeholder workshops, it was noted that many of the actions in this Background Study rely on projects that will be ongoing for many years and will require a ‘point person’ to manage them. It was suggested that the responsibility for this could be given to a dedicated GHG reduction program employee. This employee would be responsible for liaising with all departments involved, with community groups, with provincial partners, and monitoring the status of projects.
	Stakeholders noted that partial funding for this employee may be available through a grant from Efficiency Nova Scotia. Additionally, it was noted by staff stakeholders that a budget to implement projects would be required for this employee. It was suggested that to offset the cost, local university students could be hired to do supporting research and help the employee run programs to carry out these actions.

ACTION 4.3: CONSIDER HIRING A DEDICATED GHG REDUCTION EMPLOYEE

Outcome / Performance Target	Streamlined tracking of GHG reduction projects under one manager to keep Municipality on-track with goals and keep projects running over longer periods of time.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	CAO's Office
Contributors / Stakeholders	n/a
Priority	Long-term
Monitoring Process and Period	n/a
Cost / Effort	Exact cost to be determined by CAO's office for salaried employee.

GOAL 5: CREATE OPPORTUNITIES FOR WEST HANTS TO SUPPORT THE COMMUNITY AND LEAD BY EXAMPLE

The GHG Emissions Inventory shows that the Municipality itself contributes only a small fraction of the overall GHG Emissions in West Hants. Most emissions are associated with the community – specifically, in the residential and transportation sectors. As such, the Municipality's capacity to effect change is much greater if members of the community are encouraged to and see a strong example of reducing their GHG emissions. Likewise, the Municipality, as an employer, has an opportunity to set an example for other businesses in West Hants.

ACTION 5.1: INTEGRATE GHG REDUCTION STRATEGIES INTO HR POLICIES

Description/ Detail of Actions	<p>It was indicated that a review of HR policies is ongoing (winter 2019-2020). This was highlighted as an opportunity to build increased flexibility into work hours and/or working location to help employees take individual actions to reduce the GHG emissions associated specifically with traveling to and from work. Initiatives suggested include:</p> <ul style="list-style-type: none">- ‘Home-working’ days – a pre-fixed day per week or bi-weekly that individual employees can work from home- ‘Flex’ Days – employees can choose to work extra hours to achieve their bi-weekly salaried hours (i.e. taking a shorter lunch; staying later in the afternoon; etc. to achieve e.g. 70 hour work week) and then take a day off at the end of the bi-weekly period.- More flexible arrival/departure times: it was noted that being able to arrive later and leave later, within reason, would help employees to carpool with friends or spouses, thereby reducing their emissions getting to/from work.
Outcome / Performance Target	Employees using their personal vehicles for commute to work 1 or more fewer day(s) per month.
Anticipated Impact (low, medium, high)	Low
Responsible Authority	All non-essential WH staff members and their managers (managers tracking employee activities)
Contributors / Stakeholders	n/a

ACTION 5.1: INTEGRATE GHG REDUCTION STRATEGIES INTO HR POLICIES

Priority	Medium-term
Monitoring Process and Periodicity	Ask employees to self-monitor and managers to report to CAO on reductions in employee commutes.
Cost / Effort	No capital cost.

ACTION 5.2: INVESTIGATE OPTIMIZING BUSINESS/WORK-ORDER TRAVEL

Description/ Detail of Actions	<p>Work travel for the Public Works and Parks departments in West Hants is necessary to complete work orders. It was noted that ‘optimizing’ work orders to optimize work travel is a method that may help to reduce the GHG emissions associated with individual work orders. The intention of this would be to better plan work-order travel to take place on a locational basis. For example, if there are two jobs required in Brooklyn in one week, those jobs would be scheduled for the same day. The first option is to optimize work orders ‘in house’. There are many Municipalities who optimize their scheduling internally – with one manager directing and organizing the work orders like this. The second option is to purchase and utilize available Software which can then be programmed to optimize work-order travel. Some such Softwares include:</p> <ul style="list-style-type: none"> - Hippo CMMS Software: incorporates work order management, preventive maintenance, and inventory management to create an optimized maintenance management plan - City Works Software: uses GIS to group assets by location, type, age, etc. to create work orders-work flow for both scheduled and reactive work. - Accela Work Crew: uses company smart phones to schedule and track work-orders as they are completed.
Outcome / Performance Target	Reduction in work-order redundancies. More information needed on work-orders to determine exact calculation.
Anticipated Impact (low, medium, high)	Low
Responsible Authority	Public Works Department / Parks Department (each authority responsible for department work orders)
Contributors / Stakeholders	n/a
Priority	Medium-term

ACTION 5.2: INVESTIGATE OPTIMIZING BUSINESS/WORK-ORDER TRAVEL

Monitoring Process and Periodicity	Annual monitoring of number of work-order trips.
Cost / Effort	Option 1 – no capital cost. Option 2 – price of Software varies.

ACTION 5.3: EXPLORE OPTIONS ON P.A.C.E. PROGRAMMING

Description/ Detail of Actions	Explore building a partnership with Clean Foundation of Nova Scotia to introduce a Property Assessed Clean Energy (P.A.C.E.) financing model. The financing is structured around a Municipal funding model wherein a pre-determined amount is allocated each year and financing is available on a first come-first served basis. The Province will provide the Municipality with start-up funding for this program, and then the Municipality commits to funding the program during following years.
Outcome / Performance Target	P.A.C.E. programming helps individuals to do energy retrofits to their homes with financing from the Municipality. The first step is a Home Energy Assessment, which helps to determine whether a home is eligible for financing and what upgrades a home may be eligible for. These could include energy efficient windows and doors, insulation, heat pumps, solar panels, etc. The homeowner pays back the loan over the course of a 10-year (or as desired) payment period. It has been suggested that West Hants could form a partnership to deliver this program, and that funding sources for the financing could come from the Gas Tax revenue and/or existing Municipal capital funds that have been allocated for ‘future’ expenditures.
Anticipated Impact (low, medium, high)	High
Responsible Authority	Planning & Development
Contributors / Stakeholders	Clean Foundation of Nova Scotia / Province of Nova Scotia
Priority	Long-term
Monitoring Process and Periodicity	Annual reporting.
Cost / Effort	Determined in partnership with Clean Foundation – dependent on how many homeowners Municipality wants to finance at once.

ACTION 5.4: PROMOTE DESIRED ACTIONS, POLICIES AND INCENTIVES TO THE PROVINCIAL GOVERNMENT

Description/ Detail of Actions	The Municipality recognizes, through the GHG Inventory, that energy consumption is one of the major contributors to overall GHG emissions in the Municipality. This is due to the Municipality's use of the Provincial energy grid, which still uses a greater percentage of coal-powered energy than the other Provincial energy providers in Canada. Knowing this, Municipalities in Nova Scotia who have GHG reduction targets often utilize existing chances for collaboration and support to advocate for a faster transition away from fossil fuels and towards renewable energy. This action can be accomplished through channels and avenues that already exist. For instance, inviting representatives from Nova Scotia Power to attend the GHG Emissions Inventory presentation and workshop was a good opportunity to provide feedback to the service provider that West Hants will need a Provincial commitment to 'greening the grid' to help meet the GHG reduction targets.
Outcome / Performance Target	More frequent communication with Provincial decision-makers and Nova Scotia Power regarding West Hants GHG reduction targets and the provincial energy grid.
Anticipated Impact (low, medium, high)	High (potential)
Responsible Authority	All Departments – Managers & CAO
Contributors / Stakeholders	n/a
Priority	Long-term
Monitoring Process and Periodicity	n/a
Cost / Effort	No capital cost

ACTION 5.5: CONSIDER ADOPTING LAND USE POLICIES THAT MANDATE OR ENCOURAGE EFFICIENT/SUSTAINABLE GROWTH MODELS

Description/ Detail of Actions	The link between GHG emissions and land use planning is well-established in scholarship (for a summary, see CIP Briefing ⁴). As such, a recommended action is for the Municipality to emphasize policies that drive efficient growth and development when reviewing their Municipal Planning Strategy and Land Use By-law. Such policies should seek to permit growth and development in such a way that does not necessitate the use of a car. Examples of this include: <ul style="list-style-type: none">- Policies regarding the citing of community centres and facilities close to existing residential or commercial areas;
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⁴ Climate Brief: Climate Change and Land Use Planning. CIP, 2018. URL: https://www.cip-icu.ca/getattachment/ca4806bb-0c53-4ad6-a4c6-47fe0c9e0d51/Climate-Brief_Land-Use-Planning-bm.pdf.aspx

**ACTION 5.5: CONSIDER ADOPTING LAND USE POLICIES THAT MANDATE OR ENCOURAGE
EFFICIENT/SUSTAINABLE GROWTH MODELS**

- Policies to reduce lot sizing and citing requirements, including greater lot coverages permitted and less lot frontage and area required;
- Policies to permit a variety of housing forms, including medium-to-high density forms like townhomes and small multi-unit buildings
- Policies to encourage or incentivize ‘infill’ development in/around existing residential and commercial areas, as opposed to large-scale green field development (i.e. greater permissions for density in these areas)
- Policies to support the existing Active Transportation Plan in implementation.
- Policies to introduce mixed use zoning in more residential areas, which results in the development of amenities like a corner store, pharmacy, daycare, etc. to be located closer to or within existing residential neighbourhoods.

Another important initiative will be to review the policies of the Active Transportation Plan to focus on reducing GHG emissions through providing better active transportation opportunities and to update these policies, where necessary, to match initiatives under the Municipality’s future Local Action Plan. Keeping these Plans up-to-date with new information can help to ensure that the Municipality is taking all available actions to encourage the use of active transportation, so as to result in reduced GHG emissions from transportation.

Outcome / Performance Target	Results in a reduction of GHG emissions from the transportation/housing sector over a long period of time. Reduction in percentage of car ownership/number of cars per household would be a good starting place (with data available from the census).
Anticipated Impact (low, medium, high)	High
Responsible Authority	Planning & Development
Contributors / Stakeholders	Council – requires political will
Priority	Medium-term
Monitoring Process and Periodicity	Census-year monitoring – every 5 years for 25 years.
Cost / Effort	No capital investment.

ACTION 5.6: MAKE RENEWABLE ENERGY INVESTMENTS AND SUSTAINABILITY PRACTICES (CURRENT AND FUTURE) ‘VISIBLE’ AND KNOWN TO THE COMMUNITY

Description/ Detail of Actions	Celebrating the efforts associated with the Local Action Plan (once determined by Council and staff) are important for introducing the goals to the community and garnering and maintaining buy-in. This is especially important if/when the Municipality makes a monetary investment, the success of which depends on positive public perception. The Municipality should aim to include promoting sustainable practices and renewable energy projects, when being pursued or completed, in all correspondence to residents of the Municipality. This includes using newsletters and social media, but also making an effort to do wayfinding and signage in and around buildings where renewable energy and sustainability practices are featured. For example, the tendency when introducing solar panels is to install them with little visibility. This action would encourage making solar panels more visible or, at the very least, putting up wayfinding signage close to the pedestrian paths around the building.
Outcome / Performance Target	More overall awareness as measured in annual GHG literacy community survey.
Anticipated Impact (low, medium, high)	Low
Responsible Authority	Parks / Planning & Development Departments
Contributors / Stakeholders	Marketing Consultant – for a communications/marketing program like this, it may be pertinent to hire a marketing consulting firm.
Priority	Long-term
Monitoring Process and Periodicity	n/a
Cost / Effort	Costs associated with hiring a marketing consultant through an RFP process; capital costs associated with promotion materials.

ACTION 5.7: EXPLORE OPTIONS TO INCLUDE ANTICIPATED GHG EMISSIONS IN STAFF REPORTS FOR COUNCIL AND COMMITTEES

Description/ Detail of Actions	In West Hants’ pre-formatted ‘Staff Report’, which goes either directly to Council or to a review Committee and then to Council, there is a subheading that asks the author of the report to consider Financial Implications in the proposed project. This action suggests including ‘Greenhouse Gas Emissions Implications’ as a subheading in the pre-formatted staff report. This would compel the Municipal staff authoring the staff report to consider the emissions associated with the proposed project and, therefore, help Council and other committees to make decisions and recommendations based on a consideration of whether the actions taken would negatively or positively impact the Municipality’s GHG reduction goal. To integrate this subheading and streamline the consideration process for staff, it may be necessary to hire a climate change consultant on retainer
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ACTION 5.7: EXPLORE OPTIONS TO INCLUDE ANTICIPATED GHG EMISSIONS IN STAFF REPORTS FOR COUNCIL AND COMMITTEES

who can assist staff in making estimated calculations when drafting this section of the report. The alternative would be to hire a climate change consultant to develop a ‘checklist’ system that helps employees arrive at a ‘low’, ‘medium’, or ‘high’ impact on GHG emissions for potential projects.

It was noted during the stakeholder engagement meeting that this may be difficult for certain types of staff reports, and further categorization of reports may be necessary in order for a climate change consultant to provide assistance developing a program.

Outcome / Performance Target	Avoiding unintentional negative impacts on the Municipality’s GHG emissions target
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	All staff departments
Contributors / Stakeholders	Climate change consultant
Priority	Short term
Monitoring Process and Periodicity	n/a
Cost / Effort	Estimated cost for a consultant depends on requirements of projects and staff reports. If hired on retainer, a climate change consulting engineer would likely cost \$130-160/hour. Associated staff costs.

GOAL 6: MAKE WEST HANTS MORE ELECTRIC VEHICLE FRIENDLY

Once again referring to the corporate and community GHG inventories, it is clear that transportation for members of the community is much more of a significant GHG contributor than for the Municipality itself. However, the Municipality still has a role to play in increasing the use of and ease of transitioning to electric vehicles for the public.

ACTION 6.1: EXPLORE POTENTIAL PARTNERSHIPS FOR EV CHARGING STATIONS

Description/
Detail of Actions

In light of the ongoing electrification of the Trans-Canada Highway, it was suggested that employers and commercial vendors in West Hants may be interested in partnering with the Municipality to host electric vehicle charging stations on their properties for the use of employees or customers. Likewise, it was suggested that there may be other partnership opportunities to provide EV charging stations, through provincial or federal funding. Partnerships for the Municipality to explore include:

- Hants Community Hospital (Capital Health)
- McDonalds
- Atlantic Superstore (Loblaws)
- Sobeys
- Tim Horton's

Outcome / Performance Target

Increasing the number of EV charging stations from 0 to 2 in West Hants over the next 5 years. Estimated emissions reductions between conventional and electric vehicles can be found in the table under Action 3.1. Rapid charging stations can provide an electric vehicle with full charge within 1-1.5 hours.

Anticipated Impact
(low, medium, high)

Medium

Responsible Authority

Planning & Development

Contributors / Stakeholders

University Summer Student

Priority

Medium-term

Monitoring Process and Periodicity

Monitoring to count EV charging stations every 5 years

Cost / Effort

Approx. \$2,500-3,500 per charging station in total (less if cost-shared with partner) based on cost estimates in 2019.

ACTION 6.2: EXPLORE FUNDING FOR EV CHARGING STATIONS ON MUNICIPAL PROPERTY

Description/ Detail of Actions	There are funding sources for electric vehicle and zero-emission vehicle infrastructure through both the Federal Government and the Canadian Federation of Municipalities. There may be additional funding sources that become available over the next several years, as well and the number of electric vehicles owned by residents is likely to increase. As such, the Municipality has an opportunity to take a leadership role in providing EV charging stations for the public on Municipally-owned properties in central locations such as the West Hants Municipal Building and the Arena. Continuing to investigate funding and the applicable requirements will allow West Hants, if desired by Council, to allocate a portion of capital funding towards pursuing funding for and cost-sharing EV charging stations. Given that West Hants is a location in Central Nova Scotia that does not yet have an EV charging station (while many other locations along the Trans-Canada Highway do, this may position West Hants well to be eligible for funding.
Outcome / Performance Target	Acquire sufficient funding to introduce two (2) EV charging stations in West Hants, thereby increasing the number of electric vehicles and reducing emissions from transportation. Estimated emissions reductions between conventional and electric vehicles can be found in the table under Action 3.1. Rapid charging stations can provide an electric vehicle with full charge within 1-1.5 hours.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	Planning & Development
Contributors / Stakeholders	Public Works Department / Funding sources to be ascertained
Priority	Short-term
Monitoring Process and Periodicity	2 EV charging stations every 5 years
Cost / Effort	No capital cost if funding acquired covers 100% of cost. Staff time required for research.

ACTION 6.3: EXPLORE OPPRTUNITIES TO CREATE A 'TRANSPORTATION HUB'

Description/ Detail of Actions	Transitioning people in West Hants to modes of transportation other than their personal vehicles will be challenging, due to the predominantly rural nature of the Municipality. However, it was suggested that having a 'transportation hub' – a place where different modes converge, and people can switch from one mode to another seamlessly – may help to encourage this transition. The overall goal of this would be to make it easy, intuitive, and enjoyable for people to choose a more sustainable mode of transportation. Creating a transportation hub would entail identifying a central location which is available to the public for parking (i.e. a 'park and ride' type lot), and then accommodating other modes at this same lot, including infrastructure such as a bicycle parking and quick-repair station, transit pick-up/drop-off point (should transit eventually be available in the Municipality), an identified area for parking for carpooling, electric vehicle charging stations, and others. This may necessitate the Municipality purchasing land for this hub, or otherwise making currently-owned land available for such use. It is important that this hub is located in a walkable area (i.e. a place that has sidewalks and is close to neighbourhoods and commercial areas) to make it possible for people to walk to and from the hub, or to other nearby destinations.
Outcome / Performance Target	Identify step-by-step process of introducing a 'transportation hub' and begin incorporating steps into yearly capital spending. Suggested steps would be 1) identify existing area/parking lot owned by Municipality (or acquired by Municipality) to locate the hub; 2) identify modes of transportation to be made available (to be done in tandem with other 'actions' from this background report, like investing in EV charging stations); 3) install infrastructure at hub location; 4) promote and advertise hub for public use.
Anticipated Impact (low, medium, high)	High
Responsible Authority	Planning & Development / Active Living Coordinator
Contributors / Stakeholders	Department of Energy and Mines (potential funding source)
Priority	Medium-Term
Monitoring Process and Periodicity	Overall plan incorporate different elements of transportation hub to be completed within 1-3 years (short-term), allowing for further monitoring of implementation.
Cost / Effort	Staff time required for coordinating and planning. Associated costs of infrastructure (i.e. bike corrals, EV charging stations, etc.). Cost of land acquisition, if not already Municipally-owned.

ACTION 6.4: INTEGRATE ACTIVE TRANSPORTATION CONSIDERATIONS INTO LAND USE PLANNING DECISIONS

Description/ Detail of Actions	Land use planning decisions often determine whether or not people will choose active transportation (AT) or passive (vehicular) transportation. Increasing the use of active transportation offers opportunities to increase overall public health, decrease the GHG emissions from transportation, and boost the local economy. Shifting the mode share (i.e. the number of people using any given mode of transportation) in West Hants to encourage people to use active transportation instead of passive transportation has been made a priority of Council through the Active Transportation Plan. As such, considering the priorities and actions of the Active Transportation Plan is critical when making land use planning decisions. This action entails collaboration and coordination between the Planning Department and the Active Living Coordinator when master planning, strategic planning, and application processing and other significant land use planning decisions are being made. Note that for some applications, like industrial applications, this will be less relevant. On the other hand, applications for residential buildings or communities may present many opportunities to encourage future inhabitants to choose AT.
Outcome / Performance Target	Planning Staff, when completing a land use planning exercise such as strategic planning or processing a planning application, consult and discuss opportunities to consider and promote active transportation in the planned community/building, where possible and relevant.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	Planning & Development / Active Living Coordinator
Contributors / Stakeholders	Land use planning applicants
Priority	Short-term
Monitoring Process and Periodicity	Evaluate success of coordination every 1-2 years
Cost / Effort	Staff time required for coordination and collaboration.

GOAL 7: MAKE IT EASIER TO BUY FROM LOCAL VENDORS AND EAT LOCAL FOOD

Local production and purchasing has the potential not only to boost the local economy, keeping money earned in the municipality circulating in the municipality, but also to reduce the GHG emissions associated with food and good production and purchasing from elsewhere. The associated emissions include transportation emissions to deliver food and goods from point of production to point of sale (often necessitates air travel) and emissions associated with large scale agricultural or warehousing facilities consumption of energy and production of waste, among other, smaller contributors. Encouraging growing and making, selling, and buying local food and goods can help the Municipality to reduce its overall GHG emissions and promote placemaking, sense of community, increased security of livelihood for local producers, and better nutrition and physical health for members of the community.

ACTION 7.1: CREATE FOOD EDUCATION PROGRAMS IN PARTNERSHIP WITH COMMUNITY AND SCHOOLS, INCLUDING WASTE REDUCTION

Description/ Detail of Actions	Research from Ontario has shown the strong link between food education programs in school and long-term benefits in food literacy and overall health and wellbeing. ⁵ This program can and should be developed in partnership with community organizations and individuals who are able to provide resources on the topic and/or direct knowledge of food systems in the West Hants context. For instance, this could be the local representative of the Nova Scotia Federation of Agriculture, or a non-local charity with food education and provision programs, like the Ecology Action Centre. There is also provincial-wide programming to provide food education and, in partnership with knowledgeable people from the Municipality, this could be specialized to West Hants. ⁶ A key feature of this program should be to educate school-aged children on the importance of eating local foods and how to prepare these foods.
Outcome / Performance Target	It was noted during stakeholder engagement that a good example of such a program is that at the Dr. Arthur Hines District School.
Anticipated Impact (low, medium, high)	Offer an in-school program for elementary, middle, and high schools twice yearly.
Responsible Authority	Low
Contributors / Stakeholders	TBD by West Hants
Priority	Community Partners; Department of Education
Monitoring Process and Periodicity	Long-term
Cost / Effort	Review program success annually
	Possible capital cost upfront to run program, including travel costs for staff and print and promotional materials. Additionally, staff time can be expected.

⁵ Sustain Ontario, Collected Research on Food Education, 2018. URL : <https://sustainontario.com/work/edible-education/impacts-of-good-food-education/>

⁶ References or Provincial programming include:

Food and Nutrition Policy for Nova Scotia Public Schools, Nova Scotia Department of Education:
<https://novascotia.ca/dhw/healthy-communities/healthy-eating-schools.asp>

Nourish Nova Scotia: <https://www.nourishns.ca/>

ACTION 7.2: REVIEW AND AMEND POLICIES TO PROMOTE SMALL-SCALE LOCAL AGRICULTURE

Description/ Detail of Actions	It was noted during the community group workshop that certain policies are either inadvertently or inadvertently working to make small-scale local agriculture more difficult. The upcoming Municipal Planning Strategy and Land Use By-law review is an opportunity to review the policy documents to take opportunities, where possible, to promote small-scale agriculture. During the review, the documents should be examined for policies that prohibit small-scale agriculture. Likewise, a literature review of local agriculture policies for urban/suburban/small-scale agriculture should be undertaken. This was seen as a strong opportunity for West Hants to harness its largely rural nature to reduce the GHG emissions associated with food production and freight.
Outcome / Performance Target	Reduce ‘red tape’ around small-scale local agriculture policies. Increase the number of local, small-scale producers in West Hants.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	Planning & Development
Contributors / Stakeholders	n/a
Priority	Short-term
Monitoring Process and Periodicity	One occurrence; monitored through ongoing engagement with local producers.
Cost / Effort	Built into cost of performing MPS and LUB review.

ACTION 7.3: LOCAL PROCUREMENT POLICIES

Description/ Detail of Actions	The Municipality has existing local procurement policies for projects and items that go to tender. However, these are limited since many times, when food for meetings, workshops, or events is sourced, tendering is not required. The objective of this action would be to create a Policy of Council that would mandate staff to consider and prioritize local food or vendors who work with local food above those who are not producers from West Hants, or Nova Scotia more broadly.
Outcome / Performance Target	Increase the incidence of ‘local’ food being served by the Municipality
Anticipated Impact (low, medium, high)	Low
Responsible Authority	All departments
Contributors / Stakeholders	Municipal Council
Priority	Long-term
Monitoring Process and Periodicity	More local procurement over a multi-annual basis
Cost / Effort	No capital cost associated. Staff time required for policy review.

ACTION 7.4: MAKE MUNICIPAL FACILITIES AVAILABLE TO LOCAL FOOD AND GOODS VENDORS

Description/ Detail of Actions	It was noted in engagement with local producers that having more locations, like gyms, recreation rooms, etc. across the Municipality where there were consistent and predictable times and vendors for local food and goods might help encourage more residents to shop locally. It was noted by stakeholders that oftentimes, Municipal facilities across the Municipality are not utilized during all available timeslots, and that making these timeslots known to and available to private individuals or groups who may wish to rent them for a low fee on a consistent weekly or monthly basis would be one avenue for the Municipality to support local makers and growers without any significant monetary investment.
Outcome / Performance Target	This action entails the Municipality offering existing Municipal buildings to groups or collectives and providing rental of these buildings at a low or no cost for the purpose of farmers or makers markets.
Anticipated Impact (low, medium, high)	Medium
Responsible Authority	TBD by West Hants
Contributors / Stakeholders	Community partners in local food production
Priority	Long-term
Monitoring Process and Period	Addition of at least one consistent space for local producers and makers.

ACTION 7.4: MAKE MUNICIPAL FACILITIES AVAILABLE TO LOCAL FOOD AND GOODS VENDORS

Cost / Effort No capital cost.

4 GHG REDUCTION SCENARIOS

Using data from the seven Goals and the Actions which fall under each goal, three scenarios were developed: ‘Safe’, ‘Balanced’, and ‘Dynamic’. The Safe Scenario introduces the lowest effort and cost but results in the lowest level of GHG reduction. The Balanced Scenario requires moderate effort and cost but has a greater potential for GHG reduction than the Safe Scenario. Finally, the Dynamic Scenario is the greatest level of effort and the highest cost but will yield the greatest GHG reductions.

While none of these scenarios have been selected by the Municipality, they can help to inform the future Municipal Council (of The Region of Windsor and West Hants Municipality) on the different approaches that could be taken, and what actions might fall under each. The format of the scenarios allows Municipal staff to make adjustments to meet the needs and will of Council, once a GHG emission reduction target is set.

The Scenarios have been created by grouping together the short-, medium-, and long-term actions. Short-term actions are characterized as actions that could feasibly take place in 1-3 years; medium-term in 3-5 years; long-term in 5-10 years. It is important to note that the outcomes and costs of the scenarios are only rough estimates – they do not represent all of the possible GHG reduction outcomes, and they do not represent the total cost. This is due to the fact that many of the ‘Actions’ are premised on promotion, education, staff leadership, and other such activities. It is not possible to calculate direct emissions reductions from these activities. However, cumulatively, it is anticipated that these activities will make an impact on West Hants’ GHG emissions target.

The Total Cumulative calculation at the bottom of the ‘Balanced’ and ‘Dynamic’ tables represents the total cost and total amount of reduction for each scenario. The anticipated reductions are in addition to the business-as-usual forecast (found in the West Hants Greenhouse Gas Inventory Report) of 44% at the corporate level.

4.1 SAFE

The ‘Safe’ scenario represents the lowest level of effort, which is anticipated to result in the lowest level of GHG reductions. The following table summarizes the action number, action item, anticipated outcome of the action (if available) and the anticipated cost. In this table, staff time is assumed as time not included in capital budgeting, however due to increased workloads it is possible that the Municipality will require additional staff. The ‘low’ costs indicated under the anticipated costs column are costs that are predicted to be equal to or less than \$10,000 one-time expenditure. The actions included in this scenario are:

Action Number	Action Item	Anticipated Outcome	Anticipated Cost
Action 1.1	Perform internal building survey (i.e. ASHRAE Level 1 Energy Audit)	Suggested reduction target is 27.5 tCO ₂ e	Staff time + cost of upgrades (low)
Action 1.4	Promote and celebrate energy efficient buildings	Increased awareness and support	Staff time + cost of materials (low)
Action 2.4	Investigate partnerships for renewable energy provision	Improved partnerships and potential pathway for renewable energy provision	Staff time
Action 3.3	Investigate ‘bulk’ purchase of electric vehicles and/or EV charging stations	Staff Report	Staff time
Action 4.1	Partner with Efficiency N.S. to educate public on home renovation	Increased uptake on Efficiency N.S. programs	Staff time + cost of materials and travel (low)

	programs/incentives, overall reduced cost of living, etc.		
Action 4.2	Train WH staff about Efficiency N.S. programs to integrate into their day-to-day work and interaction with citizens.	Increased uptake on Efficiency N.S. programs	Staff time
Action 5.7	Explore options to include anticipated GHG Emissions in staff reports for Council and committees	Avoiding GHG emission increases	Staff time
Action 6.2	Explore funding for EV charging stations on municipal property	Funding options for EV charging stations	Staff time
Action 6.4	Integrate Active Transportation considerations into Land Use Planning Decisions	Increase uptake of Active Transportation	Staff time
Action 7.2	Review and amend policies to promote small-scale local agriculture	Increased number of local providers	Staff time
Total		27.5 tCO2e (5% of existing corporate emissions) + incalculable amount of reduction of both corporate and community emissions stemming from staff time	Low costs (anticipated \$15,000 total) + staff time

The anticipated total GHG reductions for this scenario are relatively low, but have potential to result in greater overall GHG reductions than the anticipated total because several actions mandate research or promotion. It is not possible to calculate what research and promotion actions might lead to, but they are anticipated to have a low-to-moderate impact on the overall GHG emissions in West Hants if completed successfully.

4.2 BALANCED

The ‘Balanced’ scenario represents a moderate investment and level of effort, and a moderate reduction which is greater than the ‘safe’ scenario. In this table, it is assumed that staff time is not included in capital budgeting, however due to increased workloads it is possible that the Municipality will require additional staff. The ‘medium’ costs indicated under the anticipated costs column are costs that are predicted to be equal to or less than \$10,000 one-time expenditure.

The Balanced scenario includes **all the actions from the ‘Safe’ Scenario**, in addition to the following:

Action Number	Action Item	Anticipated Outcome	Anticipated Cost
Action 1.5	Behavioral Energy Efficiency Program	Increased awareness and decreased Municipal staff energy consumption	Staff time

Action 2.3	Consider Green Power Purchasing	50% of power offset by green energy (approx. 315 tCO ₂ eq based on total electricity emissions of 631 tCO ₂ eq for Municipal buildings).	Anticipated maximum annual capital cost of \$25,000
Action 2.1	Fuel Switching – Heat Pumps	Approximately 16 tCO ₂ e	Approximately \$310,000 capital cost.
Action 3.4	Explore a Corporate Car Sharing Program	Normalization of EVs and provision of sustainable transportation options.	Staff time
Action 5.1	Integrate GHG reduction strategies into HR Policies	Reduction associated with 1 day of work per month, per employee.	Staff time
Action 5.2	Investigate optimizing business/work order travel	Reduction in work-order redundancies.	Staff time + Software cost (medium annual)
Action 5.5	Consider adopting land use policies that mandate or encourage efficient/sustainable growth models	Long-term reduction in car usership and ownership.	Staff time
Action 6.1	Explore potential partnerships for EV charging stations	Increase in EV charging stations for municipal and public use.	Staff time + potential cost-sharing of EV charging stations (medium cost)
Action 6.3	Explore Opportunities to Create a ‘Transportation Hub’	Increase the use of sustainable transportation modes	Staff time + infrastructure purchases (some included in other actions and approx. \$3,000 per bike corral x 3) + possible land cost (unknown)
Total		331 tCO₂e (19% of existing corporate emissions) + incalculable amount of reduction of both corporate and community emissions stemming from staff time and mode shift initiatives	\$319,000 one-time cost + 35,000 per annum cost + unknown capital costs, depending on decisions made by WH + staff time

Total Cumulative (‘Safe’ and ‘Balanced’ Scenario)		358.5 tCO₂eq (20.5% of existing corporate emissions) + incalculable amount of reduction of both corporate and community emissions stemming from staff time	\$334,000 one-time cost + \$35,000 per annum cost + unknown capital costs, depending on decisions made by WH + staff time
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4.3 DYNAMIC

The ‘Dynamic’ scenario features all proposed actions, and is anticipated to be a high-cost, high-return solution for GHG reductions in West Hants. In this table, it is assumed that staff time is not included in capital budgeting, however due to increased workloads it is possible that the Municipality will require additional staff. The ‘medium-to-high’ costs indicated under the anticipated costs column are costs that are predicted to be equal to or less than \$10,000 – \$30,000 for one-time expenditure.

The Dynamic scenario includes **all the actions from the ‘Safe’ and ‘Balanced’ Scenarios**, in addition to the following:

Action Number	Action Item	Anticipated Outcome	Anticipated Cost
Action 1.2	Detailed energy audits for the water and wastewater plants	Suggested reduction target of 109,62 tCO ₂ e	Anticipated capital cost of \$36,000 + staff time
Action 1.3	Assessment of the Brooklyn Fire Station and Civic Centre	Anticipated reduction of 23 tCO ₂ e	Anticipated cost of \$25,000 + staff time
Action 2.2	Investigate Renewable Energy opportunities – solar PV for the water and wastewater treatment plants	Two Options Available: Approximately 244 tCO ₂ e for option 1 OR 300 tCO ₂ e for option 2	Approximately \$557,700 (panels and axis trackers) OR \$858,000 (panels on racking system)
Action 3.1	Create a ‘fleet management’ program that introduces EVs over a Multi-Year Timeline	Anticipated energy consumption/GHG reduction per vehicle is shown in table under action 3.1	\$30,000 per annum (approximate replacement rate)
Action 3.2	Consider introducing carpool incentives for work travel	Increased carpooling and decreased redundancy	Suggested increase of \$0.10 for reimbursement for those traveling. Overall increase

			unknown, but anticipated low.
Action 4.3	Consider hiring a dedicated GHG reduction employee	Streamlined projects and tracking	Staff cost (for new salaried employee)
Action 5.3	Explore options on P.A.C.E. programming	Reduction of GHG emissions from homes in East Hants.	Dependent on # of homes supported by program.
Action 5.4	Promote desired actions, policies, and incentives to the Provincial Government	Streamlined communication with NS gov.	Staff time
Action 5.6	Make renewable energy investments and sustainability practices (current and future) visible and known to the community	More awareness of and support for renewable energy	Capital costs estimated to be low
Action 7.1	Create food education programs in partnership with community and schools, including waste reduction	Increased literacy in Municipality about healthy and local food procurement	Staff time
Action 7.3	Local Procurement Policies	Increasing Municipality's investment in local food	Staff time
Total		376.62 tCO₂eq (22% of existing corporate emissions) OR 432.62 tCO₂eq (46% of existing corporate emissions) + incalculable amount of reduction of both corporate and community emissions stemming from staff time	\$625,700 one-time cost + \$55,000 per annum cost + unknown capital costs, depending on decisions made by WH + staff time
Total Cumulative (‘Safe’, ‘Balanced’, and ‘Dynamic’ Scenario)		735.12 tCO₂eq (42% of existing corporate emissions) OR 791.12 tCO₂eq (46% of existing corporate emissions) + incalculable amount of reduction of both corporate	\$673,700 one-time cost OR \$965,000 one-time cost + \$80,000 per annum cost +

		and community emissions stemming from staff time	unknown capital costs, depending on decisions made by WH + staff time
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4.4 RECOMMENDED SCENARIO

The recommended scenario is based upon decisions made by the Municipality of West Hants' municipal Council, and that of the amalgamated Councils of West Hants and Windsor. The Municipality needs to set a target and can most appropriately match the scenario to this target. The options for the targets under this scenario are:

Target 1: 5% reduction in emissions + incalculable amount of reduction of both corporate and community emissions stemming from staff time

Target 2: 22% reduction in emissions + incalculable amount of reduction of both corporate and community emissions stemming from staff time

Target 3: 42% or 46% reduction in emissions + incalculable amount of reduction of both corporate and community emissions stemming from staff time

The scenarios, represented as targets above, can be adjusted by adding or removing different actions to achieve the Municipality's desired reduction. It was suggested by stakeholders that the Municipality should consider aligning its target with the Province's target under the *Sustainable Development Goals Act*.

5 FUNDING OPTIONS

5.1 EFFICIENCY NOVA SCOTIA

Efficiency Nova Scotia is Nova Scotia's energy efficiency utility, which operates funding for efficiency and conservation activities of Nova Scotia Power. Efficiency Nova Scotia works with local partners to assist Nova Scotians in retrofitting their homes and businesses to increase energy efficiency and reduce costs. As such, Efficiency Nova Scotia offers a variety of funding programs to help reduce energy consumption in homes and businesses, saving participants money in heating, cooling, and energy costs in the long-run. These programs are directed at home and business owners, and do not provide funding to Municipalities. However, Efficiency Nova Scotia does rely on Municipalities to help them advertise these programs in different parts of the Province. These programs include:

Program	Funding Available	Eligibility
Home Energy Assessment	\$99 cost to participant; up to \$5,000 in rebates for \$25,000 low interest financing for upgrades	Homes heated primarily with electricity
New Home Construction	\$99 cost to participant; up to \$2,000 in rebates available for upgrades	Building a new home primarily heated with electricity; register before or within 30 days of receiving building permit
Home Warming	Free upgrades like draft-proofing and insulation	Income-qualified participants (see Efficiency NS website)
Appliance Retirement	\$30 rebate for fridge or freezer; \$10 rebate for window air conditioner or mini-fridge	Appliance at least 10 years old and in working order
Green Heat	Rebate up to \$2,500	Installing efficient heating system (i.e. heat pump, solar air, etc.)
Instant Savings	Discounts up to \$75	Available at checkouts where appliances are bought each Fall and Spring; year-round for fridges and washing machines
Product Installation	Free products and installation (for products like LED lights, water saving devices, smart power strips)	Available to all homes, apartments, and condos in NS

5.2 NOVA SCOTIA FEDERATION OF MUNICIPALITIES

The Nova Scotia Federation of Municipalities (NSFM) is the collective voice for Nova Scotia municipalities and offers policy and programmatic assistance to their Municipal members. Funding programs include:

Program	Funding Available	Eligibility
Carbon Surcharge Fund Awards	Various amounts	Dispersed at Fall Conference for small-scale initiatives that help Municipality reduce energy consumption and GHG emissions

5.3 FCM

The Federation of Canadian Municipalities has a ‘catch-all’ funding program for environmental and GHG reduction projects in Municipalities, called the **Green Municipal Fund**. Funding is offered in various amounts as percentages of eligible proposed projects based on a \$1 Million annual allotment federally across all Municipalities.

Eligible projects include a wide range of municipal environmental initiatives, including buildings, wastewater, green infrastructure, etc. Specifically, eligible projects are **studies, pilot projects, OR capital projects**, including:

- Innovative ‘signature’ projects to reduce GHG emissions;
- Reduce fossil fuel use in Municipal Fleet;
- Stormwater quality improvement;
- Septic wastewater systems;
- Brownfield site redevelopment;
- Retrofitting energy efficiency programs for homes or commercial buildings;
- Energy recovery or district energy;
- Retrofit municipal facilities;
- Wastewater systems;
- Community water conservation;
- Transportation networks and commuting options;
- Waste diversion;
- Renewable energy production on a brownfield site;
- Site remediation or risk management;
- Waste stream management; and
- New construction of energy-efficient municipal facilities.

5.4 PROVINCIAL PROGRAMS

The Province of Nova Scotia and the federal government, in most cases, utilize secondary or arms-length organizations to provide grants and funding – for instance, the Federation of Canadian Municipalities or Clean Nova Scotia. However, the Province does have some funding streams that Municipalities can choose to access or automatically have access to. These include:

Program	Funding Available	Eligibility
Federal Gas Tax Fund	Based on formula (WH receives consistent amount each year)	Gas Tax fund can be used for projects that aim to reduce GHG emissions. Specifically, projects that are eligible that can help reduce GHG emissions include: wastewater, solid waste, community energy systems, and public transit.
Provincial Capital Assistance Program	Up to 50% of eligible project costs	Eligible projects include: <ul style="list-style-type: none">– Construction or expansion of facilities for the treatment and disposal of sanitary sewage.– Construction of sanitary sewage collection systems.– Construction of storm water collection systems– Installation of individual and communal in-ground sewage disposal facilities within a Wastewater Management District.– Construction of water intake, treatment, pumping, and storage facilities.– Well field exploration and development.– Installation of water transmission and distribution systems.– Construction, acquisition, upgrading or expansion of solid waste management facilities and equipment.– Municipal infrastructure engineering and research studies related to eligible project categories.
Low Carbon Communities Program	Various amounts of funding available between \$50,000 to \$75,000 per project.	Grants are done through Connect2 program and Low Carbon Communities grants.

Funding stream options available include:

- Active Transportation Infrastructure and Design
- Clean Fleets and Shared Mobility
- Community Building and Engagement
- Advanced Buildings
- Electricity

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APPENDIX

A LIST OF STAKEHOLDERS

APPENDIX

Staff Representatives at the November 12 Meeting

1. West Hants Finance Director
2. West Hants Parks and Recreation Director
3. West Hants/ Windsor Planning Department (2)
4. West Hants Public Works Director
5. Current CAO West Hants
6. Current CAO Windsor
7. CAO for Region of West Hants and Windsor (April 2020)

Community Stakeholder Groups at the November 12 Meeting

1. Citizen Action to Protect the Environment (2)
2. Hantsport Area Advisory Committee member
3. Nova Scotia Power Representatives (2)
4. Nova Scotia Federation of Agriculture
5. QUEST
6. Alternative Resource Authority

Community Stakeholder Groups at the January 29 Meeting

1. Nova Scotia Power
2. Clean Foundation of Nova Scotia
3. West Hants Active Communities Programmer (West Hants Staff)
4. Nova Scotia Health Authority
5. Nova Scotia Department of Energy and Mines