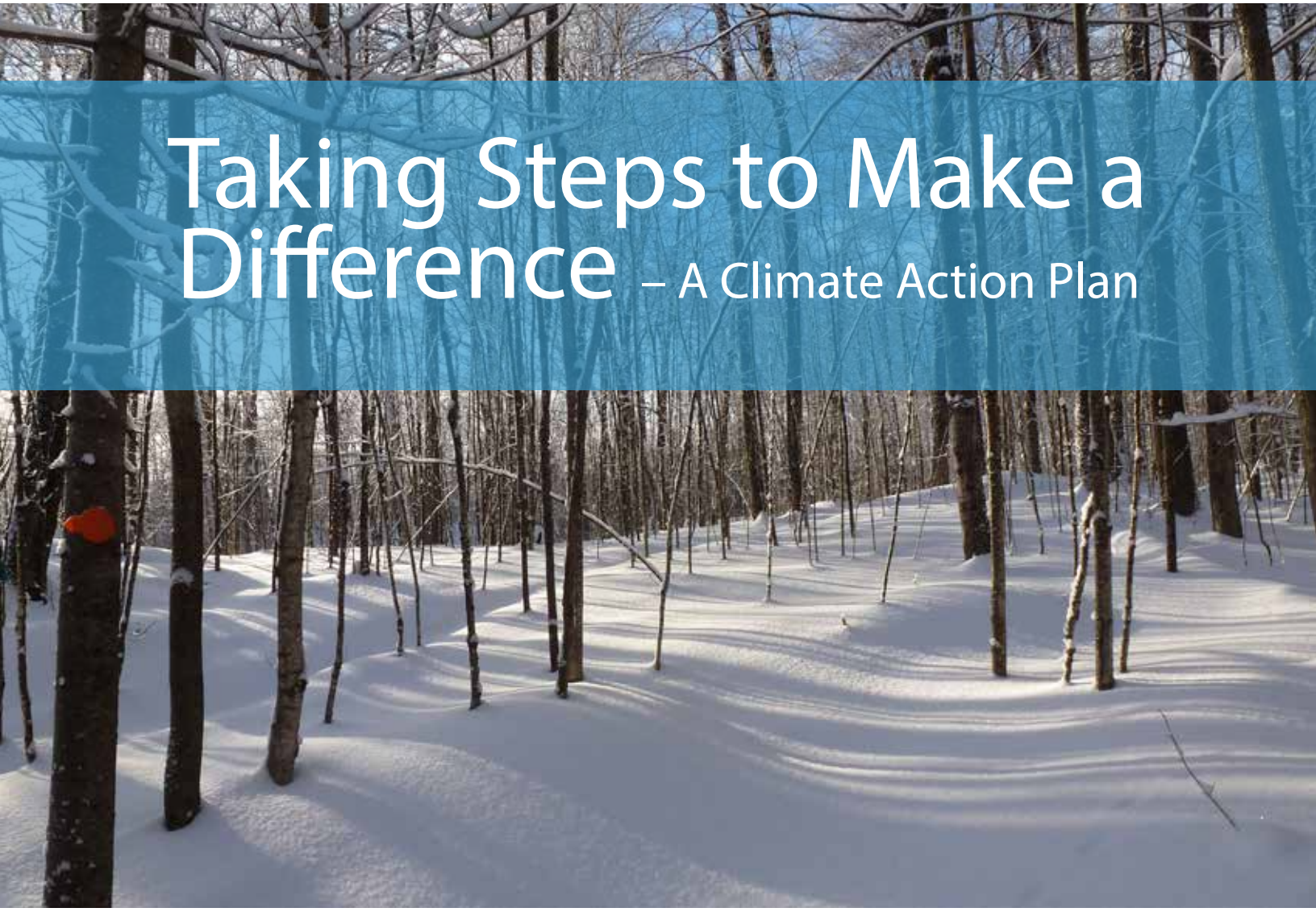
Taking Steps to Make a Difference – A Climate Action Plan



This is Exhibit A to the Affidavit of Noelle Reeve

Sworn before me July 23rd, 2024

David Poch, Commissioner of Oaths

Tay Valley Township

Acknowledgements

Funding: FCM Federation of Canadian Municipalities / Fédération canadienne des municipalités

Expertise: Green Energy and Climate Change Working Group of Tay Valley Council

Actions: The Community of Tay Valley Township, Climate Action Network of Lanark County, Smiths Falls and Region, Lanark County, The National Farmers Union and the Ecological Farmers of Eastern Ontario

Photo and image credits: Tay Valley Township and Simon Lunn

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Taking Steps to Make a Difference – A Climate Action Plan

August 2020

Tay Valley Township

Tay Valley Township is a geographically large (550 sq km) rural township in Eastern Ontario (80 km west of Ottawa) with a small permanent population of 5,500 that doubles in the summer with the return of cottagers. Tay Valley has 32 lakes and eight rivers split between the Rideau and the Mississippi watersheds. The Township is known for protecting its natural beauty including the northern reach of the Frontenac Arch Biosphere and the eastern edge of The Land Between ecosystem. Its residents include members of the Shabot Obaadjiwan and Ardoch Algonquin First Nations, farmers of Scots/Irish descent, contractors, small business owners, artists (many of whom arrived in the 1970s looking for communal living), and those who commute to Ottawa or Kingston for their jobs.

www.tayvalleytwp.ca

www.facebook.com/tayvalley

"Tay Valley Township has experienced the changing climate. We were affected by the extreme drought in 2016, we suffered extraordinary precipitation and flooding in the spring of 2017, felt the Polar Vortex effects in 2018 and experienced an abnormally warm winter in 2019. We are adapting and our residents are becoming familiar with such consequences as combatting tick-borne Lyme disease. While we anticipate more such events in the future, in 2020 we, along with the rest of the world, had to adapt to living with the COVID-19 virus.

Council recognizes that we are in an ongoing climate crisis. The Township is committed to preparing itself and its residents as best it can. Taking into account both the financial costs and benefits, we will do everything we can to contribute to reducing and sequestering greenhouse gas emissions from our buildings, vehicles, landfill and land use, and will help the community to reduce emissions across our municipality.

I am proud of the leadership role our citizens and our Council are taking on this critical issue. We look forward to taking action, and to engaging our whole community in making the world a better place for all of us."

Brian Campbell, Reeve

Executive Summary

The relatively stable climate that has supported humanity for thousands of years is breaking down, a consequence of human actions. But we see examples of projects in Ontario and elsewhere that provide a glimpse into a desirable world of less pollution and greenhouse gases. The community and the Council of Tay Valley Township recognize that, even though the Township is small, it can lead.

Consequently, the community advised the Township to set ambitious greenhouse gas reduction targets and the Township concurred. Over the 10 years from its baseline of 2018 to 2028, the Township is committing to reduce its own municipal greenhouse gas emissions by a minimum of 55% and to help the community reduce its emissions by a minimum of 45%.

The Township will take advantage of provincial initiatives to eliminate organic materials in its landfills (the largest source of emissions under the Township's control) and will take specific action to cut fossil fuel use in its buildings and fleets, offsetting those actions with revenue-generating renewable energy.

The largest source of emissions from the community are those from transportation. As existing vehicles age out of use, the Township will encourage residents to switch to Zero Emission Vehicles. It will partner to deliver education campaigns and to link residents to funding and financing for home energy programs and to advocate for changes at senior levels of government that will enable Tay Valley to meet its targets.

And the Township will innovate and use a locally developed Climate Lens to help it weigh financial costs and benefits and the greenhouse gas emissions of any project or action it plans to take. This will enable it to make the appropriate decisions to reduce its contribution to climate breakdown.

Table of Contents

"Every extra bit of warming matters, especially since warming of 1.5°C or higher increases the risk associated with long-lasting or irreversible changes, such as the loss of some ecosystems."

Hans-Otto Pörtner, Co-Chair of IPCC Working Group II

To help Tay Valley Township reduce its GHGs, Council appointed a Green Energy and Climate Change Working Group in 2018

Introduction: A Climate for Action in Tay Valley Township

The climate is changing, dramatically. While it may be small and rural, Tay Valley Township welcomes the opportunity to demonstrate leadership and to work with its residents to set an example of what best practices can accomplish. In Canada, municipalities have control or influence over about 45% of greenhouse gases (GHGs) emitted.

To achieve its goal of reducing GHGs while lowering energy costs and building a local sustainable economy, the Council of Tay Valley Township appointed a Green Energy and Climate Change Working Group https://www.tayvalleytwp.ca/en/municipal-government/green-energy-and-climate-change-working-group.asp in January 2018.

The Township subsequently applied to the Federation of Canadian Municipalities' *Partners for Climate Protection* program for funding to develop a plan to address climate change in the Township. Approximately 65% of the Canadian population live in communities that have such plans.

With funding from the Federation, the Township has developed this Climate Action Plan (CAP).

This plan provides Tay Valley Council with:

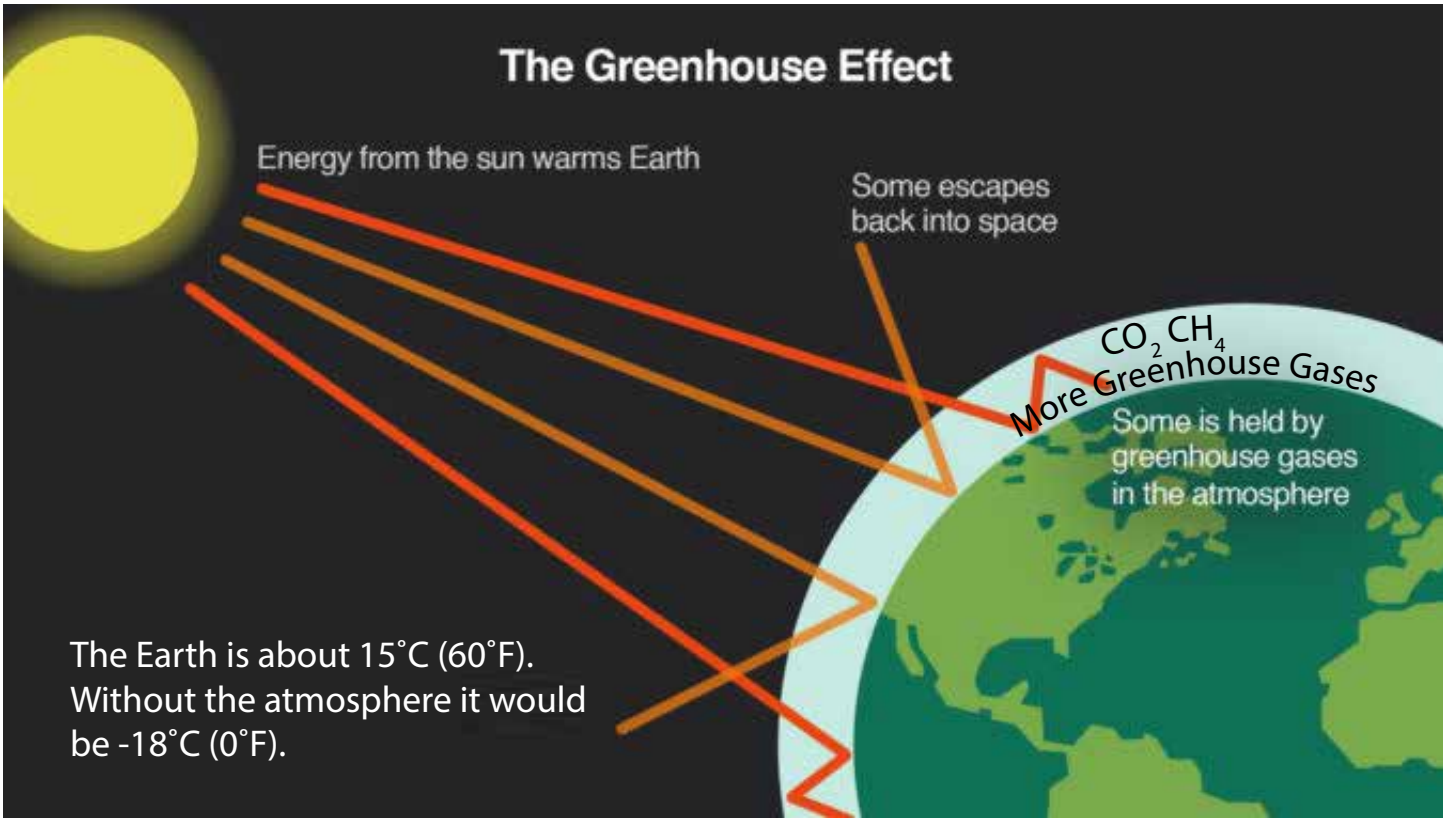
- a set of essential steps to launch the process of taking action on climate change
- a roadmap that identifies opportunities the Township can take to meet its GHG reduction targets, and
- an initial Climate Lens.

The Climate Lens is a tool to help Council and Municipal staff take climate impacts into consideration as part of significant planning and expenditure decisions.

What is Carbon Dioxide Equivalent eCO_2?

To allow the various GHG emissions to be compared, they are converted using their global warming potential to their value as if they were carbon dioxide (CO_2).

What is Climate Change?



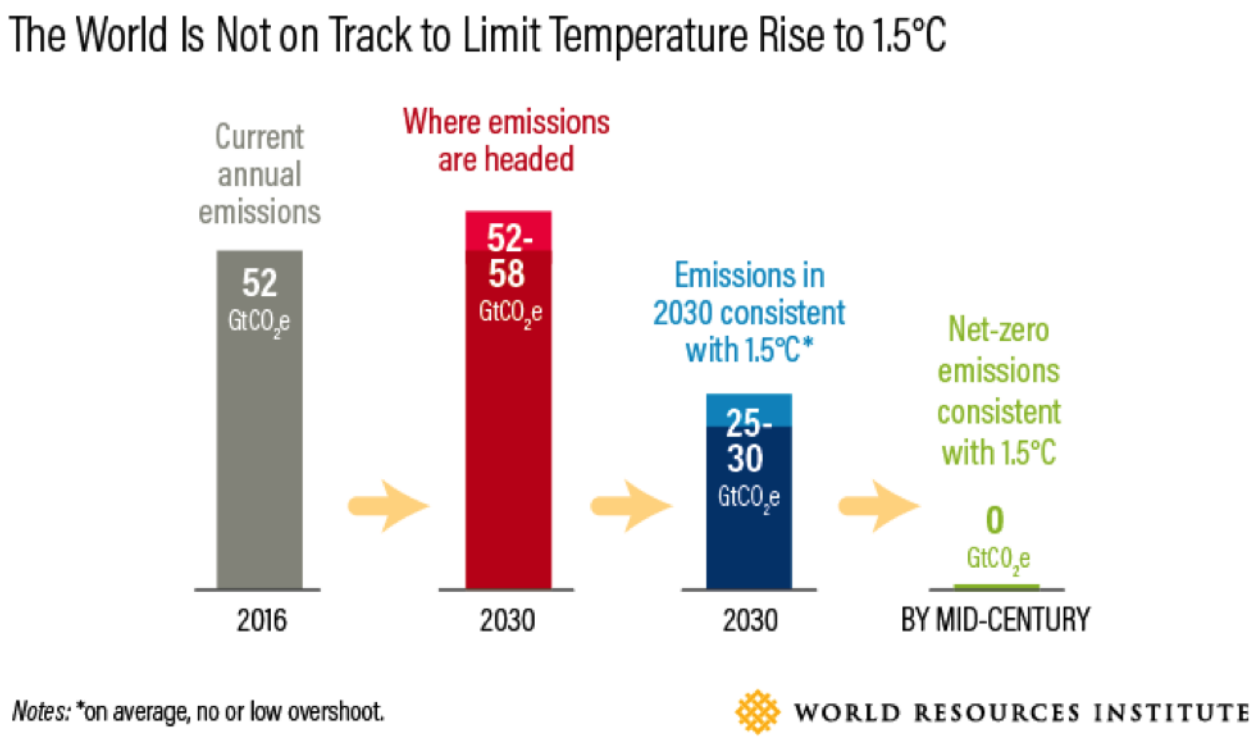
REFERENCES:

Greenhouse Effect
https://medialibrary.climatecentral.org/resources/the-greenhouse-effect

Canada is warming at twice the rate of the rest of the world and Northern Canada is warming even more quickly, at nearly three times the rate. The annual average temperature is 1.7°C (3.1°F) warmer than 1948. In the North, it's 2.3°C (4.1°F) warmer.
https://www.canada.ca/en/environment-climate-change/news/2019/04/canadas-climate-is-warming-twice-as-fast-as-global-average.html

The World and Canada

In 2016, under the Paris Agreement, the majority of the countries of the world agreed to voluntary GHG emission cuts in order to keep the global temperature from rising more than 1.5°C. They requested a report on what it would mean to keep to an increase of 1.5°C instead of going to 2°C. In October, 2018 the Intergovernmental Panel on Climate Change (IPCC) published *The Special Report on Global Warming of 1.5°C (SR15)*. This report captured the world's attention. It found that while the planet's temperature is currently on track to increase by more than 3°C, by 2100, the world could limit its temperature increase to only 1.5°C (2.7°F). However, it warned this would require "deep emissions reductions" and "rapid, far-reaching and unprecedented changes in all aspects of society." Global GHG emissions must fall by 7.6 per cent each year between 2020 and 2030 to hold to the 1.5°C increase.



The ability to make the needed unprecedented changes in all aspects of society seemed remote before the CoronaVirus hit the world in late 2019. But we have since seen it is possible to make fast and dramatic changes to the way we do business, work, get around, support society, and raise food, etc. These can lead to greater commitments worldwide to create a New Green Economy that addresses the climate breakdown and that is better for people and the natural world.

Tay Valley Township Weather Projections and Local Impacts

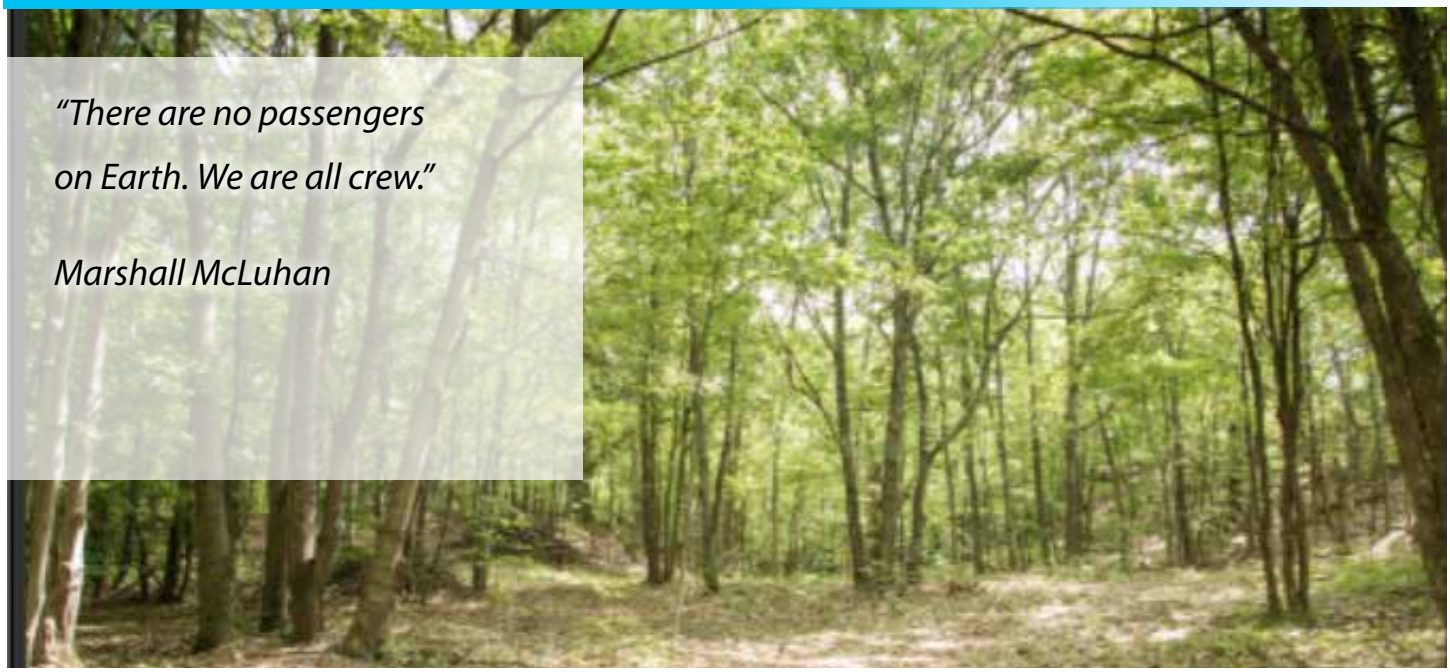
In Tay Valley Township, for the 1951-1980 period, the annual average temperature was 6°C; for 1981-2010 it was 6.5°C. Under a high emissions scenario, annual average temperatures are projected to be 8.4°C for the 2021-2050 period, 10.5°C for the 2051-2080 period and 12°C for the last 30 years of this century.

Average annual precipitation for the 1951-1980 period was 896 mm. Under a high emissions scenario, this is projected to increase by 7% for the 2021-2050 period, by 11% for the 2051-2080 period and by 15% for the last 30 years of this century.

Source: Prairie Climate Centre (2019). Climate Atlas of Canada, version 2 (July 10, 2019). https://climateatlas.ca

As of early 2020, Canada's goal was to reduce emissions by 30% from 2005 emissions of 730 megatonnes (MT) to 511 MT by 2030. In 2017, Canada emitted 716 MT of CO_2 equivalent.

Explore everything you want to know about global emissions:
https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions
About local climate forecasts at the Climate Atlas of Canada:
https://climateatlas.ca/



Through membership in the Partners for Climate Protection, Tay Valley Township has access to resources to help it inventory and reduce its greenhouse gas emissions.

The Process: Developing A Plan for Action in Tay Valley Township

Joining the FCM and PCP

Tay Valley Council voted to join the national Partners for Climate Protection (PCP) program in 2018 and became a member in 2019.

Municipal governments influence or control about 45% of Canada's greenhouse gas (GHG) emissions. Through membership in the PCP, Tay Valley Township has access to resources to help it inventory and reduce its greenhouse gas emissions.

The PCP program is a partnership of the Federation of Canadian Municipalities (FCM) and ICLEI — Local Governments for Sustainability (ICLEI Canada). In joining the PCP, Tay Valley Township has agreed to:

- Move through PCP's 5 Milestone Framework within 10 years of joining
- Report on progress at least once every two years, with the support of the PCP
- Participate in program activities and share its experience with the more than 350 network members across Canada.

The Milestone Framework

The Milestone Framework provides a methodology and tools that enable all municipalities that use it to calculate their GHGs and their planned reductions in a consistent manner, so that comparisons can be made.

This report includes reporting on Milestones 1, 2 and 3 and presents a plan to proceed with Milestones 4 and 5.

Tay Valley Township's consultations with the community

Householder Survey

Tay Valley embarked on developing its Climate Action Plan and completing Milestone 1 by taking a relatively uncommon step. Rather than seeking data solely from large organizations, it sought input from its residents.

Through June, July and early August of 2019, it conducted a householder survey. The survey was provided online and taken out to the community, including being handed out at the waste depot and at lake association meetings. Responses were collected from a very impressive 13% of householders within the Township.

"Climate change is by far the biggest public concern in our time. It is also fundamental to the economy."

Public participation respondent

"Systemic change led by all levels of government to greatly reduce fossil fuel use is vital for that change to occur."

Public participation respondent

Householders were surveyed on questions related to their homes and heating, transportation, waste management, food consumption, gardening and other practices and opinions on climate change. (Charts showing some of the data from those responses are available in Chapter 7, Appendices.)

The information from the householder survey provided some of the data compiled in Milestone 1, the Baseline GHG Emissions Inventory (Chapter 3) and Milestone 2, the GHG Emissions Targets (Chapter 4).

Community Consultations

In September 2019, the Township held two public consultation meetings, attracting more than 30 people to each event, a notably high turnout for the Township.

At that consultation, participants were consulted on their wishes regarding the Township's GHG reductions and actions the Township could take to get there.

Participants were first requested to choose one of four key directions the Township could take in setting reduction targets. The four options were the Status Quo, Baby Steps, Show Leadership or Major Transformation, roughly representing GHG reductions of 20%, 40%, 60% and 80% respectively. They chose:

Target	% Votes
Status Quo	0%
Baby Steps	0%
Show Leadership	32%
Major Transformation	68%

1 person wanted to choose a 100% GHG reduction

The participants broke into groups to select and discuss potential actions that:
1) the Township itself could take,
2) the Township could assist the community in taking, and
3) the community could take on its own or with the help or involvement of community organizations and businesses.

In February 2020 the Township went back to the community for a second consultation. More than 55 participants were asked to confirm reduction targets, to evaluate a set of potential actions and to recommend any additional actions.

The participants enthusiastically supported the most recent recommendation from the International Panel on Climate Change (IPCC) of a 7.6% global reduction in GHGs each year for the next 10 years to 2030. This accrues to a 55% reduction over the 10 years.

Staff and GECC Consultation
As well, Township senior staff and the Green Energy and Climate Change Working Group (GECC) recommended actions and content as the plan was developed.

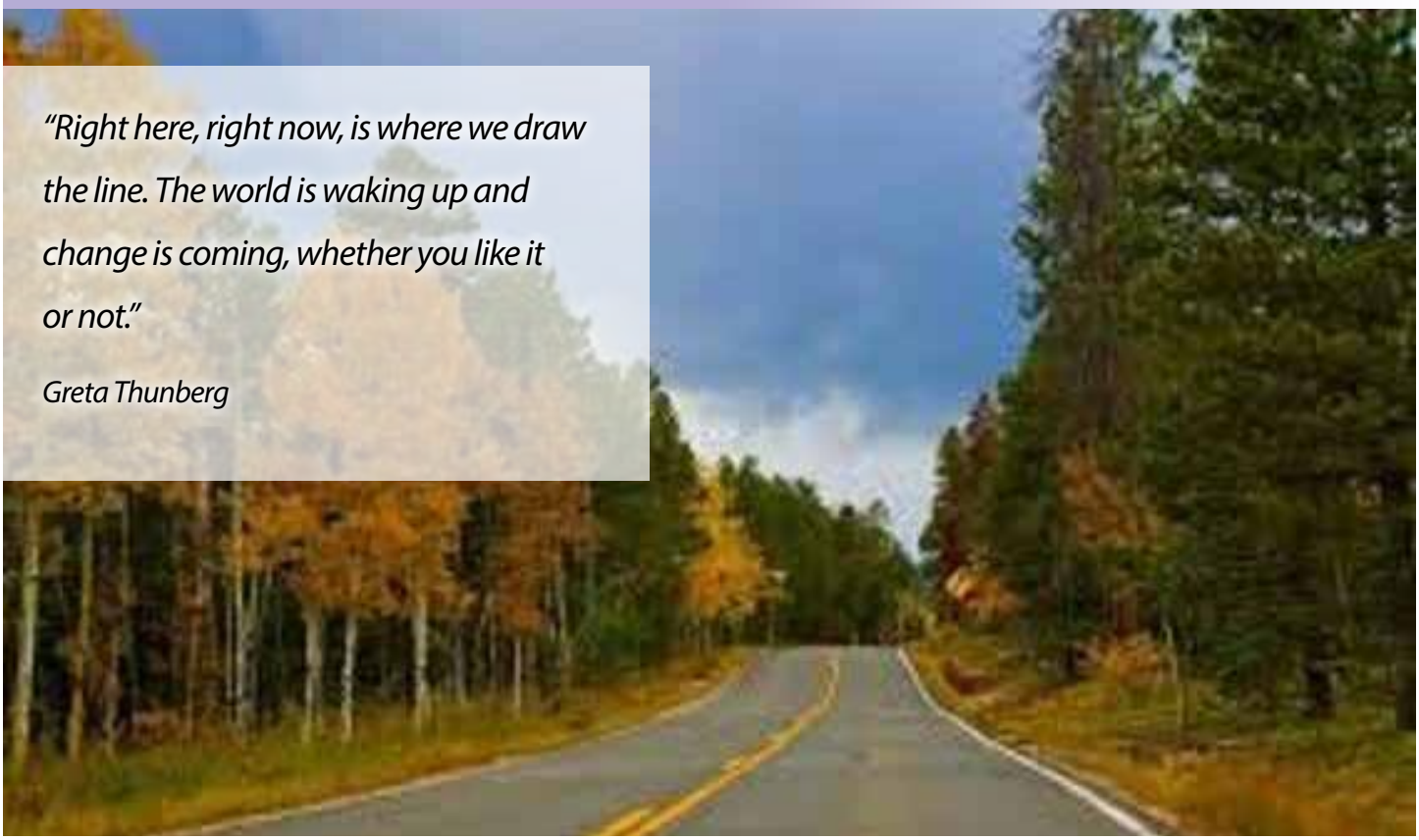
PCP Consultation
Also consulted were experts provided through the Township's membership in the PCP.

Tay Valley Township Council Review and Adoption
The draft plan went to Council for review in March, was finalized in August and was submitted to the funder, the Federation of Canadian Municipalities.

The participants enthusiastically supported the most recent recommendation from the International Panel on Climate Change (IPCC) of a 7.6% global reduction in GHGs each year for the next 10 years to 2030. This accrues to a 55% reduction over the 10 years.

"I believe most of us truly want to do our part and do it well but don't have the particulars we often need."

Public participation respondent



"Right here, right now, is where we draw the line. The world is waking up and change is coming, whether you like it or not."

Greta Thunberg

The Township chose 2018 as its baseline year because that was the most recent year that provided full and accurate data.

Inventory: Greenhouse Gas Emissions

Tay Valley Township produced inventories of the greenhouse gases (GHGs) emitted from both its internal Municipal (Corporate) operations, and from the community as a whole. The Township chose 2018 as its baseline year because that was the most recent year that provided full and accurate data. Emissions in future years can be compared and contrasted with those from 2018.

Data was collected from the Tay Valley householder survey, utilities, Statistics Canada and many other sources, including reports prepared for Tay Valley Township, such as the *Conservation and Demand Management* report and the *2019 Development Charges Background Study* by Watson & Assoc.

The emissions data was produced with the use of the Milestone Tool developed by ICLEI Canada for the Partners for Climate Protection. The Tool applies some standard assumptions to the calculations based primarily on Canada's National Greenhouse Gas Inventory https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/inventory.html .

These are best estimates using the data available and are not comprehensive, especially as data is not readily available for many particular sectors or on such a small scale as Tay Valley Township. Proprietary information prohibited the inclusion of data from unique businesses.

Township Municipal (Corporate) Inventory

In 2018, total emissions from Tay Valley Township's internal operations were 1,649 tonnes of CO_2 equivalent (tCO_2e).

Municipal Greenhouse Gas Emissions (tCO_2e) by Sector

Sector	Emissions (tCO_2e)	Energy (GJ)
Building	98	2,187
Vehicle	220	3,107
Streetlights	0	41
Waste	1,329	0
Total	**1,649**	**5,335**

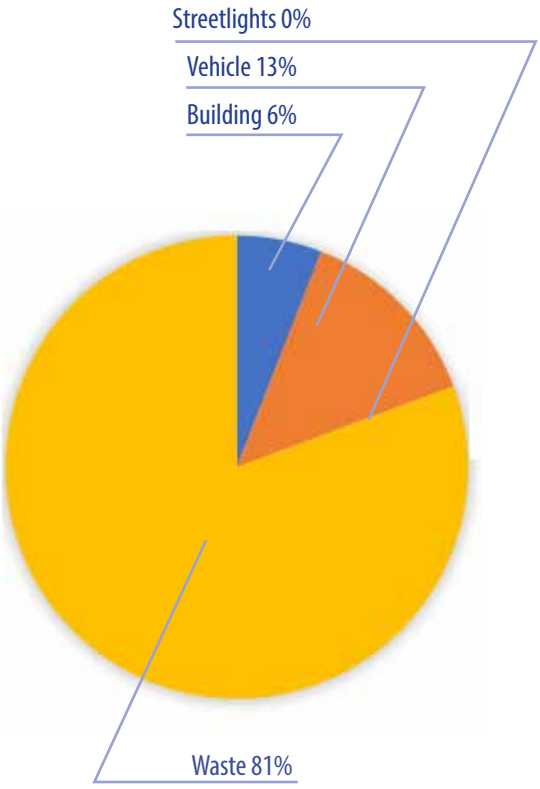
The great majority of Tay Valley Township's municipal emissions came from the decomposition of organic materials in the landfills. Most of these organic materials are paper, food waste, wood scraps and lawn and garden waste. These materials could either have been recycled or aerobically composted rather than sent to landfill where anaerobic decomposition generates methane.

When these organic materials decompose in landfill, they release methane gas which has a global warming effect of more than 80 times that of carbon dioxide over its initial 20 years. Although the emissions from solid waste are largely driven by waste produced by the homes and businesses of Tay Valley Township – and not by the Township itself – landfill emissions fall under the scope of corporate or internal emissions because the Township owns and operates the landfills, and directs how waste is handled in the Township. These results are not uncommon for a municipality that does not have a structured method of managing organic materials.

As well, the landfills emit methane as a consequence of the legacy materials buried there.

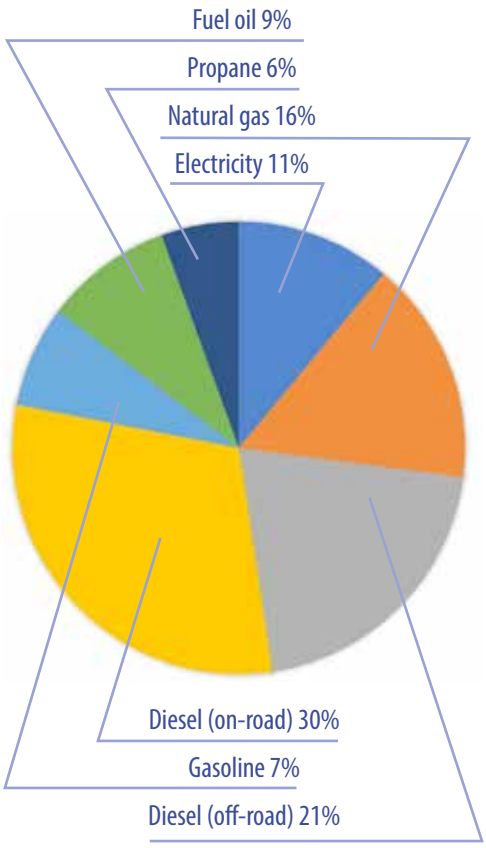
The bulk of the remaining emissions from the Township came from the consumption of fossil fuels in its buildings and its vehicle fleet. This data is compiled annually for the *Conservation and Demand Management Report*.

Municipal GHG Emissions by Sector



There are six greenhouse gases, two of which, carbon dioxide (CO_2) and methane (CH_4) are of particular importance because they are associated with human activity. eCO_2 means 'equivalent CO_2' and is a means of measuring all greenhouse gases in their relationship to CO_2.

Municipal Energy Consumption by Source



Municipal Energy Consumption (GJ) by Source

Sector	Emissions (tCO_2e)	Energy (GJ)
Electricity	3*	589
Natural gas	41	855
Diesel (off-road)	78	1,096
Diesel (on-road)	115	1,623
Gasoline	27	388
Fuel oil	34	486
Propane	17	296
Total	**315**	**5,333**

*Using the Climate Lens, 589 GJ of Ontario electricity produces 3 tCO_2e (4.7 kg CO_2/GJ based on 0.017 kg CO_2/kWh)

Of the sources of fossil fuels consumed by the Municipality, diesel is used in the Township's fleet of roads vehicles, natural gas is used for the heating system at the Township Office, and propane and fuel oil are used in other of the Township buildings. Electricity is used primarily for building operations including air conditioning and street lighting. The Township has taken actions to reduce its electricity consumption. Electricity's contribution to emissions is massively reduced with the closure of the coal-fired plants in Ontario. The emissions that are generated by electricity in Ontario are primarily from natural gas peaking plants.

Township Community Inventory

In 2018, vehicles, homes, small businesses, institutions, agriculture and other land uses in Tay Valley Township produced an estimated total GHG emissions of 45,606 tCO2e (8.3 tCO2e/capita).

Community Greenhouse Gas Emissions (tCO_2e) by Sector

Sector	Emissions (tCO_2e)	Energy (GJ)
Residential	5,914	197,068
Commercial and institutional	1,010	52,152
Manufacturing industries and construction	2	379
Agriculture, fishing and forestry activities(1)	9	1,178
On-road transportation	36,725	530,725
Wastewater and sewage	1	n/a
Incineration and open burning	8	n/a
Agriculture, forestry and other land use (AFOLU) (2)	1,937	n/a
Total	**45,606**	**781,502**

(1) Includes the GHGs produced by the energy consumed through the activities related to the equipment and management of livestock and the lumber and firewood harvest in the Township
(2) Includes the GHGs emitted through the enteric, or digestive, process of beef cattle in particular

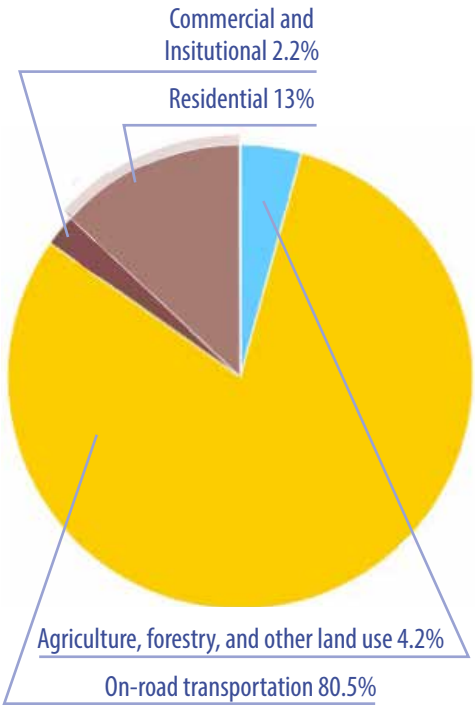
By far, the largest contributor was transportation (36,725 tCO2e), mainly from private vehicles. Estimates of emissions were based on the national average annual distance travelled of 15,200 kilometers which is likely low for rural residents. The householder survey reported there is close to one vehicle for every person, that is every child and adult, in the Township. In second place were emissions from the residential sector.

Residential, Commercial & Institutional Energy Consumption by Source

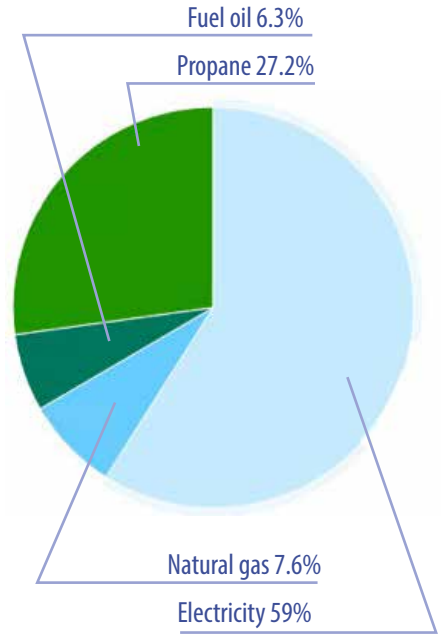
Sector	Emissions (tCO2e)	Energy (GJ)
Electricity	707	147,933
Natural gas	938	19,026
Fuel oil	1,116	15,682
Propane	4,166	68,136
Total	**6,927**	**250,777**

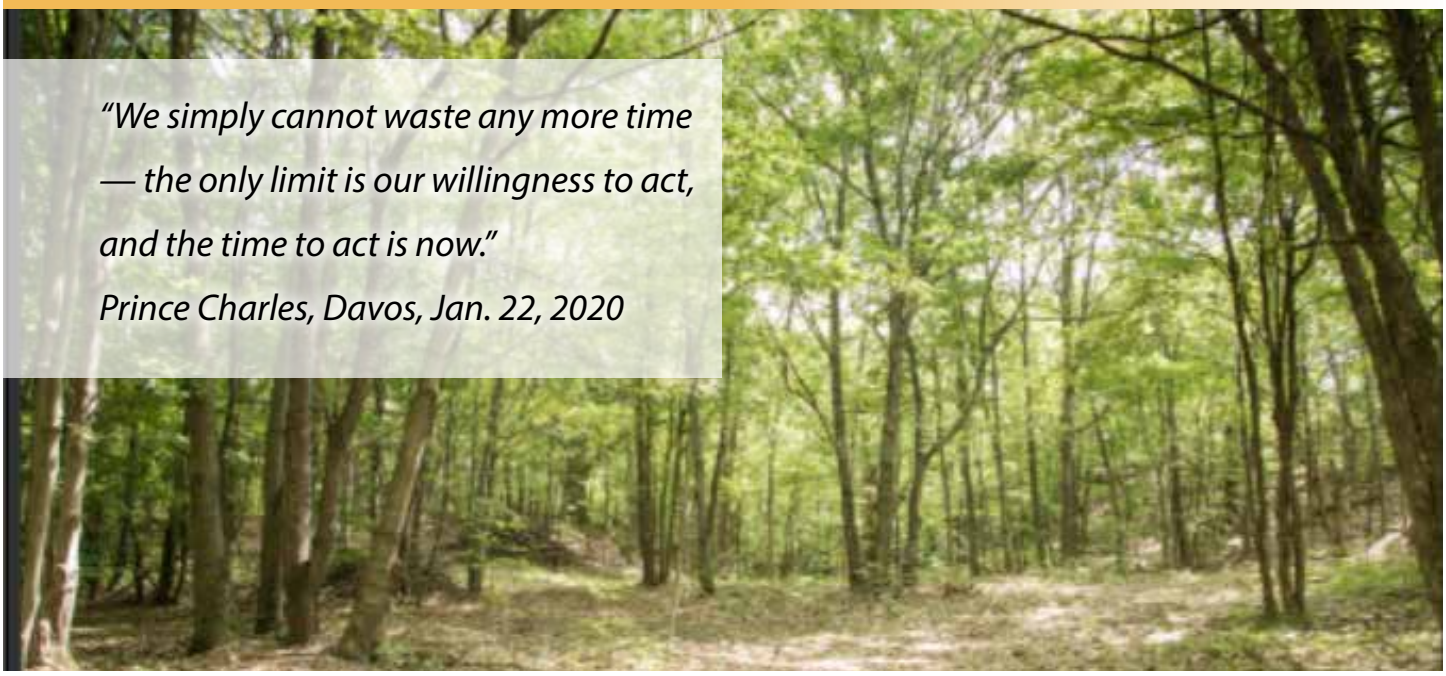
Of the total energy consumed within the community for residential purposes, electricity comprises more than half but accounts for only 10% of GHG emissions. The heating fuels propane, natural gas, and fuel oil make up somewhat less than half of energy consumed within the community. Diesel is of course used by the community, but there was insufficient means to measure its consumption. While wood is a significant heating fuel in the community, it is not quantified here as it is generally considered a carbon-neutral fuel. However, its short-term CO_2 emissions should ensure it is addressed in future.

Community GHG Emissions by Sector



Residential, Commercial & Institutional Energy Consumption by Source





Tay Valley Township Council has chosen aspirational reduction targets of at least 55% for its municipal operations and at least 45% for the community over the period 2018 to 2028.

Targets: Greenhouse Gas Reductions

As a participant in the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) program, Tay Valley Township is required to set targets for the reduction of its own greenhouse gases (GHGs) emitted and for those of its community over the 10 years from its baseline of 2018 to 2028. This comprises Milestone 2 of the PCP program.

Business as Usual Estimates

If Tay Valley Township were to continue with Business as Usual, with its population increasing by 1% a year, each year, from 2018 to 2028, it is estimated GHG emissions would increase by 10%. Specifically, municipal, or corporate, emissions, would increase from 1,649 tCO_2e to 1,822 tCO_2e and emissions from the community would increase from 45,606 tCO_2e to 50,377 tCO_2e.

Community Direction

The community gave the Township very clear direction about the targets that it wanted the Township to set. In the first community consultation in September 2019, the community called for a reduction target of 60-80% for both the municipal operations and the community. In the second consultation in February 2020, the community supported the recommendation from the Intergovernmental Panel on Climate Change for a reduction of 7.6% a year, each year, from 2020 to 2030, for an accrued reduction of 55%.

Tay Valley Township Targets

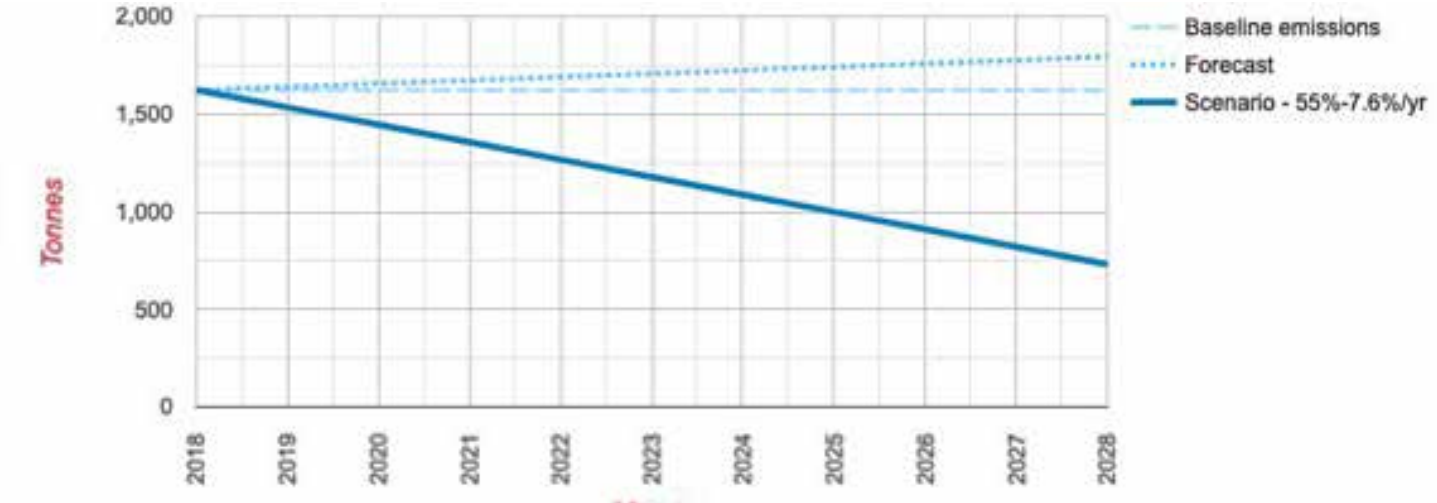
The FCM recommends that a new member of the PCP set a target of a 20% reduction in the municipality's internal, or corporate, emissions and a 6% reduction in emissions from the community, over the 10 years from the baseline.

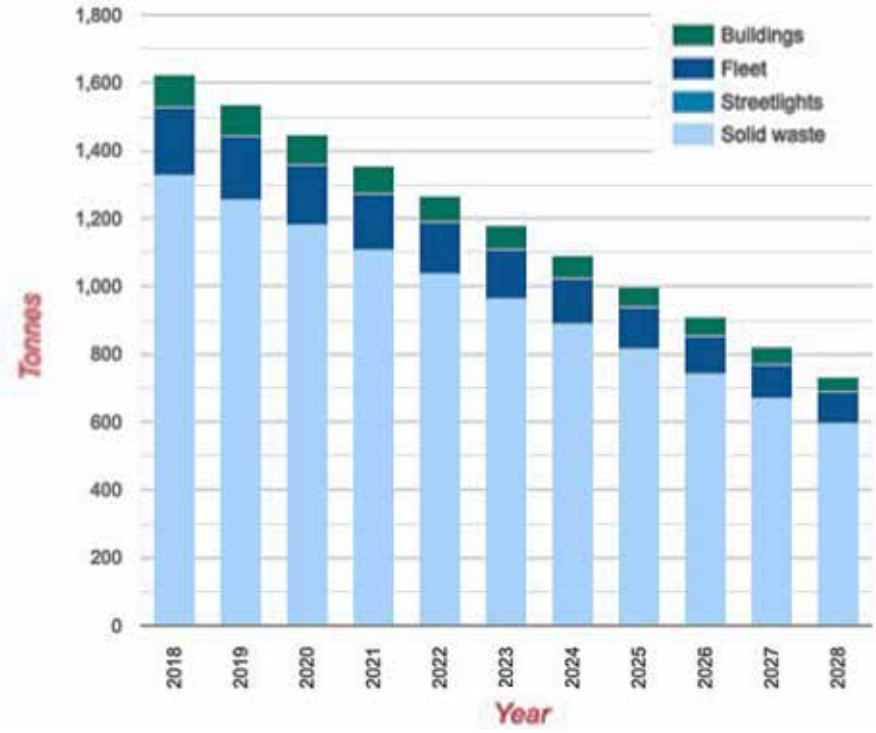
Tay Valley Township Council has chosen aspirational reduction targets of at least 55% for its municipal operations and at least 45% for the community over the period 2018 to 2028.

Ontario Target

Ontario's target reductions under the Pan-Canadian Framework on Clean Growth and Climate Change were to reduce emissions by 37% from 1990 levels by 2030. The current target is to cut emissions by 30% below 2005 levels by 2030.

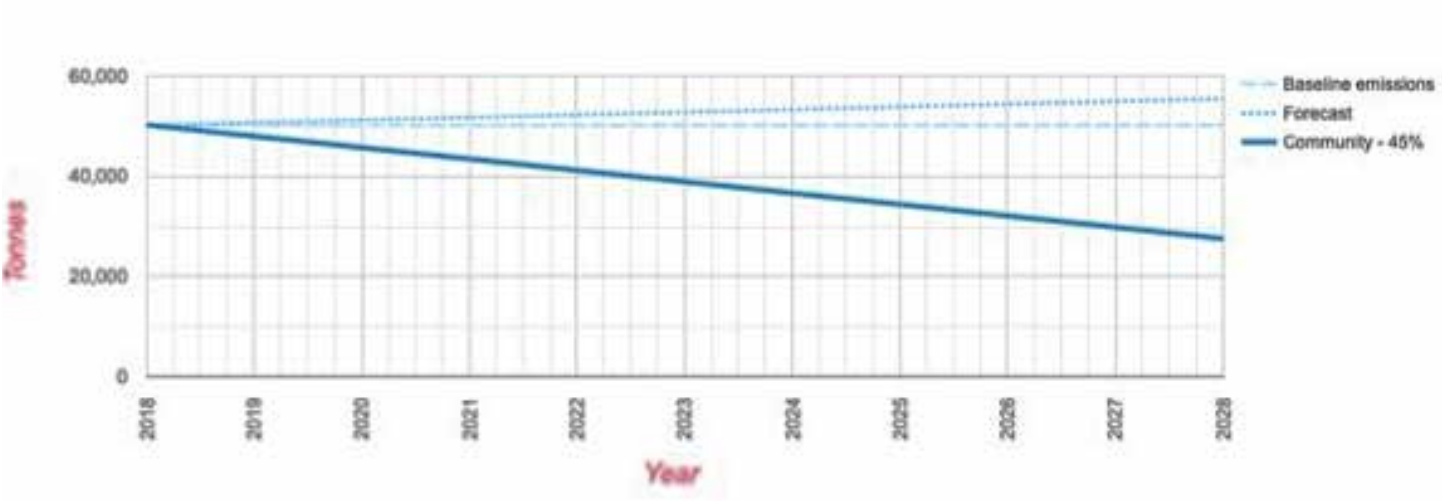
Municipal Reduction Target of 55% Over 10 Years to 2028





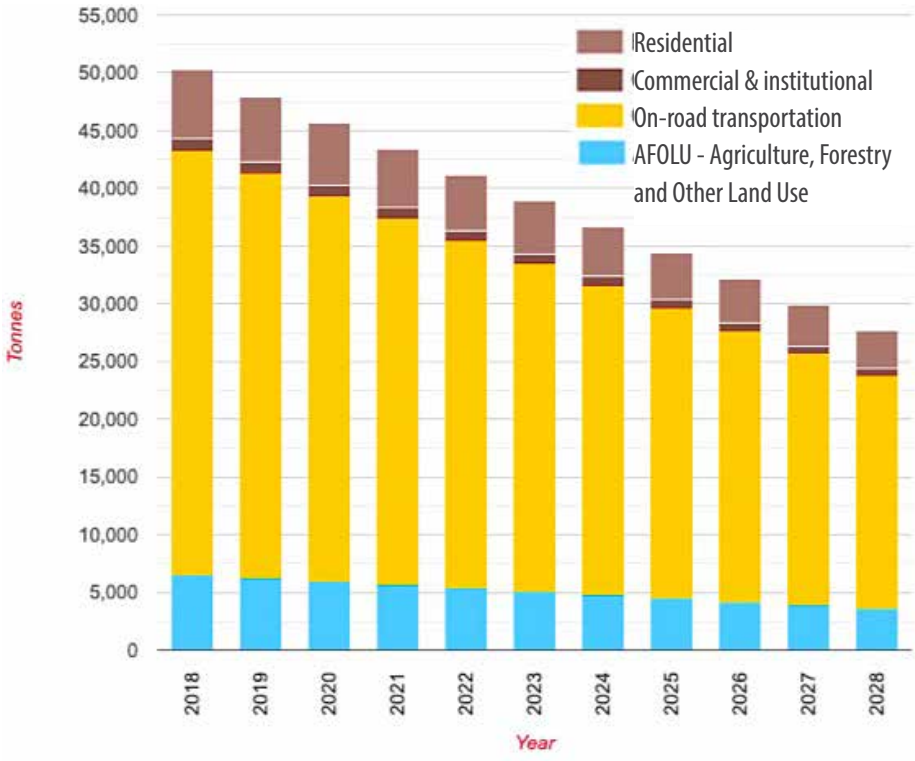
This graph represents a proportional reduction from all sources over the 10 years. However, reductions are likely to occur disproportionately as actions are focused on one sector or another for any given time period.

Community Reduction Target of 45% Over 10 Years to 2028



Federal Target

Under the United Nations' Paris Agreement, Canada has agreed to reduce its GHG emissions by 30% below 2005 levels by 2030. This would reduce Canada's emissions to 511 megatonnes by 2030. Canada's record of emissions is:
2005 – 730 megatonnes
2015 – 722 megatonnes
2016 – 708 megatonnes
(the main contributor to the drop was the closing of Ontario's coal-fired electricity stations)
2017 – 716 megatonnes.



This graph represents a proportional reduction from all sources over the 10 years. However, reductions are likely to occur disproportionately as actions are focused on one sector or another for any given time period.

"I know so many people who feel hopeless, and they ask me, "What should I do?" And I say: 'Act. Do something. Because that is the best medicine against sadness and depression."

Greta Thunberg

Climate Actions: Municipality and Community

The following table provides a list of actions the Township can take to mitigate climate change in the Township, both in its own Municipal (Corporate), operations and in the community as a whole over the 10 years to 2028. A more detailed description of these action items can be found on the pages after this table, beginning on page 33.

The first steps are essential to enable the Township to embark on the process of cutting GHGs and to achieve its targets. The steps following can be decided upon by the Township as research, funds and resources allow. These suggested actions arose from staff, the Green Energy and Climate Change Working Group, and from the public in a householder survey and three community consultations. This list is not comprehensive. This document is a living plan and as new ideas come forward, they may be included in this plan.

The first steps are essential to enable the Township to embark on the process of cutting Greenhouse Gases and to achieve its targets.

Goals	Actions	Lead	Partners	Status and Timing
		ESSENTIAL ACTIONS		
		MUNICIPAL OPERATIONS		
Enable Tay Valley Township to immediately begin cutting Greenhouse Gas emissions from Municipal operations and to achieve or surpass its reduction targets	Adopt the Climate Action Plan and Appoint a Lead Person Responsible for Delivering the Plan	TVT Council		Promptly
	Use a Quantitative Climate Lens	TVT Planner	Green Energy and Climate Change Working Group	Adopt in 2020
	Advocate for stronger Greenhouse Gas reduction targets and actions at the Federal, Provincial and County levels of government	TVT Planner, Council	Green Energy and Climate Change Working Group, Climate Action Network of Lanark County, Smiths Falls and Region	Motion to County to act on Partners for Climate Protection passed 2019 Present to Eastern Ontario Wardens Caucus 2020/21 Present to other political branches as opportunities arise
	Integrate the Climate Action Plan with the Building Condition Assessment Report, the Asset Management Plan, and the Conservation and Demand Management Plan	TVT Public Works Manager	TVT Treasurer	Conservation and Demand Management Plan Revision for 2020 Asset Management Plan Revision for 2020 Building Condition Assessment Report Revision for 2020
	Ensure climate change, Greenhouse Gas and life cycle costs are enshrined in procurement policies and in planning documents	TVT Treasurer	TVT Public Works Manager	Revise policies in 2020
Dramatically reduce methane release from the landfill	Conduct a comprehensive waste audit that includes all organic materials as well as recyclables and evaluates Greenhouse Gases produced in the transportation of materials to the waste sites	TVT Public Works Manager	Green Energy and Climate Change Working Group, Lanark County, neighbouring lower-tier municipalities	Included in 2021 budget but recommended for 2020 to take advantage of an offer of a partially subsidized audit from a waste audit company

Goals	Actions	Lead	Partners	Status and Timing
HIGH PRIORITY ACTIONS				
BUILDINGS				
Minimize energy consumption and Greenhouse Gas emissions of Municipal buildings	Before further investments are made in the Municipal Office, assess any new construction, renovation, or maintenance for its potential opportunity to reduce Greenhouse Gases and operating costs. Specifically assess the Municipal Office with the intent to reduce heating and cooling load and convert mechanical systems from natural gas to electricity with an integrated system using solar and net metering	TVT Public Works Manager	TVT Treasurer, TVT CAO, Green Energy and Climate Change Working Group	2020 Integrate with Asset Management Plan, Building Condition Assessment Report and Conservation and Demand Management Report Three possible suppliers contacted
PUBLIC COMMUNICATIONS				
Enable public action to cut Greenhouse Gas emissions	Budget for an ongoing Communications Strategy that informs and motivates community climate actions by residents, businesses, and community organizations	TVT Council	Lanark County, neighbouring municipalities, Leeds, Grenville and Lanark District Health Unit Climate Action Network of Lanark County, Smiths Falls and Region	Begin in 2020 TVT CAO presentation to Council on Communications Strategy
MUNICIPAL OPERATIONS				
Further enable Tay Valley Township to cut Greenhouse Gas emissions from Municipal operations	Install electric vehicle charger(s) at Township workplaces for use by Councillors, staff and the public	TVT Public Works Manager	Staff, Lanark County, neighbouring municipalities	2020 with available grants
	Use a Qualitative Climate Lens	TVT Planner	Clean Air Partnership, Partners for Climate Protection	As soon as available in 2020
	Report on carbon fees spent by the Township	TVT Treasurer		Budget 2021-22

Goals	Actions	Lead	Partners	Status and Timing
HIGH PRIORITY ACTIONS				
MUNICIPAL OPERATIONS				
Further enable Tay Valley Township to cut Greenhouse Gas emissions from Municipal operations *(Continued)*	Revise purchasing policies to encourage all bidders to report Greenhouse Gas emissions in tenders	TVT Public Works Manager	FCM	Revise Purchasing Policy, add to scoring process Educate bidders 2020-2021
	Advocate for and monitor for changes to policies governing municipal investments that allow for divestment of municipal funds from fossil fuels and avoidance of risk to taxpayers	TVT Treasurer		Begin 2020
	At the beginning of each term of Council, amend the Terms of Reference for the Green Energy and Climate Change Working Group to remove tasks that have been completed and to add new tasks required to fulfill its mandate	TVT Planner, Council	Lanark County, Leeds, Grenville, Lanark District Health Unit, Climate Action Network of Lanark County, Smiths Falls and Region, FCM	Every new term of Council
Goals	**Actions**	**Lead**	**Partners**	**Status and Timing**
MEDIUM PRIORITY ACTIONS				
WASTE				
Dramatically reduce methane release and other Greenhouse Gas emissions from the landfill and waste streams	Investigate and assess options for mitigating methane release from the landfill including working with Lanark County and neighbouring municipalities	TVT Public Works Manager	Province of Ontario, Lanark County, neighbouring municipalities, universities	Provincial ban on organic materials to landfills starting in 2022
	Expand materials to be recycled and increase recovery rates	TVT Public Works Manager	Province of Ontario, Lanark County, neighbouring municipalities, Green Energy and Climate Change Working Group	Ontario moving to Extended Producer Responsibility beginning 2023

Goals	Actions	Lead	Partners	Status and Timing
MEDIUM PRIORITY ACTIONS				
BUILDINGS				
Minimize energy consumption and Greenhouse Gas emissions of Municipal buildings	Assess any new construction, renovation, or maintenance for its potential opportunity to reduce Greenhouse Gases and operating costs of all Municipal buildings	TVT Public Works Manager	TVT Treasurer, TVT CAO, Green Energy and Climate Change Working Group	Integrate with Asset Management Plan, Building Condition Assessment Report and Conservation and Demand Management Report
	Continue lighting retrofit projects	TVT Public Works Manager	Hydro One	As programs are available
Generate revenue to offset costs through net metering	Assess and implement net metering to reduce Greenhouse Gas emissions from electricity consumption and to generate revenue to offset costs by installing solar PV with appropriate buildings	TVT Public Works Manager	Green Energy and Climate Change Working Group	Integrate with Asset Management Plan and Building Condition Assessment Report
FLEET & ROADS				
Cut Greenhouse Gas emissions from the fleet	Assess current fleet and any new potential purchases by type of use/size for lowest costs and Greenhouse Gas emissions	TVT Public Works Manager	TVT Treasurer, Green Energy and Climate Change Working Group, TVT Planner, Lanark County	Revise Procurement Policy, Integrate with Asset Management Plan
Cut Greenhouse Gases emitted as a consequence of road materials	Evaluate roadbed and shoulder materials for Greenhouse Gas emissions	TVT Public Works Manager	Province of Ontario, neighbouring municipalities, Lanark County	2020 – 2021, ongoing

Goals	Actions	Lead	Partners	Status and Timing
MEDIUM PRIORITY ACTIONS				
MUNICIPAL WORKPLACE				
Enable and educate Council and staff to act on cutting Greenhouse Gas emissions	Educate Council and staff to facilitate carpooling, employee switching to electric vehicles (EVs) and removing organics and plastics from waste stream	TVT Planner	All Staff	2020, ongoing
	Install bike racks	TVT Public Works Manager	TVT Clerk	To be completed in Main Street funding in 2020
	Work to reduce Greenhouse Gas emissions from Council and staff travel and offset the Greenhouse Gases	TVT Treasurer		2020, ongoing
MUNICIPAL OPERATIONS				
Continually update and revise the Climate Action Plan and develop a Climate Adaptation Plan	Seek funding and opportunities to continually update the Climate Action Plan Seek partnership opportunities to do a Climate Adaptation Plan	TVT Planner	FCM, PCP, Lanark County, neighbouring municipalities	2021

Goals	Actions	Lead	Partners	Status and Timing
MEDIUM PRIORITY ACTIONS				
TRANSPORTATION				
Cut Greenhouse Gas emissions from transportation within the community	Support the national transition to electric and hydrogen vehicles with education	Green Energy and Climate Change Working Group, Council	Government of Canada, Industry, Clean Air Partnership, Lanark County, neighbouring municipalities	Funding programs expected in Federal Budget, 2020
	Support and take advantage of opportunities to facilitate installation of electric vehicle chargers in the community and workplaces	TVT Planner	TVT Public Works Manager, Green Energy and Climate Change Working Group	Federal funding programs open in 2020
	Assess and develop systems that support public and shared micro-transit opportunities	TVT Planner, Green Energy and Climate Change Working Group	Lanark County, Lanark County Transit, neighbouring municipalities, Climate Action Network of Lanark County, Smiths Falls and Region, Clean Air Partnership, ecoPerth ride share, (Cancer Society, Rideau Home Supports)	Begin 2020
RENEWABLE ENERGY				
Cut Greenhouse Gas emissions by increasing the supply of renewable energy	Support the adoption of renewable energy such as solar, wind and water generation by Tay Valley residents, businesses and organizations	TVT Planner, Green Energy and Climate Change Working Group	Lanark County, neighbouring municipalities, local suppliers and builders	Begin 2020
	Advocate for implementation of Smart Grid capabilities	TVT Planner, Council	Green Energy and Climate Change Working Group, Council	Begun in 2019, ongoing
	Advocate for Virtual Net Billing	TVT Planner, Council	Green Energy and Climate Change Working Group, Council	2020

Goals	Actions	Lead	Partners	Status and Timing
MEDIUM PRIORITY ACTIONS				
HOUSES & SMALL BUSINESS BUILDINGS				
Cut Greenhouse Gas emissions from homes and small business buildings in the community	Develop a Home and Small Business Building Energy program with financing and bulk purchasing capacity	TVT Planner, Clean Air Partnership, Green Energy and Climate Change Working Group	Government of Canada, FCM, AMO, HRAI, IESO, City of Toronto, Lanark County, Lanark County Social Services, Smiths Falls, REAL, Home-Sol, Lanark and Leeds Home Builders Assoc., City of Kingston, Hydro One, Enbridge, Greensaver	Expression of interest submitted Dec. 2019 for pilot 3rd Party Residential Retrofit Program to support loans to residents and businesses to retrofit buildings for GHG reduction. Planned for delivery in 2021. Other municipal models in development include Kingston. Local audit programs and solar companies are available. Various financial support programs exist, including support from Lanark County for low-income retrofits.
	Encourage the development of training for local businesses and personnel in the delivery, installation and maintenance of low- and no-carbon systems such as heat pumps and PV systems.	TVT CAO	Algonquin College, Lanark and Leeds Home Builders Assoc., local businesses	Begin 2020
	Adopt LEED, Passive House, Green Development Standards and methods that evaluate embodied Greenhouse Gases in construction materials when they become available	TVT Planner	Toronto and Hamilton Planners and CBOs, Association of Low-Carbon Builders	When more widely available to other municipalities
AGRICULTURE AND FOOD SECURITY				
Cut Greenhouse Gas emissions from agriculture and increase soil sequestration of carbon by farms	Support and promote farm organizations that engage their members in Greenhouse Gas reductions, sequestering of carbon and provide low- or no-carbon crop drying systems	TVT Planner, Climate Action Network of Lanark County, Smiths Falls and Region	National Farmers Union, Ecological Farmers Assoc. of Ontario, Ontario Federation of Agriculture, Lanark County Agriculture Committee, Alternative Land Use Service (ALUS)	Climate Action Network establishing Alternative Land Use Services (ALUS) in Lanark County with target launch 2021. NFU/EFAO Soil Benchmark Study underway

Goals	Actions	Lead	Partners	Status and Timing
MEDIUM PRIORITY ACTIONS				
AGRICULTURE AND FOOD SECURITY				
Cut Greenhouse Gas emissions from agriculture and increase soil sequestration of carbon by farms *(Continued)*	Assess support for and advocate for reversal of the expansion of natural gas pipeline and services in Eastern Ontario	TVT Council	Lanark County, Eastern Ontario Wardens' Caucus, Ontario government	2020-2021
	Advocate for opportunities that provide lower-cost low-carbon or no-carbon crop drying systems	TVT Planner	Eastern Ontario Wardens' Caucus	2020, ongoing
	Investigate methane collection, capture and use on farms and supply streams including residential compostables	TVT Public Works Manager, Green Energy and Climate Change Working Group	National Farmers Union, Ecological Farmers Assoc. of Ontario, Lanark County Agriculture Committee	2021
	Promote less waste of food	TVT Planner	Province of Ontario, The Table	2021 Provincial ban on organic materials to landfills starting 2022
	Encourage local farms to produce more food for local consumption	TVT Planner	National Farmers Union, Ecological Farmers Assoc. of Ontario, Lanark County Agriculture Committee, Lanark Local Flavour, Two Rivers Food Hub	2021
NATURAL SYSTEMS				
Monitor for and develop Nature-Based Climate Solutions that sequester carbon in local natural systems, including marginal agricultural lands	Facilitate planting of 10,000 trees/year, incentivize personal commitment to plant 10 trees/person/year	TVT Planner	Lanark County, Mississippi Valley Conservation, Rideau Valley Conservation Authority, Green Energy and Climate Change Working Group, Climate Action Network of Lanark County, Smiths Falls and Region	Conservation Authorities Tree Planting program, with support from Lanark County, 2020. Lanark County tree seedling sales begin 2020 Township Tree Canopy Plan 2020

Goals	Actions	Lead	Partners	Status and Timing
MEDIUM PRIORITY ACTIONS				
NATURAL SYSTEMS				
Monitor for and develop Nature-Based Climate Solutions that sequester carbon in local natural systems, including marginal agricultural lands *(Continued)*	Develop a Natural Heritage System Plan for Tay Valley Township which implements Dr. Paul Keddy's Lanark County Green Gems project	TVT Planner	MNRF, MVCA, RVCA, Lanark County, Green Energy and Climate Change Working Group, Lanark County, Climate Action Network of Lanark County, Smiths Falls and Region	Initial steps taken in 2019 by TVT Council and Staff, and Climate Action Network of Lanark County, Smiths Falls and Region Natural Systems group.
	Consider incentivizing encouragement of home food production, conversion of lawns to natural spaces and/or food gardens using the model of the Minnesota bee friendly lawns	Green Energy and Climate Change Working Group	Climate Action Network of Lanark County, Smiths Falls and Region	Begin 2021

ESSENTIAL ACTIONS

MUNICIPAL OPERATIONS

Enable Tay Valley Township to immediately begin cutting Greenhouse Gas emissions from Municipal operations and to achieve or surpass its reduction targets

- Adopt the Climate Action Plan and Appoint a Lead Person Responsible for Delivering the Plan
- Use a Quantitative Climate Lens
  - A specific Climate Lens has been developed for Tay Valley Township. It provides staff, and Council, with the decision-making capacity to assess the Greenhouse Gas emissions produced by a given action, or lack of action, or alternative action, and to take that into account with financial considerations.
- Advocate for stronger Greenhouse Gas reduction targets and actions at the Federal, Provincial and County levels of government
  - Tay Valley Township successfully took forward a motion to Lanark County Council in 2019 for the County to engage in the Federation of Canadian Municipalities' Partners for Climate Protection planning process and actions development. This will greatly increase the ability of Tay Valley Township to implement its own actions as it will be able to work on common goals with the County and its neighbouring lower-tier municipalities.
  - In order for Tay Valley Township to achieve its Greenhouse Gas reduction targets, it will be necessary for Ontario and Canada to both strengthen and achieve their targets for action.
- Integrate the Climate Action Plan with the Building Condition Assessment Report, the Asset Management Plan, and the Conservation and Demand Management Plan
  - Climate action goals and targets need to be integrated into the regular reports that guide the actions of Tay Valley Township.
- Ensure climate change, Greenhouse Gas and life cycle costs are enshrined in procurement policies and in planning documents.
  - Climate action goals and targets be integrated into the policies that guide the purchase of goods and materials and the planning goals of Tay Valley Township.

Tay Valley Township successfully took forward a motion to Lanark County Council in 2019 for the County to engage in the Federation of Canadian Municipalities' Partners for Climate Protection planning process and actions development.

What's the issue with natural gas?

Natural gas is a particular concern as the climate crisis worsens. Where natural gas was once seen to be a good transition fuel between the most polluting of the fossil fuels – coal and oil – and renewable sources of energy, in recent years it has become clear that it is a particular contributor to climate change. Natural gas is primarily methane, and methane has a global heating effect that is more than 80 times that of carbon dioxide in the first 20 years after it is released. However, the global heating potential of methane is under re-evaluation as recent research shows greater releases of fugitive methane from storage, pipelines, flaring and wells, and from permafrost and the ocean.
theenergymix.com/2018/11/08/asleep-at-the-switch-canadas-pathway-to-1-5c-means-phasing-out-natural-gas/

Dramatically reduce methane release from the landfill

- Conduct a comprehensive waste audit that includes all organic materials as well as recyclables and evaluates Greenhouse Gases produced in the transportation of materials to the waste sites
  - The Township has never conducted a formal waste audit. A company that conducts waste audits has offered to partly subsidize an audit so it is recommended the audit scheduled for 2021 be brought forward to 2020. This would be an audit that assesses all recyclables as well as all organic contents of a contents of a typical bag including food waste, fabrics, wood waste and other organic or compostable material.

HIGH PRIORITY ACTIONS

BUILDINGS

Minimize energy consumption and Greenhouse Gas emissions of Municipal buildings

- Before further investments are made in the Municipal Office, assess any new construction, renovation, or maintenance for its potential opportunity to reduce Greenhouse Gases and operating costs. Specifically assess the Municipal Office with the intent to reduce heating and cooling load and convert mechanical systems from natural gas to electricity with an integrated system using solar and net metering
  - The building was constructed in 2010. An audit is recommended to determine conservation and air circulation improvements. The building is heated and cooled by four roof-top systems that use natural gas for heating and electricity for cooling. An assessment is recommended to convert to an integrated system using electric heating and cooling heat pumps, solar power, net metering and possibly energy storage.
  - Being rural and not on a main natural gas pipeline, there is limited consumption of natural gas in the township. However, it reaches about 20 homes, the UCDSB Glen Tay School and the Municipal Office on Harper Road.
  - Given the extraordinarily short time frame we now face to meet the goal of only increasing the planet's temperature by 1.5°C, the Township can take an important step by cutting its own consumption of natural gas.

PUBLIC COMMUNICATIONS

Enable public action to cut Greenhouse Gas emissions

- Budget for an ongoing Communications Strategy that motivates community climate actions by residents, businesses, and community organizations

- Tay Valley Township is examining creating a Communications position in 2020. This position could be tasked with resourcing efforts to deliver public education on numerous aspects of climate change and reducing Greenhouse Gas emissions.
- The Township could partner with Lanark County, neighbouring municipalities and community non-profits to deliver many common elements of a Communications Strategy including disseminating information about these items recommended by the community:
  - The identification of EV chargers and hydrogen refuelling stations in the area, in partnership with Lanark County, Smiths Falls and other neighbouring municipalities
  - EV vehicles including bikes, scooters and motorbikes, and hydrogen vehicles
  - Home energy conservation programs and funding and financing
  - Home retrofit and renewable energy programs and services
  - How to get EV chargers and hydrogen refuelling stations installed
  - Farm programs of Rideau Valley Conservation Authority and Mississippi Valley Conservation that support climate actions
  - Information on meat consumption provided in collaboration with the Leeds, Grenville and Lanark Health Unit
  - Local organizations that support local food security such as Lanark Local Flavour, Perth Farmers' Market, Two Rivers Food Hub, The Table
  - Backyard composting including information sessions delivered at the waste sites
  - The natural re-establishment, or re-wilding, of natural areas and systems including specific information on forest management and wetlands management
  - Forestry and the forestry economy in Tay Valley Township, firewood, lumber certification systems
  - The Conservation Land Tax Incentive Program and the Managed Forest Tax Incentive Program

- Water conservation programs and actions
- Local community organizations and businesses that are taking climate action and providing low- or no-carbon products and services.

MUNICIPAL OPERATIONS

Further enable Tay Valley Township to cut Greenhouse Gas emissions from Municipal operations

- Install electric vehicle charger(s) at Township workplaces for use by Councillors, staff, the public and the fleet
  - Federal funds are available in 2020 to support this action
- Use a Qualitative Climate Lens
  - In development by the Clean Air Partnership, this is a high-level checkbox system that simply assesses a municipal action in regard to mitigation, adaptation, and other environmental concerns such as effects on natural systems. A pilot project is planned for trial implementation in 2020.
- Report on carbon fees spent by the Township
  - The Township pays the carbon fees charged on fossil fuels it consumes. Breaking out the amount so that it can be reported on will allow the Township to understand when the carbon fee makes a given expense not worthwhile. If, as is expected, carbon fees continue to rise, the value of certain actions will become more clear.
- Revise purchasing policies to encourage all bidders to report Greenhouse Gas emissions in tenders
  - The Township can train its suppliers in how to use its own Climate Lens so bidders can include estimations of the Greenhouse Gas consequences of their bids
- Advocate for and monitor for changes to policies governing municipal investments that allow for divestment of municipal funds from fossil fuels and avoidance of risk to taxpayers
  - Municipal governments are restricted by Ontario government regulation from making certain investments. The Township can seek opportunities to influence changes to those regulations that would allow the Township to divest from investments in fossil fuels.
- At the beginning of each term of Council, amend the Terms of Reference for the Green Energy and Climate Change Working Group to remove tasks that have been completed and add new tasks required to fulfill its mandate
  - This will ensure the continuity of the GECCWG as an avenue to feed ideas into Tay Valley Township from the community and to evaluate new ideas as they come forward

MEDIUM ACTIONS

WASTE

Dramatically reduce methane release and other Greenhouse Gas emissions from the landfill and waste streams

- Investigate and assess options for mitigating methane release from the landfill including working with Lanark County and neighbouring municipalities
  - The GHGs generated by the landfill are the single largest source of emissions that fall under the control of the Municipality. When organic or compostable material is put in the landfill, it anaerobically rots, producing methane and leachate. Eliminating organics from the waste stream would cut the methane emissions, reduce the leachate produced in the landfill and lengthen the lifetime of the landfill. Every kilogram of organics aerobically composted is a 1.5-kilogram reduction of carbon dioxide.
  - A provincial ban on organic materials to landfills starting in 2022 may contribute to resolving this for Tay Valley Township. To achieve its goals, the province plans to start by reducing the amount of food that is wasted so less ends up in landfill. https://www.ontario.ca/page/food-and-organic-waste-framework#section-4 .
  - For Tay Valley to achieve its goals it must evaluate multiple options for managing the organic materials currently going to its landfills, and the legacy materials in the landfills that are producing methane.
  - Tay Valley Township can use a Climate Lens to evaluate various options including:
    - the Greenhouse Gas emissions of residents transporting their organic waste to the waste site in comparison with a pick-up method. (From the householder survey, about three-quarters of Tay Valley residents compost much or most of their organic waste. But detailed data from other jurisdictions shows that even with a program that diverts organic materials, such as a green bin program, as much as 30% of a bag of garbage can still be organic materials. Without a diversion program it can be up to 50%.)
    - the Township purchase of and operation of a central composting system or digester
    - partnering with farm biodigesters

"There is a hierarchy of things that can be done with food waste, landfill being the worst, of course... The first being feed other people [and] the second being to feed animals. And if neither of those is possible, turn it into compost."

Dianne Saxe, Ontario's former environmental commissioner

https://www.cbc.ca/news/technology/landfill-ban-organics-ontario-1.5282881

- partnering with neighbouring municipal composting systems
- strengthening backyard aerobic composting supports and programs
- creating an online system to allow Tay Valley residents to find neighbours who will receive and compost their organic waste
- flaring of existing methane gas from the landfill

- Expand materials to be recycled and increase recovery rates
  - A provincial shift to full Extended Producer Responsibility beginning in 2023 is likely to set the path for Tay Valley Township.
  - Tay Valley Township can take its own actions including:
    - continue support of local efforts such as the Re-Use Centre to reuse materials and build the circular and sharing economies
    - strengthen promotion for current recycling and support at the landfill sites
    - develop a program to educate about burn barrels and strengthen bylaw enforcement for the burning of paper, cardboard and plastics
    - ban or minimize single use plastics in the Township office and municipal operations
    - work with Lanark County and neighbouring municipalities to deliver common programs

BUILDINGS

Minimize energy consumption and Greenhouse Gas emissions of Municipal buildings

- Assess any new construction, renovation, or maintenance for its potential opportunity to reduce Greenhouse Gases and operating costs of all Municipal buildings
  - Of the energy used by the Municipality, slightly less than half is burned to heat and cool the Township's buildings.
- Continue lighting retrofit projects

Generate revenue to offset costs through net metering

- Assess and implement a net metering program to reduce Greenhouse Gas emissions from electricity consumption and to generate revenue to offset costs by installing solar PV for appropriate buildings

- The Municipality has the opportunity to not only reduce its Greenhouse Gas emissions from the electricity it consumes, but to generate some revenue to offset its costs by installing solar photovoltaic panels with its buildings and to take advantage of Hydro One's Net Metering program. Net metering allows any Hydro One customer who generates electricity primarily for their own use from a renewable energy source (wind, water, solar radiation or agricultural biomass) to participate in the Net Metering program and accrue credit towards electricity costs.

FLEET & ROADS

Cut Greenhouse Gas emissions from the fleet

• Assess current fleet and any new potential purchases by type of use/size for lowest costs and Greenhouse Gas emissions.

- Of the energy used by the Municipality, slightly more than half is diesel fuel consumed in the Township's fleet. While there are few Greenhouse Gas reduction developments on heavy vehicles, electric light duty trucks are expected on the market in 2020 and Tay Valley is monitoring opportunities to replace its gasoline pick-ups with electric, with the added benefit of reducing air pollution.

Cut Greenhouse Gases emitted as a consequence of road materials

• Evaluate roadbed materials for Greenhouse Gas impact

MUNICIPAL WORKPLACE

Enable and educate Council and staff to act on cutting Greenhouse Gas emissions

• Educate Council and staff to facilitate carpooling, employee switching to electric vehicles and removing organics and plastics from the waste stream

- An internal education program is recommended so that Council and staff can make changes within the workplace, including understanding the benefits of electric vehicles, establishing on-site composting and eliminating organics and plastics from the office and work site waste streams. Such education will better enable Council and staff to implement Greenhouse Gas reduction actions throughout their work and make them knowledgeable leaders in the community.

Tay Valley Municipal Lighting Retrofit

The Township has taken early action to reduce energy use. All of the Township-owned streetlights were converted to LED lights in 2015. The existing streetlighting network was consuming 23,803 kWh per year. By upgrading to LEDs, the annual energy consumption was reduced to approximately 8,886 kWh per year, or an impressive reduction of 63%.

Innisfil, Ontario Micro-transit System

Innisfil is a growing community south of Barrie that had no existing public transit system. Its population of about 40,000 is of a low density. Innisfil developed a micro-transit system that uses Uber. The municipality provides subsidies of $3-5 per ride that enable residents to arrange pick-up on-demand for both dynamic and fixed routes, meaning they can get a lift from their own door to exactly where they are going, likely picking up other riders en route. https://www.citylab.com/transportation/2019/04/innisfil-transit-ride-hailing-bus-public-transportation-uber/588154/

- Install bike racks
- Work to reduce Greenhouse Gas emissions from Council and staff travel and offset the Greenhouse Gases

MUNICIPAL OPERATIONS

Continually update and revise the Climate Action Plan and develop a Climate Adaptation Plan

- Seek funding and opportunities to continually update the Climate Action Plan
  - There is a possibility Tay Valley Township may be able to take advantage of Lanark County's development of a Climate Action Plan to continually update its own Climate Action Plan
- Seek partnership opportunities to do a Climate Adaptation Plan
  - This Climate Action Plan is a mitigation plan only. A second common type of climate plan is for adaptation and takes into account the repercussions of a changed climate on a community, including addressing such concerns for Tay Valley as flooding and emergency preparedness. There is a possibility Tay Valley Township may be able to take advantage of Lanark County's development of a Climate Action Plan to have a Climate Adaptation Plan completed.

TRANSPORTATION

Cut Greenhouse Gas emissions from transportation within the community

- Support the national transition to electric and hydrogen vehicles with education
- Support and take advantage of opportunities to facilitate installation of electric vehicle chargers in the community and workplaces
- Assess and develop systems that support public and shared micro-transit opportunities
  - Transportation is the single largest contributor of Greenhouse Gas emissions from the Tay Valley community.
  - Tay Valley's Greenhouse Gas reduction target will benefit from the rapid transition to electric vehicles (EVs) that is underway. The federal government has a target for zero emission vehicles (ZEVs) of 10% of new passenger vehicle sales by 2025, 30% by 2030, and 100% by 2040. Its incentives to support this transition have been taken up quickly. As well, the network of charging stations is growing quickly.

- The Rural Transportation Issues and Options for Lanark County Report has many applicable recommendations that could be evaluated through a Climate Lens for implementation. http://lanarkkids.ca/wp-content/uploads/2017/02/Rural-Transportation-Issues-and-Options-for-Lanark-County_Final-Report-S....pdf
- While adopting zero emission personal transportation, including EV bikes, scooters and motorbikes, is important, creating shared or public transit systems promises greater Greenhouse Gas reductions. Tay Valley can assess numerous options for shared transit, particularly in partnership with Lanark County and neighbouring municipalities, including:
  - an online ride sharing system
  - Park & Ride
  - the existing Lanark Transportation bus system
  - car share programs
  - specific opportunities to support seniors
  - opportunity for residents to rent electric municipal vehicles, especially an electric pick-up truck for occasional loads, from the Township in off hours, modeled on Plessisville, Que.
  - micro-transit. Tay Valley could work with Lanark County and neighbouring municipalities and examine some new models for micro-transit that have been developed in communities such as Innisfil, Belleville, and Okotoks. Microtransit can be privately or publicly operated and typically uses small, multi-passenger/pooled shuttles or vans. By using technology for scheduling, it can provide on-demand or fixed-schedule services with either dynamic or fixed routing.

ZEV Incentives
Federal incentives are available for new and leased battery-electric, plug-in hybrid electric and hydrogen fuel cell vehicles. Incentives range from $2,500-5,000
https://www.tc.gc.ca/en/services/road/innovative-technologies/zero-emission-vehicles.html

Incentives of $1,000 are available on used EVs
https://www.plugndrive.ca/used-electric-vehicles/

Charging stations
https://energyhub.org/ev-map-canada/

Ride Share
Community Ride Share Connection Lanark County
https://www.facebook.com/groups/668214839939550/

Lanark Transportation
https://lanarktransportation.com

Carbon Offsets to Air Travel

Air travel is a singularly large contributor per person to Greenhouse Gas emissions. A round-trip flight for two from Ottawa to Vancouver produces roughly the same amount of carbon dioxide emissions as does the average Canadian car driven for a full a year, or 3 tonnes. While a goal is to replace air travel with ground travel, when flight is necessary, purchasing carbon offsets that fund high-quality carbon sequestration or zero-emission projects can offset the emissions. The best carbon offsets are those that meet the Gold Standard Foundation's sustainable development criteria, as well as the UN's Clean Development Mechanism protocols and are endorsed by leading international environmental organizations such as the Suzuki Foundation and WWF International. The Guatemala Stove Project is based in Tay Valley Township. Where reforestation is not occurring, it replaces open fires with cookstoves, saving 20-30 tonnes of carbon dioxide over the stove's 10-year lifespan. A stove costs $300. In Project Drawdown, clean cookstoves ranked No. 21 of 80 top solutions to reverse global warming.
https://guatemalastoveproject.org/news-and-events-gsp-solution-for-reducing-your-carbon-footprint/

Subsidies, full to partial and other forms of assistance to cut your Greenhouse Gas emissions
Low-income
Lanark County Social Services
Insulate Lanark – ***NEW***
http://www.lanarkcounty.ca/Page2424.aspx

Low Income Energy Assistance Program
Bill subsidy
http://www.lanarkcounty.ca/Page1929.aspx

Ontario Electricity Save On Energy Home Assistance Program
If you use electricity and qualify, replacement appliances, insulation and air sealing
https://saveonenergy.ca/For-Your-Home/Home-Assistance-Program

Enbridge Home Winterproofing
If you use natural gas and qualify, insulation and air sealing
https://energy-savings-programs.ca/winterproofing-program/

Enbridge Natural Gas Home Efficiency Program
If you use natural gas, and retrofit, up to $5,000 in rebates
https://enbridgesmartsavings.com/home-efficiency-rebate

RENEWABLE ENERGY

Cut Greenhouse Gas emissions by increasing the supply of renewable energy

- Support the adoption of renewable energy such as solar, wind and water generation by Tay Valley residents, businesses and organizations
  - The region has a developing industry of suppliers of renewable energy. Tay Valley Township can assist in promoting the adoption of renewable energy with a robust education program
- Advocate for implementation of Smart Grid capabilities
- Advocate for Virtual Net Billing
  - Virtual Net Billing would enable renewable generation investment and net billing by Tay Valley residents despite grid constraints, and would improve net billing economics

HOUSES & BUILDINGS

Cut emissions from homes and small business buildings in the community

- Develop a Home and Small Business Building Energy program with financing and bulk purchasing capacity
  - Buildings are the second largest contributor of Greenhouse Gas emissions from the community of Tay Valley. Actions to reduce those Greenhouse Gas emissions are to make those buildings better able to conserve energy, to replace fossil fuel heating systems with low- or no-carbon electric systems and to add renewable energy.
  - Tay Valley Township can work with the Federation of Canadian Municipalities and the Clean Air Partnership, Lanark County and neighbouring municipalities to develop a financing program that would allow home and small business property owners to borrow with the township's assistance to increase efficiency, convert fossil fuel heating to electric, add solar PV and solar hot water, and implement net metering. The property owner would be able to borrow funds, then pay them back on their tax bill. The Township has expressed interest and is following a pilot project.
  - Tay Valley could facilitate the bulk purchase of equipment such as heat pumps and PV systems for its residents and small businesses.

- Encourage the development of training for local businesses and personnel in the delivery, installation and maintenance of low- and no-carbon systems such as heat pumps and PV systems.
  - The Tay Valley community has access to some services and businesses that can help residents and business owners do all of this. However, there is a pressing need in the local community for more trained personnel to install and maintain such systems as heat pumps and solar PV systems. This is a business opportunity for expansion and opportunities for local job creation.
- Adopt LEED, Passive House, Green Development Standards and methods that evaluate embodied Greenhouse Gases in construction materials when they become available
  - Working with municipal colleagues through the Partners for Climate Protection, Tay Valley will have the opportunity to adopt such leading-edge building standards as LEED (Leadership in Energy and Environmental Design), Passive House and the Green Development standards (in development in Toronto and Hamilton) when they become more widely deliverable to municipalities. As well, the Township can adopt methods that evaluate embodied Greenhouse Gases in construction materials. To encourage the take up of these standards, Tay Valley could follow the Toronto model and provide financial incentives through a Development Charge refund program. For e.g. Toronto reduces development cost charges for developers who include climate change mitigation such as enough insulation to hold a house at 18.3˚C for two weeks without power. Such programs can be designed to be self-funding and thereby budget neutral.

Home Energy Audits

Two local services, a non-profit and a local business, provide home energy audits. Audits provide the home or small building owner with information specific to that house or building, detailed insight into how to cut energy consumption, costs and Greenhouse Gas emissions, and recommendations that solve comfort, indoor air quality, efficiency and durability issues.
https://www.realaction.ca/energy/home-energy-assessment/

https://homesolbuildingsolutions.com/about-homesol/

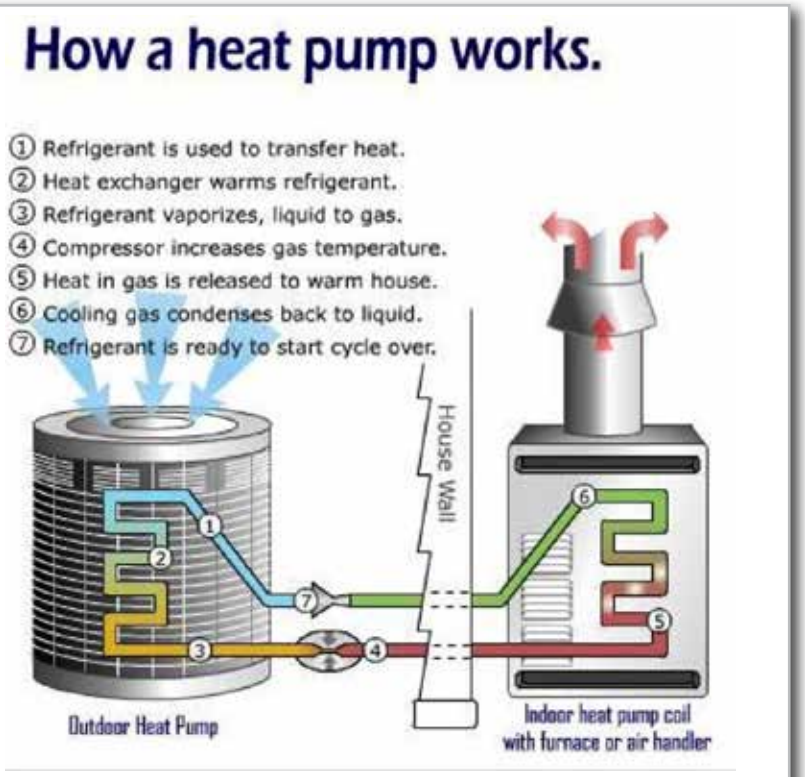
Solar PV and Net Metering

Net metering allows any Hydro One customer who generates electricity primarily for their own use from a renewable energy source (wind, water, solar radiation or agricultural biomass) to participate in the Net Metering program and accrue credit towards electricity costs.
https://www.hydroone.com/business-services/generators/net-metering

The cost of solar photovoltaic for the production of electricity from your own home or building has dropped dramatically making net metering an increasingly viable option as electricity rates increase. Tay Valley Township is served by a number of suppliers.

Electric Heat Pumps

A heat pump is an electrical device that extracts heat from one place and transfers it to another. Refrigerators and air conditioners are both common examples. Heat pump heating systems simply reverse the process. Generally, they use about 1/3 of the electricity of electric baseboards or furnaces, making them as economic as most other heating systems. As well, they provide cooling and dehumidifying. https://www.nrcan.gc.ca/energy/publications/efficiency/heating-heat-pump/6827 There are water, ground and air source heat pumps, with air source becoming very popular.



AGRICULTURE & FOOD SECURITY

Cut Greenhouse Gas emissions from agriculture and increase soil sequestration of carbon by farms

- Support and promote farm organizations that engage their members in Greenhouse Gas reductions and sequestering of carbon
  - Beef cattle and dairy cows are considered to be some of the greatest contributors of Greenhouse Gas emissions from the agricultural sector. In 2016, Tay Valley Township had 1094 cows, primarily as beef cattle. Farmers are investigating means to reduce the Greenhouse Gas emissions produced on their farms, and the means to improve sequestration of carbon in the soil, including investigating crops that may be net reducers of carbon such as hemp.
  - Local farmers are participating in an EFAO and NFU sponsored Soil Benchmark Study to determine what measures may improve carbon sequestration, including managed grazing and use of green cover crops. https://www.nfu.ca/wp-content/uploads/2019/12/Tackling-the-Farm-Crisis-and-the-Climate-Crisis-Final-with-covers.pdf

  - The Climate Action Network of Lanark County, Smiths Falls and Region is working with local farmers to bring the Alternative Land Use Services (ALUS) group to Lanark. This would pay farmers for the services they provide to maintain and restore marginal land to its natural system and to practice regenerative agriculture.
- Assess support for and advocate for reversal of the expansion of a natural gas pipeline and services in Eastern Ontario.
- Advocate for opportunities that provide lower-cost low-carbon or no-carbon crop drying systems
  - Farmers in Eastern Ontario want access to natural gas because they need low-cost energy to dry crops such as corn and soy. Tay Valley Township can support efforts to find and create crop drying systems that produce no methane and far less Greenhouse Gases
- Investigate the collection of methane, capture and use on farms and supply streams including from farm operations and residential compostables
- Promote less waste of food
  - To eliminate organic materials going to the Tay Valley landfill means starting at the upstream. Tay Valley can work with local food organizations to promote less waste of food. Canadian households waste 140 kilos of edible food each year. Every tonne of household food waste that is avoided is the equivalent of taking one car off the road each year. https://lovefoodhatewaste.ca/about/food-waste/
  - Tay Valley can work with local farm and food organizations to investigate and advocate for regulatory changes to allow slops (fresh food waste) to go to consumption by farm animals.
- Encourage local farms to produce more food for local consumption
  - Tay Valley can work with local farm and food organizations to assess how much food is imported and exported from the foodshed, how far it travels to reach consumers in Tay Valley, and to encourage increased production of local food for local consumption.

Farm Biodigesters

Shane Mowat's Jockvalley Farms is a family farm comprised primarily of dairy and cash crops in Ashton, Ontario. Adding a 1500m^3 anaerobic digester was a decision made for economic reasons as well as for sustainable agriculture. The methane biogas fuels a 500kW MWM generator, with the electricity produced supplying the grid and the recovered heat supporting the biogas plant and farm. Jockvalley can use a variety of organic materials for the digester. While current Ontario regulations limit the mix of materials allowed in biodigesters, a provincial ban on organics to landfill to start in 2022 may introduce changes. https://biogasassociation.ca/about_biogas/ontario_map_popup#

Lanark County partners with RVCA tree planting program

Lanark County is partnering with the Rideau Valley Conservation Authority's tree planting program to extend its reach and cut Greenhouse Gas emissions. To participate in the program, which provides planted seedlings at a subsidized rate, a property owner must have a minimum 0.4 Ha (one acre) of suitable land, order a minimum of 1,000 trees and agree to reasonably protect the trees from damage. Lanark County has a goal to plant at least 1 million trees in Lanark County in the next 10 years. In light of the spread of the invasive emerald ash borer, suitable diversified species would be planted. https://www.rvca.ca/stewardship-grants/tree-planting

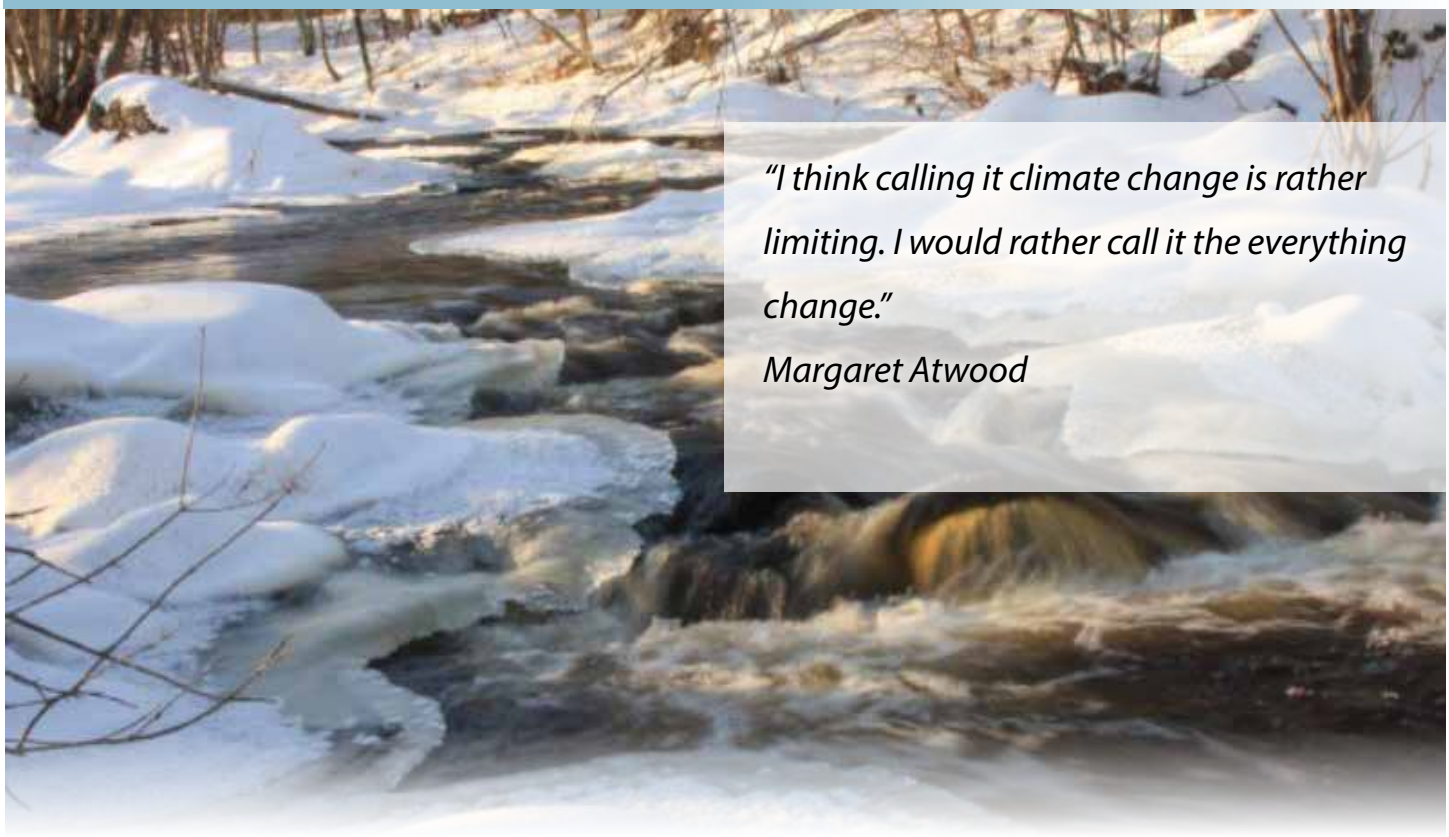
NATURAL SYSTEMS

Monitor for and develop Nature-Based Climate Solutions that sequester carbon in local natural systems, including marginal agricultural lands

- Facilitate planting of 10,000 trees/year, incentivize personal commitment to plant 10 trees/person/year
  - Trees take up carbon dioxide. The Intergovernmental Panel on Climate Change has called for a massive tree planting effort to help mitigate climate change. Tay Valley can work with its partners to encourage the re-naturalization, or rewilding, of lands in the township, the planting of trees, and the protection of existing mature forests.
- Develop a Natural Heritage System Plan for Tay Valley Township which implements Dr. Paul Keddy's Lanark County Green Gems project
  - Conservation, restoration, and/or improved land management actions that increase carbon storage and/or avoid greenhouse gas emissions across global forests, wetlands, grasslands, and agricultural lands can provide 37% of the cost-effective climate mitigation needed between now and 2030 to stabilize warming to below 2°C while improving soil productivity, cleaning air and water, and maintaining biodiversity. https://www.pnas.org/content/114/44/11645
- Consider incentivizing encouragement of home food production, conversion of lawns to natural spaces and/or food gardens using the model of the Minnesota bee friendly lawns

Minnesota Bee Friendly Lawns

Minnesota has instituted a short-term program to provide incentives to its residents to convert their lawns to natural oases for bees. Such an incentive program is a model for encouraging other positive behaviour on lands.
https://www.smithsonianmag.com/smart-news/minnesota-will-pay-residents-grow-bee-friendly-lawns-180972430/



"I think calling it climate change is rather limiting. I would rather call it the everything change."

Margaret Atwood

Critical Steps:

Implement the Plan

To begin, the Township must take the identified Essential Actions (pg. 31) in 2020:

- Adopt the Climate Action Plan and appoint a lead person responsible for delivering the plan
- Use a Quantitative Climate Lens – implement the Climate Lens in all operations
- Advocate for stronger Greenhouse Gas reduction targets and actions at the Federal, Provincial and County levels of government
- Integrate the Climate Action Plan with the Building Condition Assessment Report, the Asset Management Plan, and the Conservation and Demand Management Plan
- Ensure climate change, Greenhouse Gas and life cycle costs are enshrined in procurement policies and in planning documents
- Conduct a comprehensive waste audit that includes all organic materials as well as recyclables and evaluates GHGs produced in the transportation of materials to the waste sites

Action on climate change is a shared responsibility.

Action on climate change is a shared responsibility. To assist the municipality and the community of Tay Valley Township advance its Climate Action Plan, the Township can:

- Take advantage of partnerships with other levels of government – Federal, Provincial, County and neighbouring municipalities
- Collaborate with the many community organizations, local businesses and individuals taking action to cut GHGs
- Exploit funding and financing opportunities available to it or its partners and make a portion of the Township's reserves available as matching funds for grants

Combined, these actions comprise Milestone 4 of the Partners for Climate Protection program.

Fund the Actions

Funding to address climate change is available. It is expected that funding for both climate mitigation and adaptation planning and actions will increase substantially for municipalities and organizations interested in partnering with municipalities. This list is not comprehensive but provides leads for some new funding opportunities.

Government of Canada

- Budget 2020 and post-Covid budgets are expected to increase funding for climate actions
- Current funds are available through various federal government ministries, including allocated through the Federation of Canadian Municipalities

Infrastructure Funding

- The main federal funding program for municipal works
- Infrastructure Canada is prioritizing climate action in its funding programs and is expected to increase funding as part of a Green Economic Recovery plan in response to the Covid-19 pandemic.
- https://www.infrastructure.gc.ca/prog/programs-infc-summary-eng.html

Zero Emission Vehicle Infrastructure Program

- Funds various components of the transition to Zero Emission Vehicles including chargers
- https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/zero-emission-vehicle-infrastructure-program/21876

Funding to address climate change is available

Climate Action Incentive Fund

- Funding provided in phases, including an expected phase for municipalities to undertake energy saving and energy efficiency projects
- https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming/climate-action-incentive-fund.html

Government of Ontario

The Municipal Energy Plan Program

- improve energy efficiency
- reduce energy consumption and greenhouse gas emissions
- study the impact of future growth on energy needs
- foster renewable energy production and economic development
- https://www.ontario.ca/page/municipal-energy-plan-program

Federation of Canadian Municipalities

Green Municipal Fund

- The signature funding initiative of the FCM supports projects that improve municipal service delivery while reducing GHG emissions and protecting the air, water or land
- https://fcm.ca/en/funding
- Three new funds under the Green Municipal Fund, with a total allocation of $950 million, are rolling out over the next seven years:

Community Efficiency Financing

- Provides a financing mechanism that would allow homeowners to borrow against their property taxes to implement conservation, efficiency, GHG reduction and renewable energy
- Tay Valley Township has submitted an expression of interest in delivering this program as a pilot in the Township

Sustainable Affordable Housing

- support to local affordable housing providers – including municipal, not-for-profit organizations and housing co-ops – to retrofit existing affordable housing units, or construct energy-efficient new builds that emit lower GHG emissions

To ensure the Township keeps moving in the direction it wants to, and as quickly as it desires, it must monitor its progress.

Collaboration on Community Climate Action

- support cities and communities in reaching their full carbon emissions reduction potential while improving public health, increasing mobility, and boosting local job creation

Local Funds

Many foundations and local funds seek to support non-profits and charities, but particularly appreciate a non-profit or charity that has a partnership with a municipality.

Canopy Growth/Tweed Collective

- supports non-profits, Business Improvement Areas (BIA), and registered charities that are creating new pathways to Grow Opportunities, Grow Greener and Grow Connections that will make a positive, lasting impact in their communities
- https://www.tweedcollective.com

Perth and District Community Foundation

- supports the residents of the Town of Perth, the townships of Drummond/North Elmsley, Tay Valley and Lanark Highlands and supports one or more areas of interest in the Lanark County Vital Signs Report including the environment
- https://www.pdcf.ca

100 Women Who Care Lanark County

- Charities must be nominated by a member of 100 Women Who Care Lanark to be considered.
- http://100womenlanark.ca

Evaluate and Monitor the Actions

Tay Valley Township has set impressive aspirational GHG reduction targets. To ensure the Township keeps moving in the direction it wants to, and as quickly as it desires, it must monitor its progress. This comprises Milestone 5 of the Partners for Climate Protection program.

Monitoring and Evaluation Steps

- Monitor and re-evaluate its GHG emissions annually during the budget setting process.
    - For its municipal, or corporate emissions, this is easily done. It must accrue and report both its GHG emissions annually

for the *Conservation and Demand Management* report, and its waste stream data, both of which are filed with the Ontario government.

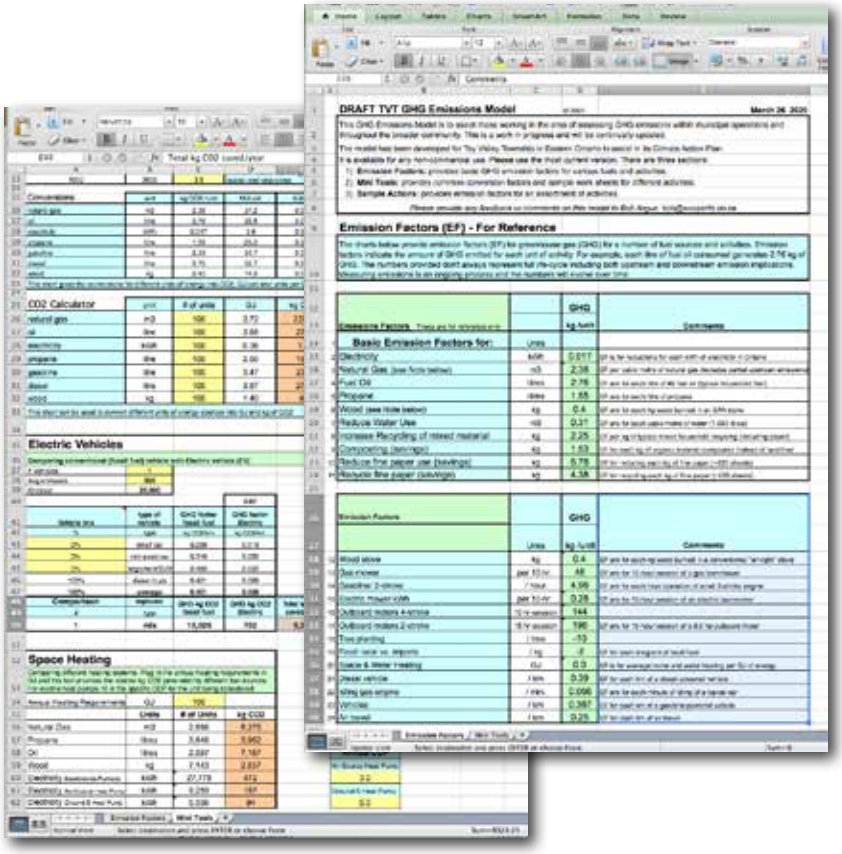
- Community emissions are more challenging to collect and monitor. There is opportunity in the next couple of years to take advantage of a partnership with Lanark County and the development of its Climate Action Plan to have community emissions updated. Otherwise, it is recommended that the Township update its community emissions on a schedule that is less than every four years.

- Every two years the Township is required to report on its progress to the FCM's PCP program, with the assistance of the PCP
- The continuity of the Green Energy and Climate Change Working Group will ensure that new ideas and actions that come forward will be added to the Plan. Regular community dialogue will ensure the plan is kept alive and remains a vibrant guide to the Township achieving its goals. The Terms of Reference for the GECC will be amended at the beginning of each new term of Council
- Finally, critical to moving forward is that the Township celebrate its successes and mark those annually in its communications strategy

Every two years the Township is required to report on its progress to the FCM's PCP program, with the assistance of the PCP

Appendix 1: Quantitative Climate Lens

DRAFT TVT GHG Emissions Model



A working GHG Emissions Model has been developed to assist those working in the area of assessing GHG emissions within municipal operations and throughout the broader community. This is a work in progress and will be continually updated

The model has been developed for Tay Valley Township to assist in its Climate Action Plan. It is available for any non-commercial use.

The model contains three sections:

1. Emission Factors: provides basic GHG emission factors for various fuels and activities. Emission factors indicate the amount of GHG emitted for each unit of activity. For example, each litre of fuel oil consumed generates 2.76 kg of GHG.

2. Mini Tools: provides common conversion factors and sample worksheets for different activities. There are a number of Mini Tools to assist in determining the likely reductions and emission factors. The first group of tools (Energy Conversions) looks at different heating sources and converts typical units into equivalent GJ. The next set of mini tools are mini-estimators for different types of actions. These are provided to aid in estimating the impact of a program.

Current Mini Tools:

- **kWh-GJ Conversion**
- **CO_2 Calculator**
- **Electric Vehicles**
- **Space Heating**
- **Solar Power**
- **Investments**
- **Composting**
- **Recycling**
- **LED Light Bulbs**
- **Fine Paper**
- **Local Food**
- **No Idle**
- **Car Pool**
- **Telework**

3. Sample Actions: provides emission factors for an assortment of activities.

Appendix 2: Tay Valley Township Householder Survey Results

Tay Valley Township Householder Survey, Summer 2019

Selected results, numbers are rounded

OPINIONS

70%
OF RESIDENTS
want Tay Valley Township & Lanark County to ***Do more to tackle climate change***

20%
OF RESIDENTS
want them to ***Take some action***

TRANSPORTATION

There are **2.64 people** and **1.79 vehicles** per household in Tay Valley Township

About **40%** ***would consider car pooling,*** **car sharing or ride sharing if there was a good system and another 25%** ***might consider it*****.**

67% say ***electric vehicles*** and the capacity to charge them are important.

WASTE

75%
of residents ***compost their kitchen waste*** at home, **25%** ***don't***.

However, close to **65%** put their ***meat scraps in the garbage*** *(which means they go into the landfill)*.

80% ***compost yard waste*** at home, ***20% don't***.

20% of residents say they ***use a burn barrel.***

FOOD & AGRICULTURE

94%
of residents ***buy local food regularly, sometimes or occasionally.***

96% said access to local food ***was important.***

56% grow vegetables.

NATURE-BASED CLIMATE SOLUTIONS

69%
say they will or are likely to ***plant trees.***

ENERGY EFFICIENCY

97% said MAKING their home more energy efficient ***was somewhat or very important.***

91% said HAVING a more efficient heating system ***was somewhat or very important.***

Rural residents frequently have a primary heating system, a secondary and/or back-up heating system and possibly a third heating system.

By percentage of households, TVT residents use the following fuels for their primary heating systems:

Propane – 35.2%
Wood or wood pellet – 32.9%
Electricity – 10.7%
Heat pump – 8.5%
Oil – 6.8%
Natural gas – 5.9%

GLOSSARY

Carbon Dioxide (CO_2) – is the primary gas driving climate change. CO_2 is both naturally occurring and a by-product of burning fossil fuels. (IPCC)

Climate – is long-term (months to many years) and weather is short term (today, tomorrow, a week). Technically, climate is a statistical description of the mean and variability of relevant quantities over a period of time, ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind. The World Meteorological Organization (WMO) considers 30 years to be a "normal" period. (Canadian Institute of Planners)

Climate Change – is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (Framework Convention on Climate Change)

Climate Adaptation – is an adjustment in natural or human systems in response to actual or expected climate stimuli and their effects, which moderates harm or exploits beneficial opportunities. There are various types of adaptation, including anticipatory, autonomous and planned adaptation. (Natural Resources Canada)

Climate Mitigation – is an anthropogenic intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks. (Natural Resources Canada)

Emissions – are greenhouse gases released into the air that are produced by numerous activities including burning fossil fuels, industrial agriculture, and thawing permafrost to name a few. (Canadian Institute of Planners)

Energy Audit – is a review of the energy consumption of a building, including appliances or major equipment, to identify opportunities to increase efficiency, decrease utility costs, and reduce greenhouse gas emissions.

Energy Retrofit – is the process of upgrading a building's energy consuming systems. Retrofitting may involve improving or replacing lighting fixtures, ventilation systems, or windows and doors, or adding insulation and air sealing. Retrofitting also means including energy efficiency measures in all renovation and repair activities.

Federation of Canadian Municipalities – is a national association which represents Canadian municipalities.

Fossil Fuels – are fuels comprised of fossilized hydrocarbon deposits such as coal, oil, natural gas and their products such as propane.

Greenhouse Gases (GHGs) – are gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, by the atmosphere itself and by clouds. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary greenhouse gases in the Earth's atmosphere. In addition, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances. (Natural Resources Canada)

Greenhouse Effect – is the process in which the absorption of infrared radiation by the atmosphere warms the Earth. In common parlance, the term 'greenhouse effect' may be used to refer either to the natural greenhouse effect, due to naturally occurring greenhouse gases, or to the enhanced (anthropogenic) greenhouse effect, which results from gases emitted as a result of human activities. (Natural Resources Canada)

ICLEI-CANADA – The International Council for Local Environmental Initiatives (ICLEI) – Local Governments for Sustainability - Canada –The Canadian branch of an international organization that works with stakeholders from across government, industry, academia and the NGO community to build more sustainable, low-carbon, energy efficient, climate-ready communities.

Intergovernmental Panel on Climate Change (IPCC) – is a panel established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988 to assess scientific, technical and socioeconomic information relevant for the understanding of climate change, its potential impacts, and options for adaptation and mitigation. (Natural Resources Canada)

Nature-Based Climate Solutions (NBCS) – solutions that take advantage of nature's systems to provide multiple economic, environmental, and social benefits, particularly those that address the twin crises of biodiversity loss and species collapse, and climate change, by increasing carbon storage or avoiding GHGs. The solutions focus on natural infrastructure, protected areas, restoration and improved management of forests and agricultural lands. (Nature United and Nature Canada)

Partners for Climate Protection (PCP) – is a national program comprised of more than 350 Canadian municipal governments committed to action on climate change. PCP is led by the Federation of Canadian Municipalities and ICLEI – Local Governments for Sustainability. The program provides expertise, training, support and networking to help municipalities create GHG inventories, set realistic and achievable reduction targets, develop and deliver local action plans, and measure their progress.

Virtual Net Billing – allows individuals to own part of a jointly owned renewable generation project and have their share of the power that is produced credited to their own residential electricity bill. The project need not be located near the participant's home. This makes net billing available to renters and those whose homes are not a suitable site for generation or whose homes are located where the grid cannot accommodate generation. Virtual net billing also enables greater economies of scale and avoids the need for individual project management and maintenance.