Project: Improving Black Carbon Emissions Inventories Data for Small Scale Biomass Combustion

1. **Two-year budget: C$625,000**

2. **Short statement on the need identified (including current status), the project objective and the outcomes (achievable by June 2019) to address it**:
   Quantification of emissions is key to the development of emission reductions initiatives in support of air quality targets and climate change mitigation. Black carbon (soot) is an important air contaminant and climate pollutant, and emissions estimation methodologies are not consistent across North America, and other parts of the world. Biomass combustion is a significant source of black carbon, but is less well characterized than other sources. This project would design and implement a survey in North America to collect data on residential and other small-scale (non-utility) use of wood or other biomass, such as agricultural waste. This includes local-scale counts of appliances and profiles and quantities of wood/biomass burned) to support improved estimation of $PM_{2.5}$ (particulate matter) and black carbon emissions in North America. The objective of this project is to use the data gathered through this survey to refine inventory estimates of emissions from small-scale biomass combustion sources. These data would be incorporated into the development of future national emission inventories in the three countries, and used to inform policies that will lead to improved health and environmental outcomes.

3. **Explain how the project can achieve more impact by working trinationally, and why the CEC is the most effective vehicle to undertake this work:**
   This project addresses a key recommendation from the CEC 2015 report, *North American Black Carbon Emissions: Recommended Methods for Estimating Black Carbon Emissions*, to conduct research to improve data from residential and other small-scale wood/biomass combustion sources, including conducting surveys on use of these fuels, in place of current statistics. Working trinationally will allow experts from each country to lend perspectives, share information on existing work in this area, and contribute to the development of a more robust and adaptable survey instrument to gather data on a wide range of biomass-burning appliances and practices, than any actively in use in any single country.

4. **Describe how the project may capitalize on, or advance, the relationship between ecosystems, job creation, gender impacts, and income generation:**
   The survey could be designed to include questions related to social aspects of residential and other small-scale biomass use (e.g., farms, maple syrup production facilities, hospitals, cultural/ceremonial practices). For example, it may be useful to understand whether certain communities rely on gathered wood and whether this disproportionately affects women's health in those communities, as well as if it affects the economic growth of those communities. While these data would not have a direct impact on inventory development, the emissions information could be of use to inform policies addressing public health and economic development.

5. **Describe how the project complements or avoids duplication with other national or international work:** This work is complementary to ongoing efforts to improve inventories of $PM_{2.5}$ and black carbon. Existing tools used by the three countries

could be used as a starting point for the input variables needed to build a robust residential wood/biomass combustion inventory. Information from Canada's current efforts to enhance an existing household survey with additional questions on the use of biomass for residential heating will inform the survey design. The three North American countries will have the flexibility to adapt the survey questions to their own circumstances. In addition to residential biomass burning, the survey design could cover other small-scale sources of combustion, as appropriate in each country, such as agricultural, light commercial and institutional use. Large-scale biomass combustion by electric utilities would not be covered, given the readily available information on these sources in North America. The data gathered under this project will also inform the countries about areas where black carbon emission factor development for residential and other small-scale biomass combustion could be improved. This project is also consistent with a recommendation from the Arctic Council's Expert Group on Black Carbon and Methane to expand the detail available on residential wood combustion in Arctic State inventories (report not yet public).

6. **Describe opportunities for inclusion of traditional ecological knowledge (TEK), if applicable, and how these opportunities are incorporated into the project:**
   TEK and, specifically, knowledge of the types of biomass used in cultural practices in certain communities, may be pertinent to the design of a survey on residential and other small-scale combustion.

7. **Describe opportunities for youth engagement, if applicable, and how these opportunities are incorporated into the project**:
   In-person and telephone survey data collection activities for portions of the project will provide an opportunity to engage university students

8. **List significant involvement of other levels of government, Indigenous groups, local communities, experts, private sector, civil society, and others, as applicable:**
   In each country, state, local and indigenous communities will be involved in providing and reviewing survey information. This project is of particular pertinence to small communities (i.e., local/municipal level). However, it will also complement/support national efforts (e.g., Canada's survey currently being developed; US Environmental Protection Agency's (EPA's) Residential Wood Combustion Tool).

9. **Identify relevant committee members and their federal agencies in each country committed to developing this project, and implementing it, if approved:**

Canada:	David Backstrom, Mathilde Brodeur (ECCC)
Mexico:	Rafael Martínez Blanco, Diana Guzmán Torres, Ana Patricia Martínez, Daniel López Vicuña (Semarnat); Abraham Ortínez Álvarez, Iris Jiménez Castillo (INECC)
United States:	Rich Mason, Amanda Curry Brown (US Environmental Protection Agency Office of Air Quality Planning and Standards).

10. List the objectives and activities to be conducted to achieve measurable results:

Objectives	Main activities to achieve objectives	Measurable results
By June 2019, improve the accuracy of inventories of black carbon and $PM_{2.5}$ emissions relative to small-scale biomass fuel combustion	**Activity 1** Design trilateral survey on small-scale biomass combustion	Survey design is completed and ensures the collection of relevant local information on small-scale biomass combustion
	Activity 2 Implement survey	Number of geographic areas surveyed to be decided Number of surveys completed by geographic area to be decided
	Activity 3 Analyze survey results and incorporate into inventories	Inventory completed