

PROJECT NAME: Fast Mitigation Strategies for Short-Lived Climate Pollutants

1. **Project duration:** 18 months
2. **Budget:** C\$350,000 (Including operational and administrative costs)
3. **Short statement of the issue(s) under this topic, need/gap identified; the project objective(s) and activities to address the issue; and expected outcomes and benefits/beneficiaries:**

Reducing methane emissions is crucial for quickly slowing global warming and preventing temperatures from exceeding 1.5 °C above pre-industrial levels. Major methane emission sources associated with human activities include the oil and gas, agriculture, and waste sectors. Reported emission inventories in North America have a degree of uncertainty, as demonstrated by studies that show considerable variability between reported inventories and estimates based on monitoring.¹ Accurate emissions inventories are essential to effectively track progress on mitigation efforts and for closing emission gaps.

Advancements in remote methane detection technologies provide an opportunity to improve emissions inventories. This project aims to develop recommendations for improved methane quantification, measurement approaches and inventories that support effective mitigation actions in the waste sector. This guidance will allow for a coordinated approach to methane emissions quantification that will support mitigation policies and activities, including adopting best practices for methane management, such as organic waste diversion, methane capture, and leak detection and repair at landfills. This project will strengthen Canadian and Mexican efforts and international commitments to reduce emissions and mitigate climate change impacts.

4. **Select the strategic pillar(s) from the 2021-2025 Strategic Plan that the project addresses:**
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¹ E.g. S. Baray et al., 2021. <https://acp.copernicus.org/articles/21/18101/2021/> ; Xiao Lu et al., 2022. <https://acp.copernicus.org/articles/22/395/2022/acp-22-395-2022.pdf>

- ☒ Clean Air, Land and Water
- ☐ Preventing and Reducing Pollution in the Marine Environment
- ☒ Circular Economy and Sustainable Materials Management
- ☐ Shared Ecosystems and Species
- ☐ Resilient Economies and Communities
- ☐ Effective Enforcement of Environmental Laws

5. Describe how the project uses strategic cross-cutting approaches in its implementation: Innovative and Effective Solutions and/or Diverse and Inclusive Stakeholder Engagement and Public Participation (including gender and diversity effects and opportunities, and youth).

This project aims to explore the potential of innovative sensing technologies to improve methane emissions quantification in the waste sector. Project activities will involve the active engagement of subject matter experts from governmental and non-governmental organizations, the private sector, and academic institutions.

6. Explain how the project can achieve more impact through international cooperation:

This project will allow current national emissions inventories improvements and support methane mitigation strategies using a coordinated approach fostering comprehensive discussions and sharing best practices for methane quantification and reduction. This collaboration will strengthen Canadian and Mexican efforts to better quantify and mitigate methane emissions.

7. Describe how the project complements, or avoids duplication with, other national or international work:

The project aims to identify tools and methods that can enhance the quantification of methane emissions in the waste sector. There is an opportunity for this project to improve emission quantification by leveraging information from international efforts in methane observation, such as the UNEP International Methane Emissions Observatory and the WMO Global Greenhouse Gas Watch. This would complement national efforts in Canada and Mexico to improve their emission inventories. Project activities are designed to support and complement national efforts, such as the formulation of Mexico's National Program for Comprehensive Methane Management (*Programa nacional de atención integral al metano*), and to ensure alignment with international methane reductions commitments, including the Global Methane Pledge and the Lowering Organic Waste Methane Initiative.

8. Describe how the project engages traditional ecological knowledge (TEK) experts or Tribal/First Nations/Indigenous communities, if applicable:

Not applicable.

9. Describe how the project engages new audiences or partners, if applicable:

Given the alignment of project activities with international methane reduction efforts, partnerships with other local, national and international institutions will be fostered. Project results could be disseminated through scientific articles, as well as through participation in fora and conferences aimed at advancing methane emissions reductions, which would engage new audiences and interested parties.

10. Identify the designated partner agencies or organizations committed to implementing this project, as well as other organizations that could be involved, or benefit from it, including through outreach efforts, collaborations or partnerships (e.g.: federal agencies; other levels of government; academia; NGOs; the private sector; civil society; and youth):

Lead agencies or organizations	Country
Environment and Climate Change Canada	Canada
National Institute of Ecology and Climate Change (<i>Instituto Nacional de Ecología y Cambio Climático</i> —INECC)	Mexico

Other organizations/individuals (if applicable)	Country
Climate and Clean Air Coalition	International
Carbon Mapper	United States - International
Netherlands Institute for Space Research – SRON	Netherlands
Global Methane Hub	Chile
Global Methane Initiative	International
Global Emissions Initiative	International
Clean Air Task Force	United States - International
Rocky Mountain Institute	United States - International
International Methane Emissions Observatory, Global Greenhouse Watch	International
Anja Schwetje, German Environment Agency	Germany
World Meteorological Organization	International
Methane Centre of Excellence	Canada
FluxLab - Emissions Science, St. Francis Xavier University	Canada

Other organizations/individuals (if applicable)	Country
Methane-SAT	United States -New Zealand
Environmental Defense Fund	International
Institute of Atmospheric Sciences and Climate Change (<i>Instituto de Ciencias de la Atmósfera y Cambio Climático</i>)	Mexico
Intergovernmental Panel on Climate Change – IPCC	International

This project will include participation from other organizations including NGOs, the private sector, and other stakeholders. Their engagement is in the process of confirmation.

11. In the following table, describe: the project objective(s) and the activities and subtasks planned to achieve the objective(s); the corresponding outputs, expected results and how they will be measured (performance measures); baselines (if known), and targets by end of the project; and the timeline and budget.

OBJECTIVE 1	Identify existing approaches for bottom-up and top-down methane estimates in the waste sector.
Activity 1 Budget C\$70,000	Document the state of the art in quantification of methane emissions from landfills internationally.
Output(s)	Identification of: - Key factors influencing the modeled estimation of methane generation and emissions in the waste sector and - Identify specific opportunities for quantification improvements using measurement results; and - Current technologies used to measure methane emissions in the waste sector.
Expected results, performance measures	Improvements in quantifying methane emissions in the region.
Baseline (current status), if known	Some baseline information has been gathered in the following papers: - D. Risk et al., 2024. Canadian Landfill Methane Project Final Report. Report prepared for Natural Resources Canada by Flux Lab, April 19, 2024. - S. Baray et al., 2021. Estimating 2010–2015 anthropogenic and natural methane emissions in Canada using ECCC surface and GOSAT satellite observations. Atmospheric Chemistry and Physics, vol. 21, # 23. https://acp.copernicus.org/articles/21/18101/2021/

	- Xiao Lu et al., 2022. Methane emissions in the United States, Canada, and Mexico: evaluation of national methane emission inventories and 2010–2017 sectoral trends by inverse analysis of in situ (GLOBALVIEWplus CH4 ObsPack) and satellite (GOSAT) atmospheric observations. Atmospheric Chemistry and Physics, vol. 22, # 1. https://acp.copernicus.org/articles/22/395/2022/acp-22-395-2022.pdf - Daniel H. Cusworth et al., 2024. Quantifying methane emissions from United States landfills. Science, vol. 383, # 6690. https://www.science.org/doi/10.1126/science.adi7735 - National Inventory Reports – Waste sector emissions estimates. Other ongoing estimations being developed by each country will also contribute to this information.	
Target (by project end)	Opportunities for emissions inventory improvements are identified.	
Sub-task 1.1	Identify the current basis for estimation and/or measurement of landfill methane emissions in use internationally in National Inventory Reports submitted to the IPCC. Identify approaches that have been used internationally to reconcile top-down/bottom-up inventory estimates in other sectors.	When: Fall 2026
Sub-task 1.2	Identify existing use of measurement-based validations or use of measurements in emissions estimates and describe outcomes of analyses.	When: Fall – Winter 2026
Sub-task 1.3	Prepare reference material to support discussions with experts on approaches/opportunities to incorporate emissions measurements in inventories and for reconciling top-down and bottom-up inventory estimates.	When: Winter 2026 – Spring 2027
OBJECTIVE 2	Produce knowledge informed by multidisciplinary expertise to improve quantification of methane emissions in the waste sector.	
Activity 2 Budget C\$230,000	Conduct consultations with subject matter experts to identify priority sources, improvements in methane quantification in the waste sector, and value-added and mitigation actions, including: • Identify opportunities for surface and remote sensing measurements to improve emissions quantification for a variety of emission sources. • Identify options for use in methane monitoring (on-site, drone/UAV, and satellite) and inverse modeling systems for methane emissions that could be used to improve inventories. • Develop recommendations for tracking and quantifying landfill methane emissions.	
Output(s)	Recommendations for improved methane emission quantification and measurement approaches to allow for more effective mitigation actions.	

Expected results, performance measures	Countries can integrate recommendations and guidelines into their methane emission inventories.	
Baseline (current status), if known	N/A	
Target (by project end)	Experts' recommendations for enhancing methane emissions quantification are compiled.	
Sub-task 2.1	Convene methane subject matter experts and practitioners from various institutions in an intersectoral workshop to discuss opportunities for enhancing methane emissions quantification using remote sensing and/or site-based surface measurements and leveraging existing efforts. Discussions may include: identify existing capabilities and gaps, including barriers to the implementation of solutions; data availability, comparability, share-ability and gaps; collaboration on communication mechanisms and sharing and replication of tools, resources, monitoring; current national efforts; other topics to be defined.	When: Spring – Summer 2027
Sub-task 2.2	Develop recommendations and guidelines for improving quantification of methane emissions and identify possible approaches that could be developed in each country to overcome barriers in methane quantification, including the use of existing/new remote sensing or site-based surface measurements to help inform convergence of data and identify mitigation opportunities.	When: Summer – Fall 2027
Activity 3 Budget C\$70,000	Dissemination of results	
Sub-task 3.1	Conduct a campaign to promote and share the project findings as a reference for regions encountering similar challenges.	When: Winter 2027 – Spring 2028

12. Describe post-project expected impacts:

Expected impact	SMART performance measure(s)
Enhancements of national methane emissions inventories, particularly in the waste sector, are integrated into national frameworks.	Evidence based on surveys that countries have incorporated recommendations into national emission inventories.

Countries outline supplementary measures and necessary actions to improve mitigation of methane emissions in the waste sector.	Evidence based on surveys that countries are implementing additional measures to reduce methane emissions in the waste sector.
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