

Climate Action Plan Working Group

Final Report

Prince Edward County

Community Greenhouse Gas Emissions

Building a Lower-Carbon Future for Prince Edward County

This report presents an analysis of community-wide greenhouse gas emissions in Prince Edward County and outlines evidence-based insights to inform climate mitigation and adaptation action. It is intended to support Council decision-making and advance practical, achievable steps toward emissions reduction, resilience, and long-term community well-being.

Prepared for: The Environmental Advisory Committee, The Corporation of the County of Prince Edward

Prepared by: The Climate Action Plan Working Group

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1. Background

Since its first report in 1990, the UN Intergovernmental Panel on Climate Change (IPCC) has shown with increasing certainty that human activity - primarily the burning of fossil fuels for energy - is driving global heating. Recent data indicate that global temperatures have already reached 1.5°C above pre-industrial levels on an annual basis, a threshold long viewed as critical. Many climate scientists now warn that 2°C of heating could happen by the mid-2030s, well within a single planning horizon for Canadian communities.

Canada's progress in reducing greenhouse-gas (GHG) emissions has been limited. While carbon pricing and renewable-energy programs have modestly changed the electricity mix, they have been outweighed by continued growth in oil and gas production and use. Fossil fuels still account for roughly three-quarters of Canada's total primary energy consumption, a share that has declined only slowly since 2000. As a result, national GHG emissions remain close to their 2005 levels, with reductions in electricity largely offset by rising emissions from oil and gas extraction, transportation, and buildings. The consequences are increasingly evident across the country, including more frequent and severe wildfires, droughts, flooding, and widespread damage to property and agriculture.

Given the pace of current heating, mitigation is no longer sufficient. Communities must also prepare for changes already underway. In Prince Edward County, these pressures are tangible through extended droughts, shoreline erosion, and rising household energy costs. At this stage, the priority is less about influencing global emissions than strengthening local resilience by ensuring residents, infrastructure, and the local economy can withstand and adapt to a fast changing climate.

This report begins that process by establishing Prince Edward County's first comprehensive estimate of community-wide GHG emissions across four sectors - Buildings, Transportation, Agriculture, and Solid Waste - and by identifying where local action can reduce vulnerability, guide future targets, and support long-term climate adaptation.

2. Introduction

In 2019, Prince Edward County declared a climate emergency, recognizing the need for coordinated local action. The County subsequently joined the Partners for Climate Protection (PCP) program, a national initiative of the Federation of Canadian Municipalities and ICLEI Canada (Local Governments for Sustainability). The PCP framework guides municipalities through five Milestones: 1) measuring GHG emissions, 2) setting reduction targets, 3) developing local climate action plans, 4) implementing them, and 5) monitoring and reporting progress.

Under this framework, the County's climate planning has proceeded on two fronts: 1) municipal operations led by the County's Green Task Force, and 2) community-wide emissions addressed by the Climate Action Plan Working Group (CAPWG), comprising six residents and Councilor John Hirsch, reporting to the Environmental Advisory Committee (EAC). Both groups agreed to choose 2019 as the baseline year for GHG emissions.

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CAPWG's work fulfills the community part of PCP program's first two Milestones and establishes the foundation for future planning.

3. Purpose and Scope

The purpose of this report is to establish a clear, data-based picture of community GHG emissions and to provide a foundation for informed climate action. It represents the first steps toward a long-term framework for both mitigation and adaptation - identifying where emissions originate, where reductions are feasible and where resilience can be strengthened to manage changes already underway.

Readers will naturally ask whether the numbers in this report are precise. They are best estimates based on a small number of data points: 1) electricity (from Hydro One) and natural-gas (from Enbridge) consumption, 2) assessment data from MPAC on dwelling counts and heating types (which may themselves be imperfect), 3) Ontario Ministry of Transport (MTO) information for on-road transportation and 4) Statistics Canada for agriculture, population, and other miscellaneous information.

No direct data are available for: 1) fossil fuel (propane, gasoline, diesel, or heating-oil) sales, 2) the adoption or sales of electric vehicles, and 3) the installation of geothermal, including heat pumps. These have been inferred. Given the magnitude of the climate challenge, it is notable that Ontario has not required fuel, vehicle and heat pump distributors to report sales to municipalities.

As a result, the numbers in this report should be seen as informed overall estimates rather than an exact inventory. For this reason, numbers are rounded and decimal places are intentionally omitted.

4. Lessons from Rural Climate Planning

Rural and small municipalities across Canada face unique challenges in addressing climate change: smaller budgets, limited staff capacity, and competing local priorities. Research on rural climate planning (by Guyadeen & Henstra, 2019; 2023) shows that success depends less on scale than on approach. The most effective rural climate strategies are those embedded in everyday governance rather than treated as stand-alone projects.

High-quality climate plans share several features:

- Targets that guide future investment and policy.
- Integration across departments, ensuring that climate objectives inform planning, infrastructure, and community services.
- Transparent monitoring and reporting, allowing progress to be tracked and adjusted over time.
- Parallel focus on adaptation, recognizing that communities must prepare for climate impacts already locked-in.
- Community consultation and buy-in.

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Prince Edward County already benefits from cross-departmental collaboration through its Green Task Force, which brings together staff from major service areas. This internal coordination is a significant achievement - it reflects genuine commitment and growing awareness among staff and leadership. However, the County is only on the verge of integrating a 'climate lens' into its day-to-day business. Reports to Council typically have been reviewed through a strategic and financial lens but not through a climate-risk or climate-adaptation perspective.

As a result, while departments are working collaboratively, climate considerations are not yet systematically built into policies, budgets, and infrastructure planning. The looming financial impacts of climate change - from infrastructure damage, rising energy costs, and insurance exposure - are seldom quantified in long-range forecasts. The focus remains largely on mitigation rather than adaptation.

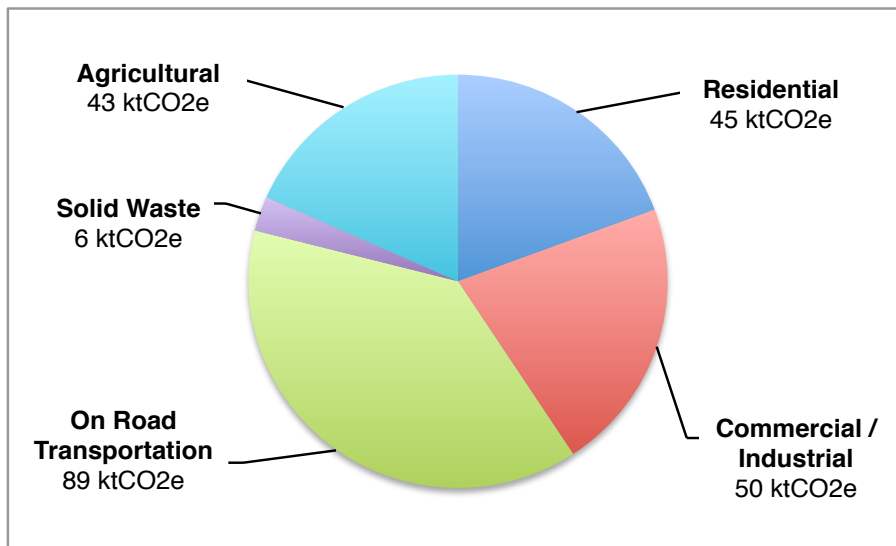
These are not failings of intent: County staff and senior leadership are actively trying to respond with limited resources and uncertain guidance. The opportunity now lies in formalizing the integration of climate objectives into all levels of municipal decision-making - so that climate awareness moves from a specialist concern to a shared responsibility embedded in daily governance.

5. Community Emissions Profile

5a. Current Status: 2019 Baseline Year

CAPWG has estimated the County's community-wide GHG emissions, for the baseline year of 2019, to be 232 kt CO₂e, distributed across four main sectors:

- Buildings (residential + commercial): 95 kt CO₂e (41%)
- Transportation: 89 kt CO₂e (38%)
- Agriculture: 43 kt CO₂e (19%)
- Solid Waste: 6 kt CO₂e (3%)



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Per-capita community greenhouse-gas emissions were approximately 7.6 tonnes CO₂e per person in 2019 (baseline year), which is consistent with values reported by other rural Ontario municipalities using the Partners for Climate Protection inventory methodology.

Municipal operations account for only 4 kt CO₂e (1.7%), underscoring that meaningful reductions must come from community-scale actions rather than the municipality, alone.

A Note on Heidelberg Cement

These totals exclude the Heidelberg (formerly Lehigh) Cement Plant, which emits approximately 575 kt CO₂e annually - more than twice all community emissions combined - the company has indicated plans to reduce emissions by 25-30% from 2019 levels, by 2030. As a federally and provincially regulated facility, Heidelberg falls outside the municipal jurisdiction.

While these industrial emissions dominate the regional footprint, they do not diminish the importance of community action, which directly influences household energy costs, local infrastructure planning and overall resilience.

Tourism Impacts

Tourism adds substantial seasonal demand on roads and transportation emissions but is not included in PCP accounting. With more than one million annual visitors - most arriving by car and making multiple trips within the County - visitor travel is estimated at 270 million vehicle-km, equivalent to an additional 54 kt CO₂e, more than 60% of community transportation emissions. This highlights the need for more integrated transit, EV-charging infrastructure, and low-carbon mobility options.

5b. A Cleaner County

To understand the County's potential for emissions reduction, CAPWG completed two background studies:

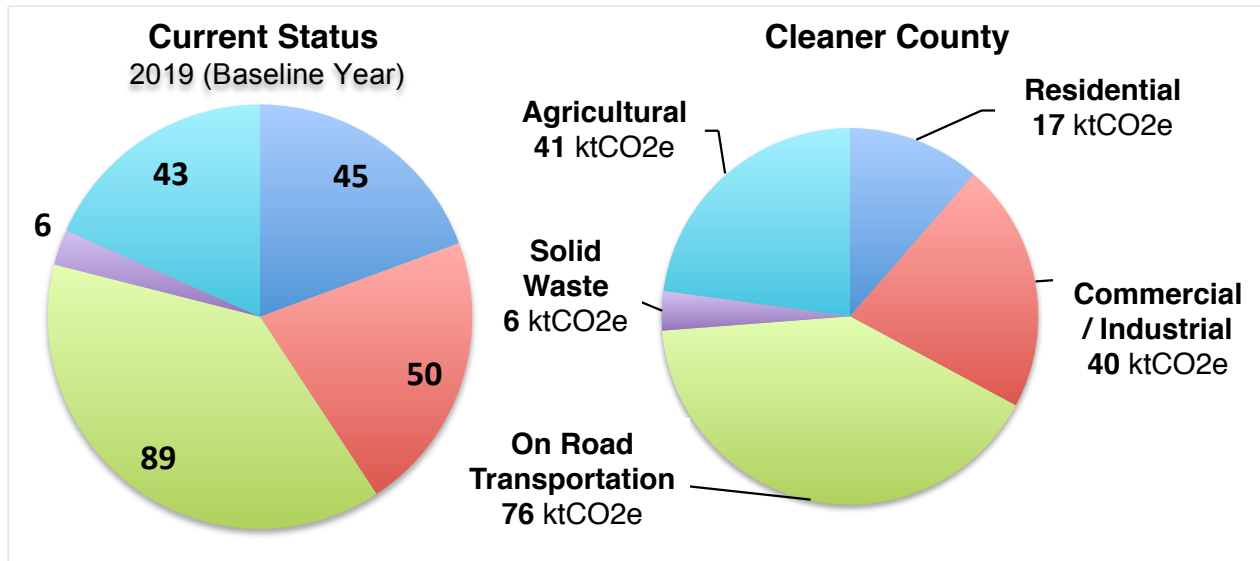
1. Energy use in buildings - residential and commercial.
2. Agricultural emissions using Agriculture Canada's Holos software - the first application of this model by a Canadian municipality.

Holos is a software application developed by Agriculture and Agri-Food Canada to help farmers evaluate mitigation strategies for livestock and crops (Appendix D). It includes inputs describing the full breadth of farming practice. We have used Holos to estimate agricultural emissions for the entire County.

By making realistic assumptions such as heat-pump adoption, electrified water heating, and appliance efficiency gains, we have estimated potential emissions reductions from residential homes of more than 50% (45 kt CO₂e to 17 kt CO₂e for 2019 to 2035, respectively), with a

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further reduction for commercial buildings of 10 kt CO₂e and transportation of 13 kt CO₂e, moderated by ongoing investments in transit, electrification, ride-sharing, and active-transportation infrastructure. See pie charts below.



For agriculture, most low-emission practices (coated fertilizers, pasture-based livestock, no-till farming, cover cropping) are already widespread so the potential for further reductions is limited - we have assumed a 5% reduction.

Taken together, these assumptions provide a “Cleaner County” scenario in which community emissions drop from 232 kt to 181 kt CO₂e - a 22% reduction - requiring a corresponding increase in electricity demand of 77 GWh (about 50%). Hydro One has confirmed that additional electricity demand is achievable with planned upgrades.

In summary, our analysis shows that there is no single pathway to mitigation; even with ambitious electrification and efficiency, we would only achieve a reduction of around one-fifth of current emissions. This reinforces the need for adaptation planning alongside mitigation.

In terms of a Milestone 2 emissions reduction target for 2035 - absent strong federal or provincial leadership - perhaps 10% is a reasonable target, equivalent to 7.0 tonnes (from 7.6 tonnes) per person.

Impact of Hot Summers

One County resident recently replaced the family’s oil furnace with an electrically backed-up heat pump. The motivation was not climate concern but uncomfortably high indoor temperatures during last summer’s heat. As summers grow hotter, many households are expected to follow suit. With MPAC reporting only one-third of County homes currently have air conditioning, as many as two-thirds may soon install heat pumps for personal comfort, thereby accelerating a Cleaner County scenario.

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6. Future Scenarios - Development

Development choices will strongly shape the County’s long-term emissions. Every new home carries energy and transportation needs, plus embodied emissions from new infrastructure. Current proposals are for roughly 3,300 dwellings by 2035, a 25% increase over today’s (2024) housing stock. If built conventionally, this would add 97 GWh of total energy demand and 12 kt CO₂e of GHG emissions.

However, actual growth is likely to be slower. Housing completions have averaged about 140 units per year, and fewer than 100 building permits were issued in 2025. Given this uncertainty, we have considered two illustrative scenarios:

- Low-Growth scenario: 1,000 new homes by 2035
- High-Growth scenario: 5,000 new homes by 2035

Development Efficiency Options

We further considered two development pathways:

- Improved: midway between current and ‘Cleaner County’ scenarios, i.e., moderate efficiency, partial electrification, modest EV adoption, which results in an additional 2.4 kt CO₂e GHG emissions requiring 15 GWh of additional electricity per 1,000 new homes.
- Clean: full electrification of heating/cooling, high building performance, robust EV adoption, which results in only 0.4 kt CO₂e GHG emissions and 22 GWh of additional electricity per 1,000 homes.

Summary of Development Scenarios

	Conventional	Improved	Clean
1,000 new homes	+3.7 ktCO ₂ e +12 GWh	+2.4 ktCO ₂ e, +15 GWh	+0.4 ktCO ₂ e, +21 GWh
5,000 new homes	+ 19 ktCO ₂ e +60 GWh	+12 ktCO ₂ e, +73 GWh	+2 ktCO ₂ e, +104 GWh

Implications for Milestone 2

Population growth obviously changes per-capita emissions:

- Improved (high-growth - because it changes population most): overall 6.5 tonnes CO₂e per person, a 14% reduction from current 7.6 tonnes per person.
- Clean (high-growth): overall 3.9 tonnes CO₂e per person, a 50% reduction.

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The conclusion is clear: the County's most powerful tool for long-term emissions reduction is ensuring new development is built cleanly - discouraging fossil-fuel heating, encouraging high-efficiency, passive design, and expanding EV infrastructure and integrated transit options.

7. Counting the Cost: Climate, Insurance and Infrastructure

Even under moderate scenarios of climate heating and new development, the County will face rising financial pressures. Across Canada and worldwide, climate impacts are no longer hypothetical - they are translating into direct measurable costs for households, businesses, and local governments. Damage to infrastructure, escalating insurance premiums, and declining insurability in high-risk areas are among the most immediate and visible indicators.

In 2024, insured losses from severe weather in Canada reached a record C\$9.2 billion - more than ten times the early-2000s average. Uninsured losses are estimated to be triple that amount.

Globally, insured catastrophe losses have exceeded US\$100 billion every year since 2020, with real costs rising about 5-7% per year. This trajectory implies a doubling time of roughly ten years, consistent with data from the Canada's Intact Centre on Climate Adaptation. As private insurers retreat from high-risk areas, raise premiums and deductibles, and bring in revised sub-limits, the burden of recovery is shifting toward property owners and municipalities.

At around 2°C of global heating, multiple Earth-systems are expected to cross critical thresholds. Research identifies tipping points in ice sheets, ocean circulation, permafrost and boreal forests that could trigger self-reinforcing damage. As well, analyses by economists conclude that conventional models vastly under-estimate impacts and could result in non-linear economic losses far exceeding the currently assumed few percentage points of GDP. When infrastructure damage, food system instability and tightening insurance markets interact under stress, local costs will rise significantly.

For municipalities like the County, climate impacts are now a fiscal as well as social challenge. The summer of 2025 provided a stark example, when numerous private wells across the County ran dry during a prolonged drought, forcing households and farmers to truck water over long distances. This expense falls hardest on residents with limited means, deepening inequality issues for families and seniors who can least afford them. Beyond the financial burden, water scarcity affects daily life - sanitation, cleaning, cooking, and personal well-being.

Physical infrastructure is also at growing risk. Roads, culverts, and bridges will deteriorate faster under more frequent freeze-thaw cycles. Storm-water and drainage systems will face repeated overload from intense rainfall, while shorelines will continue to erode. Drought, heat, and biodiversity loss will compound these pressures by reducing the County's natural resilience and capacity to recover.

At the same time, escalating insurance premiums and the withdrawal of coverage in high-risk zones will shift reconstruction and liability costs toward local governments and property owners. The result is a compounding financial burden - water hauling, infrastructure repair, and

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emergency response - all rising faster than traditional revenues. These trends underscore the need to embed climate adaptation directly into municipal asset and debt management, land-use planning, and fiscal policy.

In practical terms, climate damage now behaves like compound interest: each delay in adaptation multiplies future costs. Proactive investment in resilient infrastructure and community preparedness offers far greater long-term savings than reactive repair. The evidence suggests that early adaptation spending is not optional - it is the only financially responsible strategy.

8. Key Insights and Implications

The County's GHG profile and scenario analysis reveal a consistent picture: our emissions are concentrated, our options are known, and the greatest challenge lies not in technology but in implementation. Buildings and transportation account for roughly 80 percent of community emissions, while agriculture contributes about one-fifth. These sectors also hold the greatest potential for cost savings, resilience, and local innovation.

- Buildings (41%) - Older housing, limited insulation, and reliance on fossil fuels for heating, drive both emissions and high household costs. Widespread adoption of heat pumps, better building envelopes, and electrified water heating could cut residential emissions by more than half.
- Transportation (38%) - The County's dispersed geography makes vehicle dependence inevitable, but the transition to electric vehicles and shared mobility, including Transit, can significantly reduce GHG emissions while lowering fuel expenses.
- Agriculture (19%) - Most farms already use coated fertilizers, pasture livestock, and adopt no-till and cover-cropping practices. Further reductions are limited, but continued support for soil health and water management will improve resilience.
- Waste (3%) - Methane from landfill is a small but avoidable source; enhanced diversion and composting programs offer ready gains.

Our analysis highlights that even aggressive mitigation will only reduce total community emissions by about one-tenth. The remaining challenge is adaptation - preparing infrastructure, services and the local economy for impacts that are already unfolding. Climate costs are rising exponentially through insurance losses, uninsured losses, infrastructure damage, and energy-cost stress. Failing to plan for these expenses today will multiply fiscal pressures tomorrow.

The implication is clear: Prince Edward County must treat climate risk not as an environmental issue alone, but as a financial, social, and governance priority that affects every department, every budget, and every resident.

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9. Recommended Next Steps

With a baseline now established, the County can advance to Milestone 3 of the Partners for Climate Protection (PCP) framework - climate planning. The following steps are recommended:

1. Develop an Integrated Climate Action and Adaptation Plan with clear Targets and Metrics:

Combine mitigation and resilience into a single, integrated framework aligned with land-use planning, infrastructure renewal, and emergency preparedness. This framework should be explicitly supported by complementary policy direction in the Official Plan, providing clear municipal authority for climate studies, targets, and implementation measures. Without such policy direction, climate analyses and adaptation/mitigation initiatives lack formal standing and risk being treated as advisory rather than integral to municipal decision-making.

2. Institutionalize the 'Climate Lens':

Require that all staff reports, capital projects, and budget proposals include energy-impact and climate-risk assessments, alongside financial and strategic reviews.

3. Invest Early in Adaptation.

Prioritize infrastructure protection, drought resilience, cooling centers for at-risk populations and shoreline protection.

4. Partner for Implementation:

Work with the Federation of Canadian Municipalities, Conservation Authorities, and Southeast Public Health, which is already looking into climate change related issues, e.g., heat-stroke, and changing disease vectors. As well, engage agricultural groups and community organizations to share data, coordinate programs, and attract external funding.

5. Educate and be Educated by the Community:

Share practical guidance with residents and businesses on geothermal, including heat-pump adoption, EV charging, home retrofits, and land stewardship as well as information on Federal, provincial and municipal grants and low-interest loans.

6. Integrate Development Planning with Energy Planning:

Encourage future development - especially large subdivisions and institutional projects - to incorporate geothermal or air-sourced heating and cooling, EV infrastructure, and high efficiency standards from the outset.

By combining data-driven planning, fiscal prudence, and community collaboration, Prince Edward County can mitigate climate risk while enabling lower long-term costs and creating greater resilience and a more sustainable local economy.

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10. Conclusion

This report establishes a clear, evidence-based picture of Prince Edward County's community-wide greenhouse-gas emissions and the practical limits of mitigation alone. While meaningful reductions are achievable - particularly in buildings and transportation - the accelerating impacts of climate change mean that adaptation and resilience must now be addressed alongside emissions reduction.

The County's challenge is therefore not whether to act but how to do so in a way that is durable, coordinated, and fiscally responsible. Treating climate change as a core planning and governance issue rather than a series of isolated initiatives will help better manage long-term risks to infrastructure, public health, and household affordability.

Our six recommended Next Steps provide a practical path forward under Milestone 3 of the Partners for Climate Protection framework. Taken together, they can translate our analysis into policy direction, planning tools, partnerships, and community engagement to reduce future costs, strengthen community resilience, and support a more sustainable local economy. Acting deliberately, now, will place the County in a stronger position to adapt to changes already underway, while continuing to reduce emissions where it is most effective to do so.

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Appendix A: Impacts at 2°C of Global Heating

Overview

Global heating of roughly 2°C above pre-industrial levels is now likely within the next decade or two. Analyses by climate scientists, economists and systems researchers show that the effects will not unfold gradually but through interconnected thresholds that trigger accelerating ecological, economic, and social breakdown. For municipalities such as the County, these shifts will translate into more intense local impacts even if community emissions are relatively small. Damage costs, infrastructure pressures, and insurance exposure are expected to rise significantly - catastrophic insurance damage is doubling roughly every ten years.

Climate scientists set a 1.5°C limit for a reason: anything beyond that risks profound, irreversible changes for both human and natural systems. None of us expect our house to burn down or to be involved in a life-changing accident, yet we still buy insurance to manage those risks. The same logic applies to the climate crisis. Detractors often rely on skepticism by special interests and for the moment they appear to have succeeded in delaying action. But this is not a matter of belief or ideology - it is a matter of prudence. The risk is a dystopian future of weakened economies, food insecurity, social fragmentation and chaotic weather patterns that make agriculture unreliable and security increasingly unaffordable. Mitigating emissions and adapting to change are the civic equivalents of buying insurance - a rational safeguard against what science tells us is now the most probable outcome.

1. Economic Impacts

At 2°C, the economic consequences of climate change become unpredictable. Losses accelerate as infrastructure, agriculture and supply chains interact under stress. Roads, bridges, storm-water systems and shorelines will require more frequent repair and replacement, making adaptation an annual budget item rather than a one-time capital outlay.

Insurance markets are already signaling this shift. Private insurers are raising premiums or withdrawing coverage in high-risk zones, pushing long-term financial responsibility back to municipalities, utilities, and property owners. Without proactive investment, the fiscal burden of recovery will far exceed the cost of prevention.

2. Natural Systems, Oceans and Biodiversity

Heating of 2°C threatens to push several Earth-system tipping points past the threshold of reversibility - including rapid permafrost thaw across northern Canada, releasing vast quantities of methane, one of the most powerful GHGs. Other tipping points include destabilization of the Greenland and West Antarctic ice sheets and large-scale dieback of the boreal forest. These changes will amplify global heating and disrupt the atmospheric and oceanic circulation patterns that moderate Canada's climate.

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Oceans are also heating, acidifying and losing oxygen, reducing their ability to absorb carbon and sustain fisheries. Declining biodiversity is expected to place 20-30 % of species at high risk of extinction, undermining pollination, soil fertility and forest health. For rural regions such as the County, these global shifts will ripple through water quality, agricultural productivity and tourism - weakening the local economy and natural systems on which local resiliency depends.

3. Agriculture and Food Security

Cereal, fruit and forage crops will face shorter growing seasons, heat stress and more frequent droughts. Reduced summer rainfall and higher evaporation will intensify competition for groundwater and surface water used for irrigation. Input volatility - particularly for fertilizers, fuel and insurance - will narrow farm margins and increase financial risk.

Without strong adaptation measures, regional agricultural output could decline by 10-25% by mid-century, depending on crop type and management. This will directly affect local food security, the local economy, and the viability of smaller farming operations.

4. Well-being, Population and Habitability

Longer, hotter summers will increase the incidence of heat-related illness and strain emergency and health-care systems. New vector-borne diseases will expand northward. Rising cooling costs, property damage and loss of insurability will make housing less affordable, especially for older residents and those in un-renovated housing.

Broader migration patterns may also shift. As certain regions become harder to inhabit due to flooding, wildfire, or chronic drought, rural communities like the County could experience both inward migration from urban areas seeking refuge and outward migration driven by economic stress.

5. Cross-cutting Implications for Municipalities

The financial and operational pressures of climate change will compound. Infrastructure and insurance costs are already growing faster than general inflation. As private insurers retreat, municipalities increasingly become insurers of last resort for essential assets.

The policy imperative is clear: front-loading adaptation - such as storm-water upgrades, shoreline stabilization, resilient roadbeds and distributed energy systems - delivers higher returns than reactive repair. Maintaining community well-being will also require heat-resilient public spaces, community cooling hubs and energy-efficient housing.

Summary Statement

At 2°C of global heating, the world enters a phase of accelerating damage. Economic damage compounds, ecosystems degrade and food and water security decline. For the County, the costs of early adaptation will be less - and more manageable - than the costs of delay.

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Appendix B: Methodology and Key Findings on Energy Use and Emissions for Buildings

Overview

This appendix is derived from our previous report, “Report on Energy Use for Buildings - 2019”. It summarizes how Prince Edward County’s community energy use and GHG emissions were estimated for the baseline year of 2019. Calculations were carried out using data from Hydro One, Enbridge Gas, MPAC, Statistics Canada, and sector-specific models.

The approach follows the Partners for Climate Protection (PCP) framework and is consistent with national inventory protocols.

1. Findings

- Total building energy use (2019): ~ 735 GWh, split almost equally between residential (358 GWh) and commercial / industrial (375 GWh).
- Average energy use: ~ 29.5 GWh per 1,000 households - virtually identical to the NRCan rural average (29.2 GWh).
- Reliable data: Electricity from Hydro One (Appendix 6) and methane from Enbridge.
- Inferred data: Propane, heating oil, wood, and heat-pump / geothermal adoption, estimated using Ontario-wide ratios validated locally through RJ Specialties.
- Built-environment emissions: ~ 870 kt CO₂e - two-thirds from the Heidelberg cement plant, one-third from all other buildings.
- Planned development: If all 3,300 approved units proceed, total energy demand rises ~ 97 GWh and GHG emissions ~ 12 kt CO₂e.
- Mitigation priority: Future growth should encourage energy efficiency and low-carbon systems (heat pumps / geothermal).

2. Data and Assumptions

1. Households: 12,181 GHG-equivalent dwellings (assume 50% of seasonal).
2. Electricity: 199 GWh (Hydro One)
3. Methane: 248 GWh (approx. 23.3 million m³).
4. Other fuels: Propane 62 GWh, heating oil 43 GWh, wood 18 GWh (50 : 35 : 15 %).
5. Heat pumps / geothermal: ~ 25 % of electric-heat users (345 heat pumps + 162 geothermal).
6. Commercial / Industrial: ~ 376 GWh total; three large industrial users ≈ 36 % of methane demand.
7. Emission factors: Methane 450 t CO₂e / GWh; propane 650; heating oil 850.

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3. Methodological Notes

- Bottom-up approach: Energy use estimated per household / per business, then scaled to community totals.
- Verification: Cross-checked Hydro One electricity data with NRCan rural benchmarks.
- Confidence: High for electricity and methane; lower for propane, oil and wood due to absence of sales data.
- Key gap: No provincial requirement for fuel suppliers to report local sales volumes; this limits inventory accuracy.

4. Policy Implications

1. Annual data requests: Hydro One and Enbridge to supply annual updates; MPAC roll used to adjust dwelling counts.
2. Supplier reporting: Encourage or mandate propane and heating-oil suppliers to report local sales or year-to-year trends.
3. Tracking new builds: Record fuel choices for all new development permits.
4. Future modeling: Repeat the PCP Step 1 inventory biennially with trend updates for EVs, heat pumps and geothermal.

5. Limitations and Next Steps

Data Gaps and Reliability

- Lack of comprehensive reporting from propane and heating-oil distributors introduces uncertainty into estimates of fuel mix and emissions trends.
- MPAC data do not yet capture heat-pump or geothermal installations - key mitigation technologies whose growth should be tracked.

Hydro One and Enbridge report on different classifications (e.g., permanent vs seasonal vs industrial), complicating direct comparison.

Recommended Actions

1. We do not advocate repeating this analysis on a regular basis. Our main finding is that tracking GHG emissions will depend on the two major emissions sectors, i.e., buildings and on-road transportation. This demands better knowledge of: 1) the (hopefully) declining number of fossil fuel furnaces, 2) the number of heat pump and geothermal installations and 3) the number of EVs registered in the County. Without this information, repeating our analysis will not be a productive use of resources.
2. At least for new buildings, it would be helpful for the County to document and track the type of heating and whether there is EV charging capacity.
3. Integration with planning: use data to inform Official Plan reviews, building permits, and infrastructure investment decisions.

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4. Provincial advocacy: Work with other municipalities and AMO to press for legislation requiring fuel suppliers to report aggregate sales data to municipalities on an annual basis.
5. Regional collaboration: Form a rural climate-data network across Eastern Ontario to share methodologies and improve consistency of inventories.

Summary

This appendix establishes a defensible, data-driven baseline for the County's energy and emissions profile. While data limitations remain, the findings provide a solid foundation for setting targets, evaluating progress, and prioritizing the actions that will most effectively reduce future risk and energy costs.

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Appendix C: Major Development Projects and Estimated Impacts

Overview

As of 2025, Prince Edward County lists roughly 8,750 residential units at various stages of planning, approval, or proposal. A more realistic estimate for construction (to 2035) is 3,300 as shown below - Key Development Projects.

In fact, annual building activity has averaged about 140 new homes per year since 2020. At that pace, a realistic low-growth estimate for new homes by 2035 is about 1,000 units and we have chosen a high-growth of 5,000 units if market, servicing, and financing conditions improve.

If all 3,300 homes used conventional fossil-fuel heating, community-wide energy demand could rise by roughly 97 GWh and GHG emissions by ~ 12 ktCO_{2e}. High- and low- growth cases are given in the following table.

Scenario	Additional Units	Additional Energy Demand (GWh)	Additional GHG Emissions (kt CO _{2e})
Low Growth (1,000 homes)	1,000	12	3.7
High Growth (5,000 homes)	5,000	60	19

Key Development Projects (2024)

	Status	Estimated Units	Heating Type (assumed)	Estimated GHG (ktCO _{2e})
Base 31 (Picton)	OPA Submission / Early Build Phase	700	Mixed (NG / Propane)	3
Cork & Vine (Wellington)	Draft Plan Approved	276	Natural Gas	1
West Meadows	Under Construction	550	Propane / Mixed	2.3
Vineridge	Awaiting OLT Decision	189	Natural Gas	0.9
Cold Creek	Technical Circulation / Approved for Heat Pumps	518	Electric Heat Pumps (near-zero GHG)	0

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Talbot Ridge + Talbot on the Trail	Construction / Approved	125	Propane	0.6
Wellington North	Technical Circulation / Zoning Approved	125	Natural Gas / Propane (Mixed)	0.5
Smaller Infill Projects (Bloomfield, Picton Heights, Rossmore)	Various Stages	827	Electric / Heat Pump / Propane	~4
Realistic Total		~ 3,300		~ 12

Cold Creek’s commitment to electric heat pumps marks the County’s first large-scale “clean-build” precedent and demonstrates the feasibility of low-carbon residential heating in rural Ontario.

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Appendix D: Agricultural Emissions - Holos Analysis

Overview

To estimate GHG emissions from agriculture, CAPWG applied Holos, Agriculture and Agri-Food Canada's whole-farm emissions model. This is the first such application in Canada.

The conventional PCP methodology accounts for livestock-related emissions only - chiefly enteric fermentation and manure management, with limited adjustments for associated nitrous-oxide (N₂O) by-products. It does not include emissions from cropping systems, fertilizer use, soils, or land-use management.

By contrast, Holos models the full farm system. It captures how livestock, feed, fertilizer, tillage and soil interactions collectively influence methane (CH₄), nitrous oxide (N₂O) and carbon dioxide (CO₂) emissions. It also estimates the effects of management practices such as pasturing, sheltering and energy use.

For this project, Holos was applied at a regional scale rather than an individual farm - an innovative approach that provides a more complete picture of agriculture in Prince Edward County.

Comparison: Conventional (PCP Approach) vs Holos

Emission Source	Gas	Conventional (kt CO ₂ e)	Holos (kt CO ₂ e)	% of Total (Holos)	Holos / Conventional
Enteric Fermentation	CH ₄	24.3	14.0	33%	58%
Manure	CH ₄	4.0	5.2	12%	128%
Direct Soil Emissions	N ₂ O	2.9	11.9	28%	413%
Indirect Soil Emissions	N ₂ O	3.5	7.0	16%	199%
Farm Energy Use	CO ₂		4.5	11%	
Upstream Inputs	CO ₂		.04	0%	
Total		34.8	42.6	100%	123%

Interpretation

The Holos model produces a total emission estimate about 23% higher than the conventional PCP approach. The difference arises not from livestock emissions, but from including soil-based nitrous-oxide emissions and energy use, which conventional accounting omits.

Key observations:

- Livestock emissions (CH₄) remain important, but their share drops to roughly one-third of total agricultural GHGs when soil and fertilizer sources are added

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- Soil emissions (N₂O) - both direct and indirect - become the single largest category, reflecting fertilizer application and soil microbial activity
- Farm energy (fuel and electricity for equipment, heating and operations) contributes roughly 11%, highlighting the interconnectedness of farm infrastructure and emissions

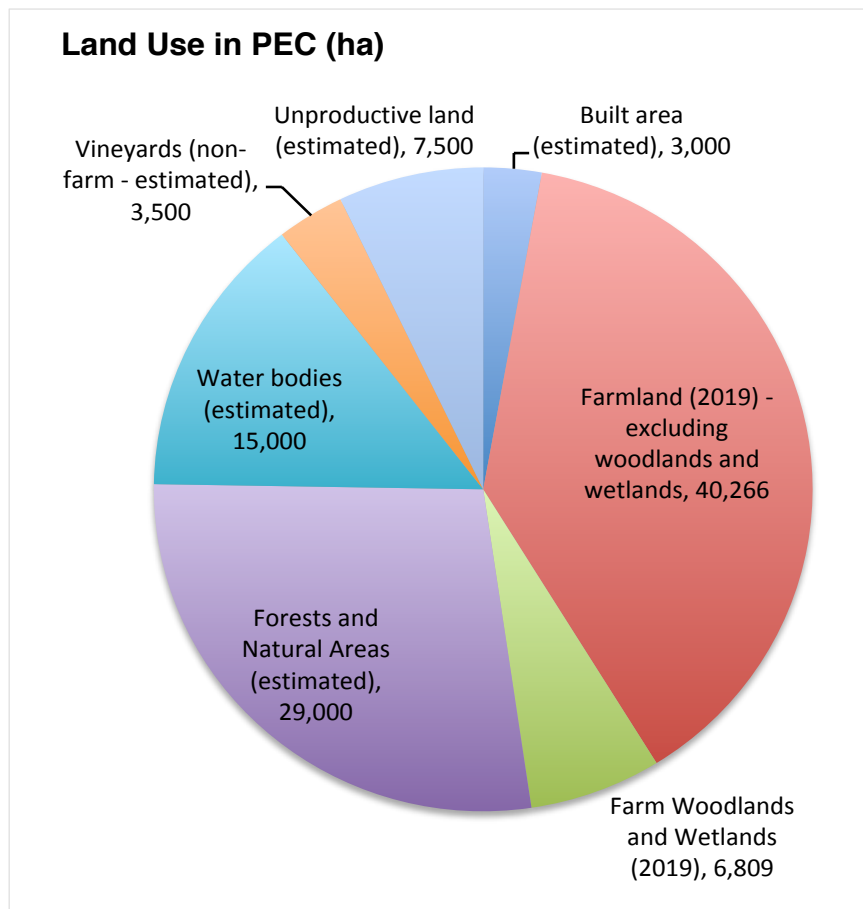
Local Context

For the County, applying Holos confirms that while agriculture is a significant emitter, much of its emissions profile reflects natural biological and soil processes rather than inefficiency. Farmers are already employing many best practices that limit further reductions:

- Coated fertilizers that inhibit N₂O release
- Pasture-based livestock systems, reducing methane intensity
- Cover crops, no-till and conservation tillage and improving soil carbon storage

Given these conditions, the potential for large additional reductions is modest. The greatest value of Holos lies in identifying where incremental improvements - such as better fertilizer timing, precision application and improved manure management - can yield measurable though limited gains.

Sequestration and Biodiversity



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We also looked into natural carbon sequestration in the County - it is of the order of 138 kt CO₂e, including:

- 42 kt CO₂e from Water Bodies and Associated Wetlands
- 7.5 kt CO₂e from unproductive land, including alvars and abandoned fields

These are not annual rates but fixed amounts of carbon - natural areas come to their own carbon equilibria and cannot, then, sequester more.

The County comprises over 105,000 hectares: 47,000 of farming (including 6,809 of wetlands and woodlands) and 29,000 of forests and natural areas. It is highly diverse including a range of key habitats, e.g., coastal wetlands, forest and limestone karst, swamp forest, open water and cold water, creeks, marshes and alvar and alvar woodlands.

We did not originally intend to look into sequestration but, for the County, it is a useful point of comparison to highlight that annual emissions are roughly 170% of what is naturally permanently sequestered.

A corollary is that significant emissions can result from disturbing or destroying natural systems and greater attention should be given to loss of natural areas than is currently the case. Broadly speaking, intensification of current built areas is preferable to new, rural development.

Conclusion

Using Holos at a regional scale provides a more comprehensive and realistic picture of agricultural GHG emissions in Prince Edward County. It demonstrates that the County's farmers are already near the practical limits of low-emission agriculture under current systems. The insights also clarify that community-wide emission reductions will depend more on building and transportation efficiency than on major shifts within agriculture - though continuous improvement in soil and nutrient management remains both possible and valuable.