PROJECT NAME: Air Quality Improvement for Environmental Justice

Effective 28 May 2026, the following amendments will be made to the "Air Quality Improvement for Environmental Justice" initiative:

- **Budget**: The budget will be reduced from C$1,000,000 to C$970,000.
- **Engagement & Scope of Activities**: Remaining activities will focus on existing collaboration agreements with partner community organizations in Canada and Mexico. Documents to be published and/or presented as part of the activities will include, to the extent possible, only results concerning Canada and Mexico.
- **Duration**: The original project was scheduled to conclude by 31 October 2026. An extension is required to deliver on remaining activities by 31 December 2026.

1. **Project duration: from October 2022 to October 2026 -** 48 months (The implementation periods of the activities might differ from what is described in this document)

2. **Budget C$1,000,000 (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 (max. 200 words):**
   Black carbon (BC) or "soot" (a component of fine particulate matter, PM) is an important air contaminant that not only affects public health but also our climate. Sources of these emissions include agricultural burning, domestic wood combustion, and fossil fuel combustion from transportation and industrial activities. Our countries' systems for monitoring air pollution have limited coverage, with millions of people across North America living in communities that have no means of measuring local air quality conditions. This initiative aims to build partnerships that will respond to community-identified poor air quality conditions from exposures to high levels of BC and particulate matter ($PM_{2.5}$) emissions, as well as communities that potentially experience disproportionate environmental harm or risk, and/or have environmental justice concerns. A specific objective of the project is to work with local stakeholders to identify emission sources and monitor air quality, as well as to formulate potential emission mitigation strategies, assess their benefits, and implement them. The initiative will select and deploy low-cost air pollution sensors (in at least one community per country) to better document, understand, and mitigate $PM_{2.5}$/BC exposures in these communities, while increasing transparency and access to air quality information for local populations and decision makers.

4. **Select the strategic pillar(s) from the 2021–2025 Strategic Plan that the project addresses:**
   - ☒ 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) (max. 100 words).**

The direct collaborative involvement of communities and consideration of local needs and knowledge are crucial to the success of this initiative. The project will seek to engage local government, community leaders, academic institutions, and relevant civil society organizations to ensure the efficient implementation of activities. The project will establish collaborative partnerships to set up capacity-building plans and activities to address community-identified poor air quality conditions through $PM_{2.5}$/BC monitoring and mitigation initiatives. Access to information generated through this process contributes to the community's environmental education, can provide a better understanding of environmental and health conditions, and enable the public to play an active role in environmental governance. Furthermore, low-cost sensors offer a way to increase public access to and awareness of air pollution information, as well as to supplement regulatory monitoring networks.

6. **Explain how the project can achieve more impact through trinational cooperation (max 100 words):**
   By working together to assess suitable low-cost technologies and strategies for BC monitoring in communities, the three countries can create a shared understanding of potential ways to improve the coverage of their air quality monitoring networks. While the challenges and priorities of addressing air quality issues and environmental justice concerns in each of the North American countries may differ, the approach to implementation through community engagement can set a road map for further improvement in acquiring priority health information and enhancing governance in communities across North America.

7. **Describe how the project complements other national or international work, or avoids duplication with it (max 100 words):**
   As national systems for monitoring air pollution in the three North American countries have limited spatial coverage, the deployment of low-cost sensors provides a way to increase public access to and awareness of air pollution information near where they live and work, as well as to supplement the information collected by regulatory networks. Although some efforts exist for the deployment of low-cost $PM_{2.5}$ sensors in areas that are not currently covered by regulatory monitoring, these are not necessarily intended to address community-identified air quality pollution problems.

8. **Describe how the project engages traditional ecological knowledge (TEK) experts or Tribal/First Nations/Indigenous communities, if applicable (max 100 words):**
   The project will prioritize the engagement of communities experiencing environmental justice concerns, which may include Indigenous communities with poor air quality conditions. Information on local air quality relative to $PM_{2.5}$/BC will increase local decision-making capacity on mitigation strategies intended to improve air quality and population health.

9. **Describe how the project engages new audiences or partners, if applicable (max 100 words):**

This project will foster collaboration with interested communities in Canada, Mexico, and the United States disproportionately affected by $PM_{2.5}$/BC air pollution and that need ambient air quality monitoring and mitigation. The project will also seek to engage local government, community leaders, academic institutions, and relevant civil society organizations, to ensure support of and effective implementation of activities, and to ensure the efficient and accessible translation of knowledge in the post-project stage. Other potential collaborations include one or more manufacturer(s) and/or supplier(s) of low or mid-cost $PM_{2.5}$/BC sensors, and the engagement of technical experts from other existing efforts for technology selection, monitoring design, and data management, analysis, and interpretation.

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 (ECCC)	Canada
National Institute of Ecology and Climate Change (*Instituto Nacional de Ecología y Cambio Climático* —INECC, Semarnat)	Mexico
US Environmental Protection Agency, (USEPA), Office of Air Quality Planning and Standards	United States
Local government agencies, NGO, and local Community environmental and health organizations*	Canada, Mexico, United States

Other organizations/individuals (if applicable)*	Country
Health Canada	Canada
Secretaría del Medio Ambiente y Recursos Naturales (Semarnat)	Mexico
Instituto Nacional de Salud Pública (INSP)	Mexico

US Department of State (US DOS)	United States
Centers for Disease Control and Prevention (CDC)	United States
Other USEPA relevant Programs (e.g., Smoke Sense Program)	United States
Manufacturers or suppliers of a low-cost $PM_{2.5}$ (or black carbon) sensors	Canada, Mexico, United States

*This effort will include participation from other relevant agencies, organizations, and stakeholders. Their engagement will be confirmed during the community selection process.

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	**Create collaborative partnerships with at least one community/region in each North American country directly affected by air pollution and with a need for air quality monitoring and mitigation efforts**
Activity 1 **Budget C$560,000**	Selection of and partnership with communities interested in air quality monitoring and pollution abatement (at least one per country) and identification of the $PM_{2.5}$/BC sources, monitoring strategy, and mitigation priorities
Output(s)	- Engagement of at least three North American communities (one per country). - Collaborative community action plan for $PM_{2.5}$/BC monitoring and mitigation. - Procurement and quality assurance of low/mid-cost sensors.
Expected results, performance measures	Engage relevant actors in selected communities, collaborative action plans set the roles and responsibilities and identify objectives, sources, technology, and priorities for monitoring $PM_{2.5}$/BC levels.
Baseline (current status), if known	Several air quality monitoring campaigns using low-cost sensors have been conducted in Canada, Mexico, and the United States. Moreover, assessments of low-cost air quality sensors have been conducted by academic institutions,

	as well as by national and international environmental organizations. However, many of these do not address black carbon or do not use a community-based approach. This activity can leverage existing sensor assessment efforts that have been conducted by environmental agencies in the three countries, such as: - EPA Air Sensor Toolbox (https://www.epa.gov/air-sensor-toolbox) - WMO Low-Cost Sensor Report (https://library.wmo.int/index.php?lvl=notice_display&id=21508#.YjtiC-rMKUk) - South Coast AQMD Air Sensor Performance Evaluation Center (http://www.aqmd.gov/aq-spec) - Assessment of DTS Black Carbon Sensor (see: https://www.mdpi.com/1424-8220/18/3/738) - Source apportionment of diesel-related contributions to black carbon emissions (https://pubs.acs.org/doi/10.1021/acs.est.1c03913) - Making the invisible visible: A guide for mapping hyperlocal air pollution to drive clean air action. Environmental Defense Fund (EFD, https://www.edf.org/sites/default/files/content/making-the-invisible-visible.pdf) - Tecnología Cívica (Redspira initiative in Baja California) (https://www.redspira.org/index.php/tecnologia) - Climatological and Air Quality Network (*Red Climatológica y de Calidad del Aire UACJ*; http://cathi.uacj.mx/handle/20.500.11961/10898) - Development and Evaluation of Correction Models for a Low-Cost Fine Particulate Matter Monitor; Environment and Climate Change Canada & University of Northern British Columbia. https://amt.copernicus.org/preprints/amt-2021-425/	
Target (by project end)	- Three or more communities (at least one per country) are engaged in air quality improvements and monitoring, and black carbon mitigation efforts.	
Subtask 1.1	Identify and engage partner communities (at least one per country) interested in $PM_{2.5}$/BC monitoring and mitigation of emissions. Community(ies) selection should consider whether the community has a relevant air quality issue with concrete opportunities for improvement and could be used to develop a case study. Similar case studies and best practices will be taken into consideration during the implementation phase. Other considerations include the availability of suitable infrastructure and engagement of community partners (academia, local	**When:** First year

	government, NGOs) to support continuity of the project, opportunities to support or supplement existing local air quality initiatives, allowing measuring mitigation impacts during the duration of the project.	
Subtask 1.2	Convene community representatives and experts from the three countries to form a technical committee to: a) define monitoring objectives; b) diagnose $PM_{2.5}$/BC source priorities; c) draft a monitoring plan; and d) discuss possible mitigation strategies.	**When:** First year
Subtask 1.3	Review, identification, and selection of the most suitable $PM_{2.5}$/BC measurement technologies and sensor data reporting for each community.	**When:** First year
Subtask 1.4	Procure $PM_{2.5}$/BC sensors. Update collaborative action plan based on the selected sensor technology.	**When:** First year
OBJECTIVE 2	**Implementation of monitoring activities, documentation, and mitigation of $PM_{2.5}$ and BC levels**	
Activity 2 Budget C$360,000	Development and implementation of community-based air quality improvement project	
Output(s)	- Monitoring and capacity-building plan for implementation - Appropriate spatial and temporal data on $PM_{2.5}$/BC levels in each community - Results report and collaborative mitigation strategies	
Expected results, performance measures	Information on $PM_{2.5}$/BC levels and its principal sources are available for the community and decision-makers. Partner communities have the capacity of implementing the monitoring and a set of mitigation strategies options.	
Baseline (current status), if known	NA	
Target (by project end)	At least three North American communities have air quality data and information on potential exposure levels to support $PM_{2.5}$/BC source mitigation strategies.	
Subtask 2.1	Develop monitoring and capacity-building plan, based on the selected technology, along with the technical committee and partners for each country.	**When:** First year
Subtask 2.2	Deploy $PM_{2.5}$/BC sensors, measure and gather data over a set period, based on identified source priorities in the three communities. Ensure proper sensor calibration with reference monitors, and setup data reporting.	**When:** Second year

Subtask 2.3	Define and implement pollution mitigation strategies.	**When:** Second/ Third year
Subtask 2.4	Evaluate and disseminate the impact of mitigation strategies in each community using air quality monitoring.	**When:** Third year
OBJECTIVE 3	**Communicate shared experiences on communities' engagement for monitoring and mitigation of $PM_{2.5}$ and BC sources**	
Activity 3 Budget C$80,000	Dissemination and publication of project results, guidance, and recommendations.	
Output(s)	- Publication of results and project guidance documents	
Expected results, performance measures	The published information shares the experiences of the three locations and provides knowledge sharing and transfers to other communities on the steps and implementation suggestions for monitoring and addressing poor air quality conditions.	
Baseline (current status), if known	The basis of the report will be the results and documentation of the implementation of the previous activities in the three communities.	
Target (by project end)	- The final assessment compilation describes results and methods for engaging communities in air quality monitoring and mitigation plans.	
Subtask 3.1	Compile community-based project results and lessons learned, and development and publish guidance and recommendations document.	When: Third year

12. Describe post-project expected impacts:

Expected impact (by when: month, year)	SMART performance measure(s)*
By early 2025, at least three communities (one per country) previously lacking air quality monitoring coverage, will now have the capability to measure and access ambient air quality conditions and information on potential	• Participatory evaluation of community engagement level (index through survey) • Access to monitoring data (tracked via web platform or dissemination campaigns)

pollution sources.	• Coverage of monitoring (area of effective monitoring)
Spatial and temporal magnitude of $PM_{2.5}$/BC in each community is diagnosed and mitigation strategies are in place.	• Mitigation strategies implemented
Improvements in air quality conditions are achieved.	• Ambient monitoring information confirms improvement
Project results provide best practices for community-based air quality monitoring.	• Number of communities replicating similar campaigns. • Evaluation of usefulness of information (through survey)

**Additional performance measures will be determined in the monitoring plan of each community (subtask 2.1)*