Project 6: Improving Indoor Air Quality to Native Population and Other Indigenous C	Reduce Exposure to Airborne Contaminants in Alaska communities in North America	Operating Year(s): 2013–2014
Planned Budget for two years: \$250,000		
Year 1: \$150,000		
Year 2: \$100,000		
Strategic Priority/Objective: Healthy Comm	unities and Ecosystems	
Project Summary: Improved indoor air quali in Alaska Native populations and in other ind conditions through interventions that reduce	ty: a pilot project to reduce the need for respiratory medical genous communities in North America. The project address exposure to airborne contaminants in homes.	care in severely impacted children es acute and chronic respiratory
other environmental factors contribute to poor extreme weather events, flooding, forest fires outcomes. Alaska Natives experience a high is hospitalized annually with acute respiratory the highest ever documented. Bronchiectasis the developed world, is still common among indigenous communities elsewhere in North a communities.	r health outcomes in indigenous populations. Climate chang and the presence of and sensitivity to allergens that may co burden of acute and chronic respiratory disease. One in fou infections, and hospitalization rates of respiratory syncytial , a chronic lung sequela resulting from severe pneumonias Alaskan Natives of this region. Similar environmental conditi America. Climate change will increase susceptibility to respiratory	ie is expected to exacerbate ontribute to negative health r infants from one region of Alaska virus (RSV) in infants are among that has nearly disappeared from ons and health effects are found in ratory disease in these
The Alaska Native Tribal Health Consortium' public health services for over 220 Alaska Na funding, under the activities of the 2011–012 address the need for respiratory medical care created a successful model and methods for in 30 homes and has reduced fine particulate and <i>o-, m-, p-</i> xylene) volatile organic compoundeclines. Phase 2, under the 2013–2014 Ope used to make recommendations in future heat community. Additional homes will be added up	s (ANTHC) Division of Environmental Health Support provide tive Tribes and is the largest Tribally-managed health organ Operational Plan, the ANTHC conducted Phase 1 of a four- e among a very high-risk group of Alaska Native children. At improving air quality in homes of high-risk children in indige s by 21 percent, carbon dioxide by 26 percent, and BTEX (t inds by 68 percent. Respiratory events, clinic visits and hosp erational Plan, is an expansion of the study in order to gener althy homes projects in North America. Phase 2 will include f ipon the ANTHC's reception of additional grant funding to ex-	es comprehensive healthcare and hization in the US. With CEC year indoor air quality study to the end of this phase, ANTHC had nous communities. ANTHC worked benzene, toluene, ethyl benzene, bitalizations have seen dramatic rate a robust dataset that can be four homes in a selected spand this work.
Short-term Outcomes (at halfway point) Conduct basic assessments, remediation and	d resident education in four homes to reduce fine particulate	s, carbon dioxide, and BTEX
(benzene, toluene, ethyl benzene, and o-, m	, <i>p</i> -xylene) volatile organic compounds.	

Long-term Outcomes (by the end of the project)

By 2015, reduce by 30 percent the indoor airborne contaminants in four homes, including fine particulates and chemicals of wood smoke combustion that affect the health of the high risk group of affected children in indigenous communities in specific regions of Alaska. It is

expected that by 2015 the project will provide information that will allow replicating the project in appropriate communities in Canada and Mexico.

Longer-term, environmental outcome (post project)

Following the completion of the project, ANTHC will have data demonstrating the impact of home interventions and resident education on air quality and human health. Those data will be utilized to make policy recommendations and help guide decisions in future healthy homes projects in North America. For example, lessons learned from this study about the effects of improved ventilation and efficient heating devices on the indoor air quality will be shared. Indigenous communities facing cumulative impacts of climate change will benefit from the results of this project by knowing how to reduce and prevent harmful indoor air pollutant exposures.

Tasks necessary to reach the environmental outcome:

1) Establish and maintain partnerships through outreach to stakeholders; identify appropriate individuals and communities.

2) Plan, design, and conduct intervention.

3) Conduct evaluation, provide data analysis for report, and share information with subsequent cohorts, and stakeholders in Canada, Mexico and the United States.

Task 1) Establish and maintain partnerships through outreach to stakeholders; identify appropriate individuals and communities					
Subtask	Project outputs	How does the subtask/output move the project towards the environmental outcome	Timing	Budget (activities)	
1.1 – Pre-Intervention					
Establish and maintain partnerships with pulmonologists at the Alaska Native Medical Center and regional Tribal health corporations to identify individuals suffering from the most severe respiratory health issues. Continue partnerships with regional housing authorities to modify homes.	An understanding of communities where children are most severely impacted by respiratory health disease from indoor exposures Home modification expertise with existing local housing staff	Allows for focusing resources on creating healthy environments for the most at-risk individuals	September 2013–January 2014 July–October 2014	Year 1: \$20,500 (salary and fringe) Year 2: \$20,500 (salary and fringe)	

1.2 Contact communities to identify those who are both interested in the program and would likely benefit from the intervention. This may include communities with a high number of individuals living in homes with leaky woodstoves, poor or no ventilation, etc.	A list of communities in Alaska with a high potential to benefit from the intervention	Improves ability to create effective interventions to mitigate harmful environmental exposures	September– December 2013 August– December 2014	Year 1: \$10,000 (salary and fringe) Year 2: \$10,000 (salary and fringe)
1.3 Contact parents of children with documented respiratory illness to participate in the intervention	A list of children with a high potential to benefit from the intervention	Improves ability to minimize future medical care for children with documented respiratory illness	September– December 2013 August– December 2014	Year 1 : \$10,000 (salary and fringe) Year 2 : \$10,000 (salary and fringe)
Subtask	Project outputs	How does the subtask/output move the project towards the environmental outcome	Timing	Budget (activities)
2.1 Intervention Collect and analyze baseline data and use this to design the appropriate intervention strategy for each home. Ship materials and supplies to worksite. Homes will be assessed to identify likely sources of exposure. Air quality data will be collected on the following parameters:	An assessment tool for identifying potential environmental exposures within the home that can be shared with other environmental health practitioners Baseline data analysis (internal report)	Identifying key sources of exposure is essential for addressing these risk factors. This tool can also be disseminated for use in other communities. Baseline data will be used to design the intervention strategies	October 2013– March 2014 (pre- modification monitoring)	Year 1 : \$2,000 (air sampling) \$8,000 (travel)

-PM _{2.5} -Volatile Organic Compounds -Carbon Monoxide -Temperature, Relative Humidity, Carbon Dioxide		and be compares to post-intervention data to measure the impact of the intervention		
2.2 Implement the interventions. A combination of education, no-cost low cost and light home modifications will be used, with an emphasis on woodstove replacement and installation of ventilation systems in homes with little or no ventilation.	Implementation of interventions (e.g., woodstove change-outs, installation of ventilation systems, etc.)	Intervention will improve the environmental conditions in identified homes	October 2013– March 2014	Year 1 : \$24,500 (home remediation)
2.3 Collect intervention air quality and health data. Data will be collected on the same parameters as in the baseline phase for pre-post analysis.	Post-intervention data analysis (internal report)	Post-intervention data will be analyzed alongside baseline data to determine environmental and health impacts	October 2013– April 2014 October 2013– April 2015	Year 1: \$2,000 (air sampling) \$8,000 (travel) Year 2: \$2,000 (air sampling) \$8,000 (travel)
Task 3) Conduct evaluation, provide data analysis for report, and share information with subsequent cohorts, and stakeholders				
Subtask	Project outputs	How does the subtask/output move the project towards the environmental outcome	Timing	Budget (activities)
3.1 – Evaluation & Information Sharing Enter data; refine materials	Post-intervention data analysis (internal report)	Results will be used to improve ongoing	April-May 2014	Year 1 : \$10,000 (salary and fringe)

and approach as needed; begin composing report to share with partners		activities and leverage new/existing resources	April-May 2015	Year 2 : \$10,000 (salary and fringe)
3.2 Information about the project and its impact will be made available to environmental health practitioners, policymakers, and relevant stakeholders in Canada, Mexico, and the US. A demonstrated reduction in indoor air pollution and reduced need for respiratory care over the long term among this very high-risk group may facilitate broader interventions in North America.	A summary report describing the methodology and impact at the end of each year Materials and resources made available through distribution Meeting to share project results to partners from Mexico and Canada at the end of each year. A list of communities in Canada, Mexico and the United States with a high potential to benefit from the intervention (provided by partner countries)	Disseminating initial outcomes, lessons, and tools from this project may benefit other communities facing similar environmental health challenges and facilitate dialogue and collaboration	May-June 2014 May-June 2015	Year 1: \$25,000 (travel, meetings, publications) Year 2: \$25,000 (travel, meetings, publications)
3.3 CEC Secretariat project management, support, outreach, and stakeholder involvement	Coordination and communications with ANTHC, Parties and other stakeholders, as appropriate (meetings, project communications and outreach, etc.) Cross-program coordination with CEC project Improving Conditions for Green Building Construction in	Sharing of project results to support the implementation of similar projects across North America. Identify barriers to green building development in isolated communities.		Year 1 : \$30,000 (Travel, meetings) Year 2 : \$14,500 (Travel, meetings)

Ν	North America.		
S c b ii e is	Stakeholder participation in discussing the role of green building systems in mproving health and environmental conditions in solated communities.		

Explain how this project meets the selection criteria adopted by Council in the Strategic Plan (See below)

The goal of all projects funded by the CEC will be to support the efforts of the Parties to conserve, protect and/or enhance the North American environment. The following criteria will guide the Secretariat, Working Groups, Committees, and other appropriate officials of the Parties in considering cooperative activities for Council approval under operational plans. These selection criteria do not apply for activities to be funded through the NAPECA grant program.

• How does the project contribute to achieving Council's strategic objectives as described within the current Strategic Plan, or as related to other priorities subsequently confirmed by Council?

In tackling climate change, it is important that we do not abandon the progress made in addressing air quality. By continuing to establish rational comparability in the ways that we collect, analyze, report and disseminate data, we build the foundation for development of complementary climate change programs in North America. This project will work well in coordination with project 4, Improving Conditions for Green Building Construction in North America.

This project contributes to Council's achieving strategic objective by working directly with targeted Tribal and Native communities with demonstrated respiratory health needs that are directly related to environmental hazards through the use of a woodstove as a primary heating source in the households resulting in improved indoor air quality. The project addresses acute and chronic respiratory conditions through interventions to reduce exposure to airborne contaminants in homes.

• Are the proposed objectives North American in scope? In other words, how are the proposed results relevant to protecting the environment in North America? (For example, what would Council members announce to the press at the successful completion of this project?)

By identifying specific Tribal and First Nations and indigenous communities in each of the three countries in North America, we are seeking to address environmental health issues that may be different in each instance, but are often the result of similar circumstances related to poverty, substandard housing, unsafe indoor air, insufficient sanitation infrastructure or other environmentally related issues. All of these communities, no matter where they are located, can be greatly helped by interventions in their environmental conditions, elimination or reduction in harmful environmental exposures, and subsequent improved health outcomes. Lessons learned through this

project will be shared and the model developed through our pilot project in Alaska will serve as a guide for subsequent projects in Canada, Mexico, and other parts of the United States.

Furthermore, the Environmental Health Research Division of the First Nations and Inuit Health Branch, Health Canada is interested in the outcomes of this project as it is focused on the engagement of First Nations and Inuit stakeholders in the project. The project is focused on an issue of much relevance to northern communities in Canada. The approach proposed by the project will be informative in helping us to better scope out the future modalities of our work in undertaking indoor air quality research and/or intervention studies in collaboration with key indigenous stakeholders.

Finally, US federally-acknowledged Indian Tribes, including those proposed for this project, engage directly with the US government through a government to government relationship. As such, the results of this project will be brought forward trilaterally by the US at a meeting of appropriate national-level officials from the three countries, to ensure relevance in North America.

• What are the specific, clear and tangible results that will be achieved and how will progress toward each result be measured over time? Identify performance measures to be used to indicate success at reaching all outcomes and/or performance.

The project will include three evaluation methods: process evaluation, environmental impact evaluation, and human health and behavior change evaluation. Pre- and post-intervention air quality and health data will be collected and analyzed to determine the intervention effectiveness with each cohort. Baseline airborne contaminant data will be collected for PM_{2.5}, volatile organic compounds, carbon monoxide, temperature, relative humidity, and carbon dioxide. A visual assessment of the home environment will be conducted to identify likely sources of exposure, and a respiratory health questionnaire will be administered for all occupants less than 13 years old. The sampling strategy and 30 percent reduction target were informed by a similar project carried out on the Nez Perce Reservation in Idaho.

• Explain why the CEC is the most effective vehicle for the Parties to undertake the project, considering:

• The value-added of doing it under the CEC cooperative program

ANTHC has a history of collaboration with counterpart agencies, but has not had the resources and capacity to use these important relationships to its full potential. A CEC cooperative learning program would encourage international collaboration and support resource-sharing and cooperative learning.

• Any other public, private or social organizations that work on such activities

Partners may include the Alaska Office of Housing and Urban Development, the Bureau of Indian Affairs, the Northwest Pediatric Environmental Health Unit, the Canada Pediatric Environmental Health Specialty Unit at Misericordia Community Hospital in Edmonton, Alberta, Canada, the US Environmental Protection Agency (Region 10), Alaska Housing Finance Corporation, the USDA, the Denali

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Commission, multiple Health Homes workgroups, and others. The actual organizations in Canada and Mexico will be identified in the future.

• Opportunities to cooperate and/or leverage resources with such organizations

Residents of local communities in indigenous populations in all three countries can benefit from this project. Indoor air quality and respiratory health are concerns across North America with their indigenous populations, and much can be learned sharing methods of air monitoring and methods of implementing home-based intervention programs. Resources can be leveraged as all three countries communicate on how to create similar projects and the results of such interventions.

• Does the project propose a clear timeline for implementation of the activities, including a target end date for CEC's involvement? Where applicable, describe how the work will continue after CEC involvement ends.

The project was estimated to take place over four years, beginning back in 2011. See table above for when specific activities fall into this time frame; most activities will take place in an ongoing manner over the four years, as we continue to conduct the project interventions with four cohorts over the period to continually address acute and chronic respiratory conditions. ANTHC's existing and continued environmental and public health work in Alaska will help to sustain this project past CEC's involvement, which is expected to end in 2015. Cohorts in Canada and Mexico will be identified in subsequent years through the involvement of the appropriate Tribal, First Nations, state, provincial, and local government and stakeholders.

• Where applicable, identify with reasonable specificity:

• Linkages with other relevant CEC projects, past or present, in order to create synergies, capitalize on experience, or avoid duplication

This project could link with the North American Pediatric Environmental Health Specialty Unit Network. Recently, the council created a unit in Guadalajara, Mexico, a resource of environmental health professionals with pediatric and occupational expertise designed and equipped to provide information to communities and health care professionals on the prevention diagnosis, management, and treatment of illness in children related to environmental exposures and conditions. The Network has units in Canada, Mexico, and the United States (as well as in other countries).

This project will also link to the activities of the CEC's Improving Conditions for Green Building Construction in North America project under the 2013–2014 Operational Plan. We will seek the involvement of our housing authorities' partners in this project in a workshop to discuss: 1) the role of green building systems in improving health and environmental conditions in isolated communities, 2) identify needs and limiting factors in the implementation of green building developments in isolated communities, and 3) identify options to overcome the barriers identified.

• The target audience, as well as its receptivity and capacity to use the information that may be produced as a result of the project

The target audience for this proposal includes indigenous populations and Native Villages and public health, environmental health, and housing workers in rural Mexico, Alaska and Canada, which are to be identified in subsequent years through the participation of the appropriate Tribal, First Nations, state, provincial and local governments and stakeholders.

The work will begin by addressing dire environmental health challenges in Alaska Native Villages. ANTHC has a longstanding presence in Alaska Native Village, thus has developed trust with community members, which ensures likelihood of receptivity and success of the proposed activities. Many villages have already been organized and working to the address environmental health issues in their communities, thus will be positioned well to receive and use the resources available through this project. The existing capacity and expertise among ANTHC's community health aides will also support the roll-out of this work.

o The beneficiaries of capacity building activities that the project may include

The beneficiaries would include residents of local communities the housing workforce, school staff, regional health corporations, and other environmental and human health staff who seek to address health issues in indigenous populations in the three countries.

• The relevant stakeholders, with particular attention to communities, academia, NGOs and industry, and their involvement and contribution to a successful outcome

Relevant stakeholders and partners in this project include Alaska's 220+ Native Villages and their Tribal Councils and regional health corporations, Alaska Offices of Housing and Urban Development (HUD), the US Department of Agriculture (USDA), and the US Environmental Protection Agency (EPA), the Denali Commission, the Alaska Energy Authority, the North American Network of Pediatric Environmental Health Specialty Units, and the Alaska Housing Finance Corporation. Additional key stakeholders and potential partners in all three countries will be identified as appropriate. For Canada, key stakeholders include Canadian Territorial Governments and Inuit Tapiriit Kanatami (ITK).