



## **Innovation in Design and Construction of Low-Cost, Resilient, Energy-Efficient and Safe Housing for First Nation Communities**

This call for proposals is dedicated to the design and construction of low-cost, resilient, energy efficient, and safe housing for First Nations communities, an area of immediate and high priority for IC-IMPACTS.

### **Background**

IC-IMPACTS and the Assembly of First Nations (AFN) co-hosted a First Nations Focus Group in Ottawa on July 17, 2018, to determine parameters for a relevant call for proposals. Researchers from Canadian universities, members of the AFN and other First Nations communities, technical experts from northern and remote communities in Canada, representatives from the Networks of Centres of Excellence (NCE), and First Nations engaged in a full day of discussion over strategic housing needs of First Nations communities.

The focus group succeeded in producing the core ideas of this call for proposals. It also resulted in establishing a First Nations working group consisting of five members with significant and relevant construction experience in on-reserve communities.

Based on the core ideas developed in the Working Group, IC-IMPACTS drafted a call for proposals on First Nations housing. The First Nations Working Group reviewed the draft during its foundational meeting on August 1, 2018.

The group made the following recommendations, which have since been integrated into the call for proposals:

1. The call will focus exclusively on First Nations.
2. Applicants must secure the participation of a First Nations community (see section 2.2).
3. The call will focus on specific areas in First Nations housing (as listed in sections 1.1, 1.2, and 1.3).

4. The call will encourage prototyping using expertise especially among previous recipients of IC-IMPACTS funding in Canada and India (see section 1.4).
5. The First Nations Working Group will have a strong voice in the review process and the selection of proposals (see section 3.6).
6. Based on the above recommendations, IC-IMPACTS has launched the call for proposals, as detailed below.

## 1. A Call for Research Proposals on Smart and Resilient Homes by IC-IMPACTS

Current First Nations housing faces several challenges, such as poor construction and impacts from mould, fire, extreme weather, seismic activities, and other challenges that can be dealt with successfully by IC-IMPACTS innovative initiatives. It is estimated that there will be a backlog of 130,000 First Nations units and that 44 per cent of existing units will require major repairs and 18 per cent will require replacement in the next 10 years. It is further estimated that more than 40 per cent of homes on First Nations reserves need major repairs, compared with 7 per cent in non-aboriginal homes outside reserves in Canada.<sup>1</sup> (2011, November 28.) According to recent fire statistics, First Nations people in Canada are ten times more susceptible to die in house fires than the population at large.<sup>2</sup> (2015, December 21.)

To address these major infrastructure challenges, IC-IMPACTS is soliciting research proposals that focus on the development and evaluation of novel ideas, methodologies, materials, and strategies that can enhance the design and construction of low-cost, resilient, energy-efficient and safe housing for First Nations communities.

Outcomes of this call may lead to a model house or a retrofit of a public facility in an underserved/remote community in Canada. Using advanced design and construction, IC-IMPACTS research will produce a resilient, energy-efficient, low-cost, safe, and healthy housing innovations that will be resistant to mould and low-temperature conditions and will mitigate other risks, including fire and earthquake.

Proposals may fall under one or more of the following broad themes:

### 1.1. Buildings: Human Comfort and Health

- Building systems for enhanced thermal comfort
- Innovations in lighting and visual efficiency in buildings
- Psychophysics and complex interactions of thermal, acoustical and lighting systems with the building inhabitants
- Volatile organic compounds in air and relationship of the ventilation system

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<sup>1</sup> [www.cbc.ca/news/canada/first-nations-housing-in-dire-need-of-overhaul-1.981227](http://www.cbc.ca/news/canada/first-nations-housing-in-dire-need-of-overhaul-1.981227)

<sup>2</sup> [www.cbc.ca/news/indigenous/first-nations-10-times-more-likely-to-die-in-house-fires-1.3374631](http://www.cbc.ca/news/indigenous/first-nations-10-times-more-likely-to-die-in-house-fires-1.3374631)

- Human-generated aerosols, aerosol transport, ventilation design, the biology of infection, and building-use patterns
- 1.2. Climate Change and Adaptation
- Mould and its prevention
  - Fire performance
  - Soil-structure interaction and permafrost
  - Building resilience
  - Durable building materials
- 1.3. Energy and Water
- Net zero energy and carbon neutrality
  - The relation between building design and energy consumption
  - Advances in renewable energy for off-grid homes
  - Water harvesting, recycling and on-site treatment
  - Design for low water consumption
- 1.4. Prototyping of an existing successful innovation in a First Nations community
- If you have had a successful innovation in Canada or a region with similar climatic conditions, funds will be available towards its deployment in a First Nations Community in Canada. This part of the Call is especially addressed to previous recipients of IC-IMPACTS funding including research teams in India. Prototyping should encourage the use of model standards and codes without raising costs of construction associated with stringent inspection, regulation, and bylaws that can potentially escalate housing prices.

## 2. Implementing Agencies for This Call for Proposals

- 2.1 **IC-IMPACTS Centres of Excellence** is a not-for-profit organization, established by the Federal Government of Canada through the Networks of Centres of Excellence Program to serve as a pan-Canadian agency responsible for the delivery of research programs in the areas of safe and sustainable infrastructure, integrated water management, and public health, disease prevention, and treatment. It is the only Networks of Centres of Excellence (NCE) with a mandate focused on research collaborations between Canada and India.
- 2.2 **First Nation Strategic Partners:** In response to this Call, applicants will propose a First Nation partner in their application and outline their commitment and involvement in the project.
- 2.3 **Other Strategic Partners:** IC-IMPACTS may select additional strategic partners who may contribute additional financial and technical resources to participate in this Call for proposals.
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### 3.1 Timeline (TBC)

- Open the Call for proposals: **Monday, August 27, 2018**
  - Deadline to submit proposals: **Monday, October 22, 2018**
  - Proposals approved: **Thursday, January 31, 2019**
  - Project(s) launched no later than **Friday, March 15, 2019**
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### 3.2 Eligibility

#### Eligibility for research funding:

- All Canadian researchers eligible to receive funding from IC-IMPACTS and tri-council agencies in Canada are eligible to apply as Principal Investigators from Canada.
- Canadian researchers may apply with, or without, a Principal Investigator from India. (This area will be subject to a decision by the IC-IMPACTS Board of Directors/Executive Committee).

#### Eligibility for prototype funding:

Eligible Canadian researcher can apply jointly with Indian and other international researchers, including with the recipients of previous IC-IMPACTS funding in India and Canada, subject to the condition that the prototype installation will be located in a First Nations community in Canada. The installation may draw expertise from around the world, especially previous recipients of IC-IMPACTS funding.

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### 3.3 Intellectual Property

Participants funded by IC-IMPACTS shall agree upon the ownership, access rights and exploitation of the intellectual property generated throughout the duration of the research project. The agreements shall be made in writing. The guidelines of the funding organizations should be followed when making the

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agreements. At a minimum, a letter of intent between the collaborators should be included in the application stating the desire for cooperation and acknowledging that each participant has understood the general terms and conditions of the other project parties.

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### 3.4 Application Instructions

Please note following important application instructions:

- Research projects of one (1) or two (2) years in duration are eligible for funding.
  - Funding beyond the first year of the project will be contingent upon successful progress being made in the previous year as determined by the review processes in place for each funding organization.
  - Each project application must consist of a Canadian applicant (Principal Investigator)—and may include a Principal Investigator from India—who has developed a project proposal and project budget. The project proposal along with all supporting documentation required by each funding organization must be submitted online via IC-IMPACTS' submission portal. **All documents and forms required for a project application are accessible at the bottom of this web page.**
  - The online application will be sent to IC-IMPACTS with all documents submitted as part of the online application process.
  - The budget document must clearly delineate funding being requested from IC-IMPACTS. Cash and in-kind contributions from other collaborating partners, if any, must be clearly identified in the budget documentation.
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### 3.5 Evaluation Criteria

The research projects funded in this call are expected to be of a high international standard that will lead to a technology or solution directly impacting the lives of people in Canada.

All projects must be based on meaningful engagement, include a common project plan, and involve at least one researcher from Canada and preferably supported by a First Nation community or organization that may be willing to host a demonstration/installation if required. Student and HQP (Highly Qualified Professional) training is a mandatory component of all funded projects.

**Research proposals submitted to IC-IMPACTS for funding through this call will be evaluated against the following selection criteria:**

- Relevance to Canadian environmental and housing challenges, especially those faced by First Nation communities in underserved, remote areas;

- The potential for research outcome to be deployed in remote and low-resource settings in Canada;
  - Quality and originality of the research program;
  - Qualification and excellence of research team and proven record of successfully delivering prior research project objectives;
  - Expected results and outcomes, and appropriateness of budget strategy to achieve them;
  - **Applicants must secure the participation of a First Nations community;**
  - Potential for successful commercialization and community adoption of research outcomes;
  - One or more local partner organizations, which may include a corporate entity willing to participate and share project costs and benefits and that can potentially carry forward the research to application stage. The local partner may also be a hospital, public health agency, education, or not-for-profit institute that is willing to invest significant cash and in-kind support. Applicants should submit a Letter of Support(s) from the partner organization(s) with details of potential funding commitment;
  - Potential to scale up the application rapidly and deploy it to other communities;
  - Training of **Highly Qualified Professionals (HQP)** recruited by the applicant: The quality and diversity of HQP will be a key selection criterion in the assessment process. The following strategies will be weighted at a higher value:
    - Recruiting qualified First Nations HQP including qualified women HQPs - IC-IMPACTS is committed to increase gender equity and attract women HQP in engineering.
    - Recruiting HQP who qualify for funding from external sources. Such sources include the Canada Foundation for Innovation, which provides funding for equipment.
  - The inclusion of multidisciplinary aspects of the research program; and,
  - Engagement of partners from academic, industrial, government, community sectors (Note: it is not a requirement to have non-academic partners on the research project. However, multi-sector partnerships will be evaluated more favourably. All partners participating in a research project must demonstrate meaningful engagement and commitment to the project).
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### 3.6 Review Process for Evaluation of Applications

- All applications will be handled in the strictest of confidence.
- An Evaluation Committee comprised of representatives and independent external reviewers from Canada will thoroughly examine the proposals and reach consensus within the overall budget

framework about which projects should be funded. The First Nations Working Group formed by IC-IMPACTS will have a strong voice in the review process and will submit recommendations to the IC-IMPACTS Research Management Committee.

- The IC-IMPACTS Research Management Committee (RMC) will review all qualified applications submitted and seriously weigh in recommendations by the First Nations Working Group. All funding approvals are at the discretion the IC-IMPACTS Board of Directors and based on recommendations from RMC.
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### 3.7 Questions?

Please contact:

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### 3.8 Download Documents and Forms

To apply for this Call for Proposals, download and complete the following documents:

- Application Form
  - Budget Form
  - CVs of all Research Team Members
  - Letter(s) of Support from Community or Testing Site Partner(s)
  - IP Agreement/Letter of Intent between Collaborating Partners and Researchers
  - Canadian scientists must also include the following:
    - Conflict of Interest Form
    - Consent to Disclosure Form
    - Acknowledgment to Network Agreement Form
    - Investigator Environmental Impact Self-Assessment Form
    - Approval from their University's Office of Research Services
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**Once you have completed your application form, budget, and supporting documentation, please submit them here online.**



**IC-IMPACTS**  
Building Healthy Communities in  
Canada & India

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